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Sl. No.	Subject and Syllabus	Distribution of Marks

1. **Bangla**

Paper-I
Marks-100
(For both General and Technical /Professional Cadre)

(i). Grammar : 30 marks

(a) Correction of errors in composition of sentences.

(b) Fill in the blanks with appropriate word or group of words.

(c) Use of Idioms, Phrases and Proverbs.

(d) Transformation of sentences from one form to another, such as simple to compound, complex to compound, compound to complex.

(e) Making sentences with selected official Terminology.

(ii) Amplification of ideas : 20 marks

(iii) Substance/précis writing : 20 marks

(iv) Short answer questions on Bangla Language & Literature 30 marks

(Charyapada, Mangal Kavya, Romantic Kavya, Fort William College, Vidyasagar, Bankimchandra Chatterjee, Madhusadan, Mir Mossarraf Hossain, Rabindranath Tagore, Dinobondhu Mittra, Kazi Nazrul Islam, Jashim Uddin, Begum Rokeya, Farrukh Ahmed, Kaikobad, Modern and Contemporary poets, writers and playrights of Bangla literature)

Total = 100 marks

Bangla

Paper-II
Marks-100
(For General Cadre only)

(i) Essay (without hints) : 40 marks

(ii) Essay (with hints) : 40 marks

(iii) Letter writing (Official/Demi-official/Memorandum/ Business type) 20 marks

Total = 100 marks

2. **English**

Paper-I
Marks-100
(For both General and Technical/Professional Cadre)

(i) Translation from English into Bangla and from Bangla into English 20+20=40

(ii) Amplification of Ideas 20

Sl. No.	Subject and Syllabus		Distribution of Marks
(iii)	Substance/Précis writing	....	15
(iv)	Grammar(use of verb, preposition, voice, narration, correction of errors in composition, use of words having similar pronunciation but conveying different meaning, use of idioms and phrases).		25

Total = 100 marks

English
Paper-II
(For both General and Technical/Professional Cadre)

Marks-100

(i)	Essay(free composition i.e. without hints)	30
(ii)	Essay (guided composition i.e. with hints)	30
(iii)	Letter Writing(Official/Demi-Official/Memorandum, Business type)	20
(iv)	Objective reporting	20

Total = 100 marks

3. Bangladesh Affairs
Paper-I
Marks-100
(For both General and Professional/Technical Cadre)

This paper is designed to cover historical, geographical, environmental, social, cultural, political, economic and administrative affairs of Bangladesh. Attention may be given to the following topics:-

(i) Topographical and demographic features of Bangladesh;
(ii) Historical background of Bangladesh;
(iii) Bangladesh Liberation war;
(iv) Social, Economic and Political life in Bangladesh;
(v) Art and Literature of Bangladesh;
(vi) Resources and Conservation: Natural, Flora and Fauna, Mineral;
(vii) Management of Water and Energy resources;
(viii) Various Development Strategies and Policies of Bangladesh;
(ix) Role of Education in human resource development;
(x) GNP and Per capita income: Contribution of agriculture, industry, commerce and services to GNP.

Bangladesh Affairs
Paper-II
(For both General and Technical/Professional Cadre)
Marks-100

(i) The Constitution of Bangladesh;
(ii) Government of Bangladesh:
  a) Legislative
  b) Executive
  c) Judiciary
(iii) Foreign Policy, international relations and security strategy of Bangladesh;
(iv) Role of Political Parties in Bangladesh;

(v) Administrative set up –Central and local governments;
(vi) Civil-Military relations in Bangladesh;
(vii) Role of NGOs in Bangladesh;
(viii) Empowerment of women in Bangladesh;
(ix) Political and economic institutions and their accountability;
(x) Civil Society, democracy and state – building;
(xi) Reforms in Bangladesh – Administrative, Land and Education;
(xii) Role of IMF, ADB and World Bank in Bangladesh;
(xiii) Effect of free market and globalization in Bangladesh.

4. **International Affairs**

Marks-100

(For both General and Professional /Technical Cadre)

(i) International Affairs–Meaning, Scope and Significance. International Affairs and International Politics: Approaches to the study of International Affairs.
(ii) Nationalism, Imperialism, Colonialism and Neo-colonialism, Globalization and New World Order.
(iii) State–Kinds of state, Mode of acquiring state territory, River, Sea and Outer Space.
(iv) National Power–Meaning and Components.
(v) Balance of Power.
(vi) Diplomacy, Diplomatic Envoys, Functions and immunities of diplomatic envoys
(vii) Armament and Disarmament: Treaties relating to arms control
(viii) Economic instrument of national policy, Tariff, Cartels, Dumping, Quotas and licenses, Loan and grant, Inter-government agent. Barter Commodity Agreement. Pre-emptive buying, Exchange Control, Control of enemy assets.
(ix) The UNO–The General Assembly, The Security Council, The International Court of Justice-Criminal Court of Justice, The Economic and Social Council and the Development Agenda, Collective Security, Conflictual Issues and peace keeping, RIO Conference (Environment), Kyoto Protocol, Cairo Conference(population), Copenhagen Conference (Social issues) Beijing Conference (Women)
(x) NATO
(xi) Non-Aligned Movement.
(xii) Commonwealth.
(xiii) The international Politics of South East Asia, Latin America, Middle East and sub-Sahara Region.
(xiv) Foreign Policies of Bangladesh, India, China, North Korea, Iran, UK, USA, France, Germany, South Africa, Israel, Russia, Pakistan, Poland
(xv) Regionalism–Meaning and reasons for forming regional organizations, ASEAN, BIMSTEC, OPEC, OAS, APEC, SAARC, SAPTA, NAFTA, EU, OIC, African Union, GCC.
(xvi) Financial Institutions–G-8, G-77, LDC, Asian Development Bank, World Bank, WTO, European Union Bank, IMF, Islamic Development Bank

Sl. No. Subject and Syllabus Distribution of Marks

Mathematical Reasoning and Mental Ability

Marks-100

(For both General and Professional/Technical Cadre)

A. Mathematical Reasoning 50

The aim is to test the candidates ability to solve problems of elementary mathematics, involving methods and processes of arithmetic, algebra and geometry. The following outline is intended as a guide line :

(i) Arithmetic: Simplification. Averages. Greatest Common Divisor and Least Common Multiple. Unitary Method. Percentages: Simple Interest; Loss and Gain; Work and Time. Ratio and Proportion.

(ii) Algebra : Simplification. Formulas for Squares and Cubes and their Applications. Polynomials, Remainder Theorem. Factorisation of Quadratic and Cubic Polynomials. Simple Equations. Systems of Simultaneous Linear Equations in Two Unknowns. Graphs of Linear Equations.

(iii)

Geometry : Basic Theorems(including their consequences) on straight lines, angles, triangles, parallel lines, parallelograms and circles. The Theorem of Pythagorus. Area of triangle.

B. Mental Ability 50

The objective of mental ability test is to assess candidates' personal qualities and traits of character based on his academic attainment and life experiences.

The following broad areas are likely to be covered-

(i) Ability to understand language.

(ii) Decision making ability

(iii) Ability to measure spatial relationship and direction.

(iv) Problem solving ability.

(v) Perceptual ability etc.

Note : The answer sheet will be computer readable Form. The candidates are instructed to bring 2B/3B pencil, eraser and ball-point pen.

5. **General Science and Technology**

Marks-100

(For General Cadre only)

Part-A: General Science Marks-50

(i) Introduction: This is intended to test the candidates' basic knowledge and understanding about the application of science in our daily life.

(ii) Light: nature, Spectrum, Different colors and wavelengths, U.V., I,R, and LASER,

(iii) Sound: Hearing mechanism, Decibel, Frequency, Sound machines in home and around.-Tape recorder, Microphone, Loud speaker, Public address system. Electricity: Current, Cell, Battery, Generator, Light bulb, Voltage, Heater, Plug, Socket, Live wire and possible hazards.

Sl. No. Subject and Syllabus Distribution of Marks

(iv) Magnet : Polarity and relationship with current.

(v) Disease and Healthcare. Deficiency, Infection, Antiseptic, Antibiotics, Stroke, Heart attack and Hypertension, Vaccination.

(vi) Atmosphere: Biosphere and Hydrosphere — basic treatment, role of oxygen, carbon dioxide and nitrogen. Potable and Polluted water, Pasteurization.

(vii) Basic concept of Cancer, AIDS and Hepatitis.

Part-B: Technology ***Marks-50***

(i) Computer Technology: Organization of a modern personal computer and its major functional units, computer generations, central processing unit and microprocessor, computer memories and their characteristics, input output devices with characteristics and uses. Computer software, system software, operating systems, application software with examples of applications, office automation. Programming languages, their types and levels, steps for software development. Impacts of computer on society.

(ii) Information Technology: Data and information, information collection, processing and distribution, System analysis and information systems, expert systems. Basics of multimedia systems with examples hardware and software, concept of data compression, multimedia system development life cycle. Local area, metropolitan area and wide area computer networks. TCP/IP protocol suit, Internet, Internet services and protocols, Internet service providers and their responsibilities, intranet and extranet, World Wide Web and Web technology. Major components of telecommunication systems, mobile telephone systems, satellite communication systems and VSAT, importance of fiber optic communication system, Electronic commerce and technology for electronic commerce.

(iii) Electrical Technology: Electrical components, voltage, current, Ohm's law, Electrical power and energy, Electromagnet and magnetic field, electromagnetic induction, Generation of AC and DC voltages, thermal, hydraulic and nuclear power generators. Electric motors and their applications. Transformers, AC transmission and distribution, Electrical instruments, voltage stabilizers, IPS and UPS.

(iv) Electronics Technology: Electronic components, analog and digital signals, analog electronic devices, amplifiers and oscillators, working principle of DC supply, radio, television and radar. Digital devices and digital integrated circuits, impact of digital integrated circuits, counters and digital display devices, digital instruments.

Sl. No. Subject and Syllabus Distribution of Marks

7. Post(s) Related Subject(s) :
(For Professional/Technical cadre only)

Bangla

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cÖ_g cÎ

c~Y©gvb-100

(K) evsjv mvwn‡Z¨i cwiPq t cÖvPxb I ga¨hyM 50 b¤^i
Ph©vc`, eo–PÛx`vm, kvn& gyn¤§` mMxi, g~jKve¨, ^eòe c`vejx, AvivKvb ivRmfv, ^mq¨` myjZvb, K…wËevm, †`ŠjZ DwRi evnivg Lvb, gyKz›`ivg PµeZx©, Kvkxivg `vm, AvjvIj, Ave`yj nvwKg, fviZP›`ª ivq¸YvKi, kvn& gyn¤§` Mixeyjv, AviKvb ivRmfv †Kw›`ªK evsjv mvwnZ¨, gqgbwmsn MxwZKv|

(L) evsjv mvwn‡Z¨i cwiPq t AvaywbK hyM 50 b¤^i
Ck¦iP›`ª ¸ß, Ck¦iP›`ª we`¨vmvMi, gaym~`b `Ë, ew¼gP›`ª P‡Uªvcva¨vq, gxi †gvkviid †nv‡mb, Kvq‡Kvev`, iex›`ªbv_ VvKzi, cÖg_ †PŠayix, kirP›`ª P‡Uªvcva¨vq, bwRei ingvb mvwnZ¨iZœ, Rxebvb›` `vm, KvRx bRi“j Bmjvg, dii“L Avng`, Rmxg D`&`xb|

evsjv fvlv I mvwnZ¨

wØZxq cÎ

c~Y©gvb-100

(K) Kve¨ t gvB‡Kj gaymy`b `Ë, wenvix jvj PµeZx©, Kvq‡Kvev`, 20
iex›`ªbv_ VvKzi, KvRx bRyi“j Bmjvg, Rxebvb›` `vm, Rwmg DÏxb|

(L) M`¨ t Ck¦iP›`ª we`¨vmvMi, ew¼g P›`ª P‡Uªvcva¨vq, 20
kir P›`ª P‡Uªvcva¨vq, gxi †gvkviid †nv‡mb, cÖg_ †PŠayix|

(M) bvUKt `xbeÜz wgÎ, gxi †gvkviid †nv‡mb, iex›`ªbv_ VvKzi| 20

e¨vKiY t hy³v¶i MVb, YZ¡ I lZ¡ weavb, cÖwgZ evbv‡bi wbqg 4× 5= 20
(evsjv GKv‡Wgx cÖYxZ), evK¨ MVb, evsjv evK¨ MV‡b Bs‡iwR ixwZi cÖfve, evK¨ I evbv‡bi ï×vïw×, PjwZ ixwZi wbqgvejx, evsjv fvlvi kãm¤¢vi, kãMV‡bi ^ewkó¨, mgv_©K I wecixZv_©K kã, k‡ãi evbvb I D”PviY|

(O) Aby‡”Q` iPbv| 10

(P) mvay, PwjZ I AvÂwjK fvlvixwZ 10

Sl. No.	Subject and Syllabus	Distribution of Marks

English
Paper I
Marks : 100

(Shakespeare to Romantic Period)

(Candidates will have to answer five questions in all of twenty marks each- two from groups-A and three from group-B. In group-A, there will be one question from each text. In group-B, there will be one question from each author.)

Group A - Marks 50

Shakespeare : Hamlet, King Lear, Macbeth, Othello. The Tempest.

Group B - 50

Milton : Paradise Lost, Book IX and X
Swift : Gulliver's Travels
Wordsworth: " Tintern Abbey", " Ode: Intimations of Immortality"
Coleridge : " The Rime of the Ancient Mariner",
" Kubla Khan", " Dejection: an Ode"
Shelley : " Ode to the West Wind", " To a Skylark"
Keats : Odes
Jane Austen : Pride and Prejudice

English
Paper II
Marks : 100

(Victorian to Modern Period)

Group A - Marks 50

(There will be one question of 20 marks from each author. Candidates will have to answer two questions from this group.)

Tennyson : " Ulysses", " The Lotos Eaters",
" Tithonus", " In Memoriam" (selections)
Browning : " Andrea del Sarto" " Fra Lippo Lippi"
" My Last Duchess", " Rabbi Ben Ezra"
Mathew Arnold : " Dover Beach", " The Scholar Gipsy", " Thyrsis"
Dickens : Great Expectations
Hardy : Tess of the D'Urbarvilles

Group B - Marks 50

(There will be one question of 20 marks from each author. Candidates will have to answer three questions from this group.)

Yeats : Selections
T.S.Eliot : " The Love Song of J. Alfred Prufrock"
The Waste Land
D. H. Lawrence : Sons and Lovers
Conrad : Heart of Darkness
Arthur Miller : Death of a Salesman
Beckett : Waiting for Godot

Sl.. No. Subject and Syllabus Distribution of Marks

Arabic

Paper-I

Marks – 100

(Literature)

(Evaluation System & Distribution of Marks)

a) Translation 10 x 4 = 40
b) Explanation 5 x 4 = 20
c) Critical Questions on : 10 x 4 = 40

1. The Qur'an
2. The Hadith
3. Literary works of the following poets and prose writers
   a) Poets :
      Zuhayr bin Abi Sulma, Ka'b bin Zuhayr, Farazdaq, Abu Nuwas, Al-Mutanabbi, Amad Shawqi, Hafiz Ibrahim, Mahmud Sami al Barudi, Mikhail Nu'aima.
   b) Prose writers :
      Najib Mahfuz, Husain Haikal, Taha Husain, Abbas Mahmud al-Aqqad, Al-Manfaluti, Ahmad Amin, Tawfiq al-Hakim.
4. History of Arabic Literature :
   a) Qasida : origin and development
   b) The Seven Odds
   c) Al-Hamasa : Diwan
   d) Collection and preservation of al-Qur'an
   e) Compilation of al-Hadith with special reference to al-Sihah al-Sitta
   f) Development of Arabic Literature in Umayyad and Abbasid periods
   g) Development of Modern Arabic Literature

Arabic

Paper-II

Marks – 100

(Language)

(Evaluation System (Distribution of Marks)

1. Arabic Grammar 48

   a. Syntax (Nahw) 3 question x 8 = 24
   b. Morphology (Sarf) 3 question x 8 = 24

2. Composition 52

   a) Translation from Bengali/English to Arabic and vice versa 10
   b) Correction 6
   c) Précis writing 8
   d) Letter/Application writing 8
   e) Paragraph writing 8
   f) Essay writing 12

Sl. No.	Subject and Syllabus	Distribution of Marks

Persian

Paper-I

Marks : 100

(Text)

A :	Prose	
(1)	Gulistan, Chapter I By Saadi Shirazi	15
(2)	Azfa Book III By Dr. Yadollah Samarch	15
B :	Poetry	
(1)	Dewan-e-Hafiz Shirzi (First 10 Ghazals)	15
(2)	Rubayat-e-Omar khyyam (First 20 Rubaiyat)	15
C :	A Short History of Persian Literature in Iran (Gajnavi and seljuki period)	40

Total : 100

Persian

Paper-II

Marks : 100

Group : A

(1)	Grammar : Illustration of Idioms Phrases	20
(2)	Translation from Persian into Bengali or English	10
(3)	Translation from Bengali or English into Persian	10
(4)	An Essay in Persian	20

Group : B

A Short History of Persian Literature in Bangladesh (20th Century) 40

Total : 100

Urdu

Paper : I

Marks : 100

A:	Prose	
(1)	Intekhab-e-Mazameen-e-Sir Syed Ahmad khan (a) Ummid (b) Ta'assub	15
(2)	Prem Chand ke Numaindah Afsane : (a) Do-Bail (b) Kafan	15
B:	Poetry	
	(a) Shikwa by Dr. Allama Iqbal	15
	(b) Musaddas-e-Hali	15
C:	A Short History of Urdu Literature in the Sub-Cotinent : (1801 A.D. - 1947 A.d.)	40

Total : 100

Sl. No. Subject and Syllabus Distribution of Marks

Urdu

Paper : II

Marks : 100

A.	Grammar, Composition	60	
B.	A Short History of Urdu Literature in Bangladesh (20th Century)	40	

A: Distribution of Marks

(1)	Grammar: Illustration of Idioms Phrases	20	
(2)	Translation from Urdu into Bengali or English		10
(3)	Translation from Bengali or English into Urdu		10
(4)	An Essay in Urdu	20	

B: A Short History of Urdu Literature in Bangladesh
(20th Century) 40

Total : 100

ms¯‹…Z
cÖ_g cÎ
b¤^i-100

(ms¯‹…Z mvwn‡Z¨i BwZnvm, `vk©wbK Kve¨, Q›` I Abyev`)

welq t

(K)	ms¯‹…Z mvwn‡Z¨i BwZnvm	.....	50 b¤^i
(L)	`vk©wbK Kve¨(MxZv-m¤ú~Y©)	.....	20 b¤^i
	(M) we`y¨b¥vjv, wkLwiYx, gvwjbx, emš—wZjK, i‡_v×Zv, nwiYx, esk¯’wej, g›`vµvš—v, i“wPiv, fyR½cÖqvZ, Avh©v, kvwjbx, kv`©yj weµxwoZ	Q›`(B›`ªeRªv, D‡c›`ªeRªv, ...	10 b¤^i
	(N) ev Bs‡iRx)	Abyev` (ms¯‹…Z †_‡K evsjv	20 b¤^i

100 b¤^i

ms¯‹…Z
wØZxq cÎ
b¤^i-100

(bvUK, c`¨Kve¨, e¨vKiY I Abyev`)

1| bvUK t

(K)	AwfÁvbkKzš—jg&	.....	15 b¤^i
(L)	¯^cœevme`Ëg&	.....	15 b¤^i

2| c`¨ t

(K)	‡gN`~Zg&(m¤ú~Y©)	.....	20 b¤^i
(L)	wKivZvRy©bxqg&(1g mM©)	.....	10 b¤^i

3| e¨vKiY t

mwÜ, KviK I wefw³, mgvm, Ae¨q, ¯¿xcÖZ¨q, AvZg‡bc` I ci‰¯§c`weavb, K…r I Zw×Z cÖZ¨q, YZ¡ I lZ¡ weavb ..... 20 b¤^i

4| Abyev` t ..... 20 b¤^i

(evsjv ev Bs‡iRx †_‡K ms¯‹…Z fvlvq Abyev`)

Sl. No. Subject and Syllabus Distribution of Marks

PALI

Paper-I

Marks : 100

(Texts and History of Pali Literature)

A. Pali Prose 30

Selected Topics :

1. Majjhima Nikays : Anigulimata sutta, Dhammacetiya Sutta and Rahulavada sutta.
2. Milinda Panha : Bahirakatha, Sila, Saddha, Viriya, Samadhi, Pauna and Nibbana.
3. Atthakatha : Udena and Vasuladatta, Marriage of Visakha and Porana-Vajjidhamma.

B. Pali Poetry 30

Selected Topics :

1. Samyutta Nikaya : Kutika, Kasi, Jata, Acchara, Sela and Alavaka.
2. Dhammapada : Yamaka, Appamada, Citta, Puppha, Danda, Magga, Bhikkhu and Brahmans.
3. Thera-Therigatha : Mahakaccayana, Vangisa, Silava, Punnika, Ambapali and Isidasi.

C. History of Pali Literature 40

1. Origin and Development of Pali Canonical literature.
2. Non-canonical literature.

(Candidate will be expected to have knowledge of Pali literature along with principal author).

PALI

Paper-II

Marks : 100

(Pali Prosody, Rhetoric, Grammar and Comparative Philology)

A. Pali Prosody and Rhetoric : 30

) Vuttodaya

i) Subodhalanikara

B. Pali Grammar : 30

Sandi, Declension, Conjugation, Compound, Case-edning, Upasagga and Nipata, Participles, Infinitive, Gerund, Causative, Denominative, Intensive, Desiderative and Denominative Verb.

C. Translation from Bengali or English into Pali (Simple Sentence only) 10

D. Comparative Philology : 30

Principles, Family of Languages, Relation between Pali and Inscriptional Prakrits, Sounds, Phonetics and Inflictions.

Sl. No.	Subject and Syllabus	Distribution of Marks

Psychology
Paper-I
Marks : 100
(General and Developmental Psychology)

A—General Psychology 50

1. Definition and subject matter of Psychology; Fields of Psychology; Research Methods: Observation, Survey, Experimental method, Case study.
2. Psychological basis of Behavior : Structure and functions of Central and Peripheral nervous system; Endocrine glands and their effects on behavior.
3. Sensation and Perception : Definition Sensation and Perception; Visual and auditory senses. Thresholds and their measurement. Perceptual organization. Depth perception. Illusion and hallucinations.
4. Motivation and Emotion : Definition of Motivation and Emotion; Physiological and Social motives; Theories of motivation. Development of Emotions; Bodily charges in emotion; Theories of Emotion.
5. Learning and Memory : Definition of learning. Factors of learning. Classical Conditioning and Operant conditioning; Observational learning, Perceptual learning. The process of memory; Sensory memory, Short-term memory and Long term memory; Forgetting and its causes.
6. Cognition and Intelligence : Definition of thinking, Concept formation, Problem solving; Creative thinking. Cognitive development; Definition of intelligence; Measurement of intelligence-Standford-Binet and Wachslet's- intelligence scales.
7. Personality : Definition of personality. Development of personality-psychoanalytic and Behavioral approaches. Assessment of personality.

B—Developmental Psychology 50

8. Development Psychology : Definition of Developmental Psychology. Division of the life cycle. Principles of development. Methods used in studying development.
9. Beginning of Life : Conception, Prenatal development; Stages of and factors affecting prenatal development.
10. The Birth : Birth process. Types of birth and its effect on development.
11. The Neonate : Physiological functioning. Reflex actions.
12. Infancy : Physical, language, social and emotional development.
13. Childhood : Physical, language, social and emotional development.
14. Adolescence : Physical changes. Causes and psychological effects of physical changes. Problems of adolescence : Juvenile delinquency. Drug addiction. Suicide.

Sl. No. Subject and Syllabus Distribution of Marks

Psychology
Paper-II
Marks : 100
(General and Developmental Psychology)

A. Social Psychology

50

1.	Social Psychology	:	Definition and subject matter of Social Psychology and its relation to other Social Sciences. Methods used in studying social behaviour.
2.	Socialization	:	Its processes and products; Agents of socialization : Family, schools and neighburs. Cultural influences on bahaviour.
3.	Attitudes	:	Definition of attitude; components of attitude; Opinions and values. Formation of attitudes; Attitude change : Cognitive theories;
4.	Groups	:	Types of group. Group cohesiveness.
5.	Leadership	:	Definition of leadership; Approaches to the study of leadership : Trait approach, type approach and situational approach. Functions of leader; Characteristics of leader; Effective leadership.
6.	Mass Communication and collective behaviour	:	Public opinion-formation and assessment of public opinion. Propaganda-Techniques and principle of propaganda. Rumour and Prejudice.
7.	Abnormal Psychology	:	The concept of normality and abnormality in behaviour. Relation of Abnormal Psychology with Clinical psychology, Psychiatry and Mental health.
8.	Causes of abnormal behaviour	:	Biological, psychological and socio-cultural causal factors of abnormal behaviour.
9.	Anxiety-based disorder	:	Generalized anxiety disorder. Phobias. Obsessive-Compulsive disorder.
10.	Somatoform and Dissociative disorder	:	Conversion disorder. Hypochondriasis.
11.	Schizophrenia	:	Types and causal factors of schizophrenia.
12.	Treatment of behaviour disorder	:	Psychoanalytic therapy. Client-centered therapy and Behaviour therapy.

Sl. No.	Subject and Syllabus	Distribution of Marks

History

Paper-I

Marks-100

History of Bangladesh

(From earliest times to 1971 A.D)

Group-I: Ancient

a. Maurya and Gupta rule in Bengal

b. Sasanka

c. Pala rule in Bengal: rise of the Palas; Dharmapala; Devapala; Mahipala I; Samantra Rebellion during the reign of Mahipala II; Ramapala; glories of Palas

d. Dynasties of South-Eastern Bengal: the Devas; the Chandras; the Varmans

e. Sena rule in Bengal: Vijayasena; Vallalasena; Laksmanasena; glories of the Senas.

Group-II: Medieval

a. Coming of the Muslims: Bakhtiyar Khalji: Ghitasuddin Iwaz Khalji

b. Cricumstaces leading to the independence of Bengal

c. Independent Sultannate: Shamsuddin IIiyas Shah; Ghiyasuddin Azam shah; Alauddin Hussain Shah; Glories of the Hussain Shahi Period.

d. Foreigh Accounts on Bengal: Ibn Barutah; Mahuan

e. Prtuguese in Bengal

f. Mughal occupation of Bengal and the Bara Bhuiyas;

g. Mughal Subahdars:Shaista khan; Mir Jumla; Murshid Quli Khan

h. Bengal under the Nawabs: Alivardi Khan; Sirajuddaula

Group-III: Modern

a. Coming of the English: Battle of Plassey; Battle of Buxar; Crant of Diwani to the East India Company

b. The Permanent Settlement

c. Early Resistance Movements against the British: Fakir-Sannyasi movement; Titumir

d. Reform Movements: the Faraizi Movement; Rammohan Ray

e. Partition of Bengal, 1905; Swadeshi and Non-Cooperation Movement

f. Bengal Politics, 1937-1946; Lahore Resolution; Partition of 1947

g. 1952 Language Movement and the Election of 1956

h. Disparity between the two wings of Pakistan

i. The demand for autonomy of East Pakistan; Six-Point Programme

j. Eleven Point Movement of 1969

k. Election of 1970 and its aftermath

l. The War of Liberation and the emergence of Bangladesh

(Candidate shall have the option of choosing five questions from the three groups taking at least one form each group)

Sl. No.	Subject and Syllabus	Distribution of Marks

History

Paper-II

Marks-100

(This Paper has been divided into two parts, viz., part A and part B.
Candidates shall have the option of choosing either part A or Part B)

History of the Indian Subcontinent, 1206-1947

(Select topics)

Group-I: Sultanate Period

a. Coming of the Muslims: invasion of Sindh; invasion of Sultan Mahmud of Ghazni; Ghoride invasion

b. Sultans: Iltutmish; Ghiyasuddin Balban; Alauddin Khalji; Muhammad bin Tughlaq

Group-II: Mughal period

a. Battle of Panipath and the foundation of Mughal rule; Badur

b. Humayun's struggle with Sher Shah; Sher Shah's Reforms

c. Akbar: conquests, Revenue reforms , Rajput Policy, Religious policy: Mansabdari System

d. Art and Architecture under Shahjahan; War of Succession

e. Aurangzeb: Deccan Plicy; Decline of Mughal Rule

Group-III: British period

a. Battle of Plassey; Battle of Buxar and the grant of the Diwani

b. Consolidation of British rule: Warren Hastings; Cornwallis

c. Expansion of British Rule: Wellesley; Dalhousi

d. Social & Administrative Reforms: Ripon; Bentinck

e. War of 1857

f. Growth of Nationalism: Indian National Congress and the Muslim League; Partition of Bengal of 1905 and its aftermath; Swadeshi and Khilafat Movements; Act 1935; Lahore Resolution, 1940.

g. Partition of 1947

(Candidates shall have the option of choosing five questions from the three Groups taking at least one from each group)

Part -B

History of Europe, 1453 1945

(Select Topics)

Group-I

Geographical Discoveries; Impact on the subsequent course of history

Martin Luther and Protestant Reformation

Counter Reformation

Benevolent Despots: Frederick; Peter; Catherine II; Joseph II

Absolute Monarchy: Louis XIV of France

Group-II

a. French Revolution: background and cause; role of the philosophers
b. Napoleon: rise and conquests; reforms; fall of Napoleon
c. congress of Vienna and Metternich
d. French Revolutions of 1830 and 1848

Sl. No.	Subject and Syllabus	Distribution of Marks
e.	Unification of Germany	
f.	Unification of Italy	
g.	The Eastern Question; the Crimean War; the Berlin Congress	
h.	World War I: background and causes; results; Versailles Treaty	
i.	Rise of Socialism in Europe: the Bolshevik Revolution	
j.	Rise of Hitler in Germany and Mussolini in Italy	
k.	World War II: Background and cause; the Allied and Axis Powers; American involvement	
l.	Yalta Conference; Potsdam Declaration	
m.	The establishment of the UNO	

(Candidates shall have the option of choosing five questions from the two Groups taking at best one from each group)

Islamic History & Culture

Paper-I

Marks-100

(a) Pre-Islamic Arabia

The Ayyam Al-Arab; The Social, Political, Economic and Religious Aspects of the Arabs' Life; Trade and Trade Routes; Geophysical Environs.

(b) The Prophet Muhammad(Sm) 632 A.C.

Important events of the Makkah life of the Prophet with reference to the backdrop of his receiving the prophetic call in the cave of Hira, to the oath of al-Aqabah and the hijrat or migration from Makkah to Madinah; the Madinite life with special emphasis on the Sanad or the Charter of Madinah and the foundation of state, the war policy, the Treaty of Hudaibiyah, the conquest of Makkah, the farewell pilgrimage sermon and the multidimensional reforms.

(c) The Khulafa Rashidun (the pious caliphs) 632-661 A.C.

Hazrat Abu Bakr-his election and services for the cause of Islam and the nascent state of Madinah; Hazrat Umar-the territorial expansion of the caliphate and the administrative policy; Hazrat Uthman-charges and civil disturbances; Hazart Ali- civil war, forces of disintegration and the end of the pious caliphate; the salient features of administration under the pious caliphs.

(d) The Umayyad dynasty 661-750 A.C.

The Umayyads : the Khilafat under Mu'awiyah; Abdul Malik and his consolidation and arabicization; Khilafat of al-Walid-expansion in the East and the West; the services of Hajjaj B. Yusuf; later Umayyad Khalifas with special reference to Umar b. Abdul Aziz; the Mawali and their role in the Abbasid Revolution; causes for the fall of the Umayyad Khilafat; outline of the administration under the Umayyads.

(e) The Abbasid dynasty 750-1258 A.C.

Factors leading to the foundation of the Abbasid dynasty; Al-Mansur-his policy of the consolidation and administration; al_Mahdi-the important events of his reign; Harun al-Rashid-his character and achievements; al-Amin and al-Mamun-civil war between the two brothers and its aftermath; the reign of al-Mutawakil and the forces of disintegration; the rise and fall of the Barmakides; early Abbasid caliphs' Byzantine policy; Turkish and Persian's ascendancy in the court and its results; the development of learning and culture under Harun al-Rashid and al-Mamun; the rise of the Buwaihids and Saljuqs with reference to their impacts on the Abbasid caliphate; causes for the decay and downfall of the Abbasid dynasty; sack of Baghdad by Halaku Khan in 1258 A.C. and its farreaching effects; social and intellectual life under the Abbasids.

Sl. No.	Subject and Syllabus	Distribution of Marks

(f) Religious beliefs and practices

Five pillars of Islam; al-Quran, al Hadith; the sources of Muslim law; four Sunni schools of law; the Shites; the Murjites; the Kharijites; the Mutazilites, the Asharites.

Islamic History and Culture

Paper-II

Marks-100

a. Review of the sources for the study of the subject.

b. Pre-Muslim background of the land and people of India.

c. The Arab conquest of Sind-its effects; Sultan Mahmud's invasion of India and the later Ghaznavids; India on the eve of Muhammad Ghori's invasion; the battles of Tarain and the foundation of Muslim rule in India.

d. Qutubuddin Aibak-the Mamluk dynasty-its consolidation by Iltutmish; the successors of Iltutmish; Ghiyasuddin Balban and his policy of consolidation with special reference to the theory of kingship; the beginning of Mongol invasion.

e. The Khaljis : the foundation of the dynasty; Alauddin Khalji's conquests and price control system.

f. The Tughlags : Muhammad b. Tughlag's ambitious projects and their results; Firuz Shah Tughlaq's reforms and army organization.

Sayyids and Lodis : the forces of disintegration; the causes of the fall of Sultanate and the rise of the Mughals; Sher Shah Sur and his agrarian policy.

Society, learning, culture, history-writing and administration under the Sultanate of Delhi.

g. The foundation of Mughal Empire and its corresponding power, Zhairuddin Muhammad Babur-his struggle for power and the foundation of Mughal dynasty in India-character and achievements; Nasiruddin Humayun-his struggle with Sher Shah, exile and restoration of power; Jalauddin Muhammad Akbar-his rapprochement with the Rajputs, The religious policy and the promulgation of Din-i-Elahi Nuruddin Jahangir-his state policy, patronization of art and painting, the influence of Nurjahan in the court; Shihabuddin Shah Jahan-his administration and architectural development-war of succession among his sons; Muhiuddin Alamgir Aurangzib-his expansion of the empire-struggle with the Marahtas and Deccan policy-his revivalist and religious policy; the weak successors of the dynasty and the forces of disintegration; the causes for the decay and downfall of the dynasty; society, learning, culture and administration in Muhgal India.

h. Advent of the Europeans and struggle for power

English East India Company's ascendancy, the battles of Plassey and Buxar, the Grant of Diwani to the East India Company, Emperor Bahadur Shah Zafar and the Indian war of Independence, 1857; Banishment of Bahadur Shah and the end of the Mughal rule theoretically and practically.

Sl. No.	Subject and Syllabus	Distribution of Marks

Islamic Studies

Paper-I

Marks 100

Part - I 50

Qur'anic Studies and Studies of Hadith :

(a) Qur'anic Studies, Textual Study of Surahs : al-Fath, al-Hujurat and an-Nur
- (i) Translation 15
- (ii) Critical questions 10

(b) Studies of Hadith : Kitab al-Iman (upto Bab al-Kabair), Kitab al-Ilm (pp.32/38) and Kitab al-Adab (upto Bab al-Istizan):
- (i) Translation 15
- (ii) Critical questions 10

Part -II 50

Al-Sirat al-Nabawiyyah and Islamic personal law :

Al-Sirat al-Nabawiyyah : 40

(a) The life of the Prophet (S.) before Hijrah;
- (i) Pre-Islamic Arabia : Its social, Political, economic, moral and religious conditions.
- (ii) The Prophet (S.) : His life before Hijrah;
- (iii) Pre-Nabuwat period;
- (iv) Post-Nabuwat Period.

(b) The life of the Prophet (S.) after Hijrah;
- (i) Causes of Hijrah, Muwakhat (Islamic brotherhood),
- (ii) Charter of Madina, the first Magna carta of the world.
- (iii) Conflict with the Quraysh and its consequence : The battles of Badr, Uhud and Ahzab etc.
- (iv) The Prophet (S.) as peace maker and the Treaty of Hudaybia Preaching of Islam to the kings and emperors of the world.
- (v) Conquest of Makka and its effects on the spread of Islam.
- (vi) The Farewell pilgrimage (Hijjatul wida)

Part - III : Islamic personal law 10

Islamic personal law as regards marriage, dissolution of marriage and succession and inheritance.

Sl. No. Subject and Syllabus Distribution of Marks

Islamic Studies

Paper-II

Marks : 100

Part - I 50

(a) Social System of Islam

(i) Dignity of man, Position of women, duties to parents, children, neighbours, relatives and their rights.

(ii) Concept of family welfare in the light of the Holy Quran and the Sunnah, Marriage and polygamy in Islam. The relationship between husband and wife.

(iii) Islam and Family planning in the twentieth century, concept of 'Azl' in the Hadith.

(b) Economic System of Islam :

(i) Tax structure in Islam : Zakat, Kharaj (Land Tax,) Ushur, Sadaqat, Baitul Mal etc.

(ii) Consumption and consumer, Factors of production and the concept of ownership, Distribution of Income and wealth etc.

(iii) Islamic Insurance (Takaful)

(c) Political System of Islam :

Topics to be discussed include : Millat, Khilafat, Amr bil ma' ruf wa nahy an al-Munkar, Islamic Government and individuals, Islamic legislation,Majlis-i-Shura, Sovereignty, Democracy, internal policy and foreign policy of the Islamic State.

Part - II 50

(a) Muslim Contribution to Science and Technology :

Muslim Contribution to various Science, such as Mathematics, Medicine, Geography, Chemistry, Astronomy, Physics, Architecture and Surgery with special reference to al-khawarizimi, Ibn Sina, Yaqub Ibn Abdullah, Jabir bin Hayyan, Al-Biruni, Al-kindi, Al-Razi etc.

(b) Human Rights in Islam :

Conception of human rights in Islam : Civil, political, Social economic and cultural rights; Islam and slavery, Human rights during war; Rights of religious minorities and women; Study of human rights in Islam with special reference to the Universal Declaration of U.N.O.

(c) Study of Religions :

History Main tenets and comparative study of Islam, Hinduism, Buddhism, Judaism and Christianity.

Tafseer

Paper-1

Marks-100

(a) Al-Qur'an 30

Translation, Explanation, Collection, Preservation.

(b) Al-Hadith 30

Translation, Explanation, Compilation, Preservation, Preaching.

(c) Prose literature 40

Pre-Islamic period, Period of Holy Prophet and pious Caliphs, Umayyad and Abbasid period, Fatimid in Egypt and Umaayyad in Spain.

Sl. No.	Subject and Syllabus	Distribution of Marks

Tafseer

Paper-1I

Marks-100

(a)	Development of Arabic poetry-Pre-Islamic and post Islamic ages.	20
(b)	Modern Arabic literature Prose and Poetry.	15
(c)	Outlines of the history of Arabic literature.	10
(d)	Development of literary criticism of Arabic.	10
(e)	Grammar and Composition.	25
(f)	Translation into Arabic and into Bengali/English.	20

Hadith

Paper-I

Marks-100

a)	Al-Qur'an Translation, Explanation, Collection, Preservation.	30
(b)	Al-Hadith Translation, Explanation, Compilation, Preservation, Preaching.	30
(c)	Prose literature Pre-Islamic period, Period of Holy Prophet and pious Caliphs. Umayyad and Abbasid period, Fatimid in Egypt and Umaayyad in Spain.	40

Hadith

Paper-II

Marks-100

(a)	Development of Arabic poetry-Pre-Islamic and post Islamic ages	20
(b)	Modern Arabic literature Prose and Poetry.	15
(c)	Outlines of the history of Arabic literature.	10
(d)	Development of literary criticism of Arabic	10
(e)	Grammar and Composition.	25
(f)	Translation into Arabic and into Bengali/English.	20

Philosophy

Paper-I

100 Marks

Introduction:

The nature, scope, methods and aims of Philosophy. Is Philosophy Useful in Life? Relation of Philosophy to Religion, Science and Commonsense.

Logic and Epistemology :

Logic as a normative science. The nature of Deductive and inductive arguments.

What is knowledge? Theories of sources of Knowledge: Rationalism, Empiricism, Criticism (Kant) and Intuitionism. Realism and Idealism.

Theories of Reality :

Materialism and Idealism. Monism, Dualism and Pluralism.

Theories of Evolution:

Creation and Evolution. Types of Evolution: Mechanical, Teleological, Emergent, and Creative Evolutions.

Freedom of the Will :

Cause. Determinism and Freedom.

Philosophy of Mind:

Mind as a spiritual substance . The empirical concept of the self. Theories of mind-body relationship.

Immortality of the Soul:

Its meanings and implications. Classical proofs for immortality. Kant's ethical proof.

Value:

Fact and Value, Intrinsic and Extrinsic Values. Three cardinal values: Truth, Beauty and Goodness. Subjectivity and objectivity of values.

Truth:

What is truth ? Three main theories of truth: Correspondence, Coherence and Pragmatic theories.

Philosophy of Religion :

What is meant by God? Three concepts about God: Pantheism, Deism and Theism, Proofs for God's Existence. God and the Problem of evil.

Major Trends in Contemporary Western Philosophy:

Existentialism, Logical Positivism, Pragmatism, Neo-Idealism, Neo-Realism, Intuitionism and Analytical Philosophy.

Philosophy

Paper-II

100 Marks

Modern Philosophic Trends in Bangladesh :

Materialism, Idealism, Humanism and Mysticism.

Philosophic Approach to Certain Problems of Practical Life:

Suicide, Abortion, Environmental Pollution, Terrorism, Hoarding, Corruption in Profession, and Dealings with Lower Animals.

Moral Standard : Evolution of moral standard.

The nature of moral standard. Theories of moral standard: Hedonism, Perfectionism and Law(Categorical Imperative).

Right and Duty :

Mutual involvement of right and duty. Duties towards one's fellow-human beings.

Moral Pathology:

Wrong-doing and punishment. Main theories of punishment: The Retributive Theory, the Deterrent Theory and the Reformative Theory.

Individual and Society:

Egoism, Universalism and Altruism. Justice and Beneficence.

Muslim Philosophy :

Four great medieval Muslim philosophers: Al-Farabi, IbnSina, al-ghazali and Ibn Rushd. Modern Muslim Philosophers: Shah Waliullah Dehlawi and Muhammad Iqbal.

Indian Philosophy :

Buddhism, Sakhya, Naya and Vedanta schools. Swami Vivekananda and Aurobindo Ghosh.

GEOGRAPHY

Paper-I

Marks –100

A. Physical Geography
   - Definition, history and development
   - Nature and scope of geomorphology
   - Recent trends in physical geography

B. The Earth as a Planet
   - Origin of the earth
   - Shape and Size
   - Rotation and Revolution
   - Perihelion and Aphelion
   - Earth’s orbit : Solstice and Equinox
   - Internal Structure of the Earth
   - World time zones

Geological Time Scale

C. The Lithosphere

Composition of the earth crust: Minerals and rocks
Diastrophism and Volcanism
Denudation and Weathering
Agents of earth sculpture: Landforms produced by the work of rivers, glaciers, wind, oceanic waves and ground water
Pre-Davision geomorphology
Davisian cycle of Erosion

D. Theories on the Various Tectonic Aspects of the Earth's Surface Processes

- Plate Tectonic Theory
- Wegner's Continental Drift Theory
- Theories of Isostasy and Gravity Tectonics

E. The Atmosphere

- Composition of the atmosphere
- Elements of climate:

- Insulation and temperature, horizontal and vertical distribution of temperature;
- Air pressure and pressure belts;
- Winds and planetary wind system;
- Humidity, types of rainfall;
  - Airmass; cyclones and anticyclones; Thunderstorms;
  - Major climatic types.

F. The Hydrosphere

- Hydrological cycle
- Oceans and their locations
- Profile of the ocean floor
- Major ocean currents
- Marine resources and deposition

G. The Biosphere

Definition of Ecology and Ecosystem
Soil Profile
Factors of soil formation
Major soil types of the world
Geographical Distributions of Plants
Biodiversity and conservation
Flora and Fauna of Bangladesh

GEOGRAPHY

Paper-II
Marks-100

(Human Geography and Geography of Bangladesh)

Part – I Human Geography 80

A. Human Geography

Definition scope and methodology
Branches of human
Current approaches to human geography
Man environment interaction

B. Population
Definition and concept of population geography
Global distribution and density
Population dynamics (fertility, mortality and migration)
Population growth theories
Population Projection
Life table
Population Policy

C. Settlements
Definition, scope and approaches of settlement geography
Types and patterns of settlements
Rural and urban settlements

D. Economic Activities
Primary activities:
- Agriculture (major crop types, agricultural systems, livestock);
- Fisheries
- Forestry (distribution and principal use/products)
- Mining (industrial minerals and energy resources)

Secondary activities:
- Vocational factors of industry
- Global distribution of iron-steel and textile industries

Tertiary activities:
- Internal and international trade
- Transportation: land, water, air
- Service industries: commerce and finance

E. Urban geography
Definition, scope, methodology of urban geography
Urbanization concepts
Internal structure of the city
Hierarchy of urban areas (Christaller's theory and Growth Pole concept)
Transportation system

Part – II Geography of Bangladesh 20

A. Natural Environment
Geographical location and boundary
Geology : Relief and physiography
Soils
River system
Climate
Wet lands
Natural hazard

B. Population
Population composition
Density and distribution
Population dynamics (fertility, mortality and migration)
Population policy and problems

C. Natural Resources Base:
    Natural vegetation and forest
    Agriculture and fisheries
    Minerals and fuel energy
    Water resources and land resources
D. Economic Base:
    Industry: Nature, growth and location
    Transport and Communication
    Trade and commerce
    Urbanization and economic development

Mass Communication and Journalism

Paper-I

Marks-100

(a) Journalism.
  (i) Aims, objectives, functions, nature & scope;
  (ii) Terminology;
  (iii) Contents of Newspaper.
(b) News.
  (i) Definitions, elements, functions & types;
  (ii) News value, News sense, News analysis.
(c) Reporting.
  (i) News gathering and writing;
  (ii) News structure;
  (iii) Reporting: types & writing;
  (iv) Lead: types & writing;
  (v) Interview: types & writing;
  (vi) Practical report writing excercise based on information/setting to be provided in the question paper;
  (vii) Parliamentary reporting: terminology, importance of parliamentary reporting, bill & its passage in parliament.
(d) Editing.
  (i) News room: functions;
  (ii) Art of selection, correction, compression & improvement of news;
  (iii) Headline: types & writing;
  (iv) Make-up-types & functions.
(e) Law relating to Journalism.
  (i) Defamation: libel & slander;
  (ii) Contempt of court;
  (iii) Copyright.
(f) Ethics of Journalism.
(g) Pressures on the Press
(h) Role & responsibilities of the Press.
(i) History of Journalism in Bangladesh (since 1947).
(j) Radio & Television Journalism.
(k) Publicity, Public Relations & Propaganda.
(l) Handout, Press release and Press note.
(m) Editorial.
(n) Feature.

Mass Communication and Journalism

Paper-II

Marks-100

(a) Communication.
- (i) Definitions;
- (ii) Scope & purpose of communication;
- (iii) Process of communication;
- (iv) Functions of communication;
- (v) Types of communication;
- (vi) Models of communication;
- (vii) Barriers to communication.

(b) Mass Communication.
- (i) Nature of mass communication.
- (ii) Scope of mass communication.
- (iii) Functions of mass communication.
- (iv) Communication policy & planning.
- (v) Communication & development.

(c) Media.
- (i) Media's watchdog role in society;
- (ii) Governance and media;
- (iii) Media's role in shaping public opinion;
- (iv) Media effects;
- (v) Media research.

ECONOMICS

Paper-I

Marks – 100

Principles of Economics

1. Micro and Macro economics. Basic Macro economic concepts in relation to the Keynesian model of income determination – relevance of Keynesian economics for underdeveloped countries.
2. Concepts of supply and demand and their determinates – concepts and measurements of various elasticities of demand and supply.
3. Cardinal and Ordinal utility – law of diminishing marginal utility – equimarginal principle.
4. The Indifference Curve analysis – Properties of Indifference Curve – consumer’s equilibrium – income substitution and price effect.
5. Analysis of Production costs – Production function, Isoquants and return to scale – short run and long run cost curve – Producers equilibrium.
6. Price determination in a perfectly competitive market – equilibrium of the farm and the industry – short run and long run equilibrium – pricing under monopoly, oligopoly and monopolistic competition.

7. The Marginal Productivity theory of distribution – determination of rent, wages, interest and profit.

8. Types of function – linear, Quadratic, Hyperbolic, exponential and log functions – graphs of function. Equation of a straight line – Rectangular hyperbola – coordinates and location of points.

9. Concept of national income, utility of the study of national income, methods of measuring national income, nominal income and real income.

10. Theory of international trade: Necessity of Trade, Theory of Comparative advantage, Hecksher-ohlin theory of trade, terms of trade, gains from trade, tariffs and their justifications.

11. Globalization and its necessity, effects on the developing countries, Globalization under WTO regime.

ECONOMICS

Paper-II

Marks – 100

a) Meaning of development and under development, causes of under development and their remedies – characteristics of a developing economy like Bangladesh, prospects of development of Bangladesh.

b) Issues related to development of Bangladesh: Population growth, level of unemployment, inequality in distribution of income and wealth, gender inequality, economic governance, corruption and poverty.

c) Role of Fiscal Policy in economic development : Government's budget, taxes, borrowings and repayments.

d) Role of monetary policy in economic development : role of central bank, commercial banks, specialized banks, Grameen bank, PKSP, NGOs and micro credit programs, money market, capital market, credit policy, exchange rate policy, devaluation.

e) Growth of exports, imports, terms of trade, balance of trade, foreign aid, balance of payments.

f) Changing structure of real GDP of Bangladesh (1972-2005): role of agriculture, industry and service sectors.

g) Changing structure of Bangladesh agriculture (1972-2005): role of crops, livestock, fisheries and forestry-land use pattern, agricultural productivity and reforms-self sufficiency in food.

h) Industralisation in Bangladesh (1972-2005): Role of large scale, small scale and cottage industries, RMG and other export promotion and import substitution industries.

i) Growth of service sector in Bangladesh (1972-2005) and its importance.

j) Development planning-private sector versus public – five year plans – BDF – PRSP.

k) Bangladesh economy in the era of Globalization and WTO regime: new challenges.

Political Science
Paper-I
Marks : 100

A. Introduction to Political Science : Basic Concepts, State and its evolution, Society, Citizenship, Law, Meaning and Classification of Constitution, Classification and forms of Govt., Democratic, Dictatorial, Totalitarian, Presidential and Parliamentary, French model, Unitary, Federalism, Problems and new trends.

B. Organs of Govt. : Separation of Power-Variety and Proportional Representation, Electorate, Political Party, Interest Group, Pressure Group, Public Opinion, Bureaucracy, Elite, Local Govt., Local Self govt.

C. Nature and Meaning of Public Administration : Scope and the main elements of Public Administration, Public and Private Administration, Approaches to the Study of Public Administration.

D. Administrative Concepts : Hierarchy, Division of Work, Coordination, Span of Control, Unity of Command, Line and Staff, Centralization and Decentralization, Departmentalization.

E. Bureaucracy : Meaning and Characteristics, Political and Administrative Role, Administrative Accountability : Legislative, Executive and Judiciary.

F. Approaches to the Study of Politics : System Analysis, Structural-Functional Analysis, Elite Theory, Group Theory, Role Theory, Decision-Making Theory, Conflict Theory, Game Theory, Communication Theory, Psycho-Analytic approaches, Marxist and Neo-Marxist Approaches.

G. Political Thought
Greek City State and/Greek Philosophy Socrates, Plato, Aristotle.
Kautilya and Arthashastra
Confucianism, Taoism
Ibne Khaldun, Imam Gazzali
Machiavelli, Hobbes, Locks, Montesquieu, Rousseau
Karl Marx, Mao-Ze-Dong.

Political Science
Paper-II
Marks : 100

A. Politics In Bangladesh : Geography, History, Society, Culture.

B. The Liberation War and its Background : Language Movement, 1952; Constitutional Movement, 1962; Autonomy Movement, 1966; Mass Movement, 1968, 1969; Non-Cooperation Movement, 1971.

Liberation War-Courses and various Dimensions.

C. Political Process & Constitution Making : Political Development, 1972-2005. Rule of Military and Military withdrawal from Politics, Role of Opposition, The Concept of Caretaker Govt. Amendments to the Constitution.

D. Foreign Policy of Bangladesh : The Big Power Diplomacy in the Bangladesh Liberation War, The Nature and the Objectives of Bangladesh's Foreign Policy, Foreign Policy Making Process in Bangladesh, Economic and Political bases of Bangladesh Foreign Policy, Bangladesh and its South Asian Neighbours, Bangladesh's Relations with the US, Former Soviet Union, Russia, China and the EU, Bangladesh and the Islamic World, Bangladesh and UNO, Recent trends in Bangladesh Foreign Policy.

E. International Politics of South & South East Asia : The Region, Social & Cultural Setting, Historical & Colonial Experience, Nationalist Movement, Nature & Political System : Democratic Setup, The Foreign Policies of South and South East Asian Countries, The Formation of SAARC, ASEAN, and Future Prospects.

F. Major Political Systems : UK, USA, PRC and Japan.

Sociology

Paper-I
Marks : 100
(Introducing Sociology)

1. Subject matter of Sociology
    1. Definition, nature, scope & importance.
    2. Origin and development of Sociology.
    3. Sociology and other social sciences.
    4. Research methods in Sociology.
2. Some Primary Concepts of Sociology
    1. Society, community, association, institution, group.
    2. Culture, civilization, cultural lag, social structure.
    3. Family, marriage, property, state and religion.

3. Stage of Development of Human Society
    1. Pre-industrial society, ancient society, pastoral society, agricultural society.
    2. Industrial society and post-industrial society.

4. Social Institutions
    1. Family, types, functions and future.
    2. Marriage, types and functions.

5. Economic Institution
    1. Property, definition, types, forms of ownership.
    2. Origin of private property-primitive communism-arguments for and against private ownership.
    3. Economic systems-capitalism, socialism and mixed economy.
    4. Property in ancient society, pastoral, agricultural and industrial society.

6. Political Institution
    1. State, state and government.
    2. Legitimacy, power and authority.
    3. Marx and state.
    4. Democracy and state.

7. Social Stratification & Social Mobility
    1. The concept of social stratification-its characteristics & consequences.
    2. Major types of social stratification, slavery, estate, caste, class & status.
    3. Theories of social stratification-functionalist and conflict theories.
    4. Towards an integrative theory, Dahrendrof & Lenski's theories.
    5. Social mobility-types and causes of mobility-horizontal & vertical mobility.

8. Deviance and Social Control
    1. Crime and deviance, functions and dysfunction of crime, types of crime and criminal.
    2. Etiology of crime and deviance, biological, psychological and sociological theories.
    3. Social control-signification and agencies of social control. Formal and informal agencies.

9. Population and Society
    1. Fertility, mortality and migration.
    2. Population growth and problem, causes and consequences of population growth.
    3. Theories-Malthus, Demographic transition, optimum, population theory.
    4. Solutions to population problem.

10. Social Change
    1. The concept of social changes.
    2. Theories of social change linear theories-Comte, Spencer, Hobhbouse, Marx.
    3. Cyclical theories, bio-cyclical theory-Spengler's theory-Pareto's theory-Chapin's theory-Sorokin's theory-Toynbee's theory.
    4. Ancient & medieval theories of social change.
    5. Invention, discovery & diffusion and social change-general causes of social change.
    6. Planned social change.

Sociology
Paper-II
(Social and Culture of Bangladesh)

Marks : 100

1. The People of Bangladesh
    1. Race : the racial characteristics of the people of Bangladesh.
    2. The ethnic & linguistic composition.
    3. Major religious communities of Bangladesh.
    4. The land, people of physical environment

2. The major archeological sites of Bangladesh
    1. Mahastan Garh.
    2. Mainamoti.
    3. Paharpur.
        - The archeological relics and their socio-historical significance.

3. The Indus Valley Civilization

1. Brief history of the civilization.
2. Relics and their significance

4. Glimpses of Social History of Bangladesh
    1. Society and economy of pre-British Bengal. Self-sufficient village communities.
    2. The advent of the British Rule in Sub-Continent and its impact. Permanent Settlement Act of 1993; Introduction of English Education; Growth of Middle Class; Society and Economy during Pakistani Rule.
    3. Social background of the emergence of Bangladesh as an independent state.

5. Rural and Urban Society of Bangladesh
    1. Rural and urban life : an overview.
    2. Rural and urban social life of Bangladesh : socio-economic, politico-cultural, education & religious life.
    3. Rural and urban social stratification.
    4. Power structure : rural and urban.

6. Family, Marriage and Kinship in Bangladesh
    1. Family, types, rule and functions.
    2. Marriage, types, role and functions.
    3. Kinship- types, role and functions.

7. Industrialization & Urbanization in Bangladesh
    1. Industrial society : an overview.
    2. Importance of Industrialization.
    3. Obstacles to industrialization.
    4. Urbanization & urbanism in Bangladesh.
    5. Major urban problems.
    6. Impact of urbanization and industrialization upon the society of Bangladesh.

8. The Ethnic Societies of Bangladesh
   (Some major ethnic societies)
    1. The Chakma society
    2. The Marma society
    3. The Garo society
    4. The Santal society

9. Social Problems in Bangladesh
   (Some selected problems)
    1. Population problem-causes, consequences & solutions.
    2. Poverty- causes, consequences & solutions.
    3. Illiteracy- causes, consequences & solutions.
    4. Dowry- causes, consequences & solutions.
    5. Problems of unemployment- causes, consequences & solutions.

10. Social change in Bangladesh
    1. The concept in social change.
    2. Present social structure of Bangladesh.
    3. Social change in Bangladesh-causes and consequences-problems and prospects.

Social Welfare/Social Work

Paper-I

Marks : 100

(i) Meaning objectives, scope and necessity of social welfare or social work. Welfare State.

(ii) Nature of social work in pre and post industrial society, basic differences of social work between pre and post industrial society, contributions of traditional social welfare to the development of organized and modern social work.

(iii) Industrial Revolution, its meaning and impact on social life Industrialization and Urbanization, emergence of social problems due to industrialization and urbanization, social services to combat the problems of industrialization and urbanization.

(iv) Relationship of social welfare/social work with other branches of science/social science - Psychology, Sociology, Economics, Political Science, Anthropology, Philosophy and Public Administration.

(v) Some important concepts related to social welfare: social work, social service, social security, social change and social development.

(vi) Historical Foundation of social welfare in Indo-Pak-Bangladesh sub-continent: Ancient, Medieval and British Period, Evolution of social welfare in Bangladesh.

(vii) Reform movement and its meaning and importance, some reform movements of the sub-continent- Brahma Samaj, Faraizee Movement, Ram Krishna Mission, Mohammedan Literary Society and Aligarh Movement.

(viii) Philosophical values of social work, contributions of major religions to the development of modern social work-Islam, Hinduism, Buddhism, and Christianity. Human Rights and social justice and its relationship with social welfare/social work.

(ix) Importance of social legislation in social welfare/social work, some important social legislations in Bangladesh- The Workmen's Compensation Act of 1923, The Maternity Benefits Act of 1939, The Children Act of 1974, The Dowry Prohibition Act of 1980.

(x) Social work as a profession: Definition and characteristics of profession, evolution of social work as a profession, difference between professional non-professional social work. Social work in Developing countries.

Social Welfare/Social Work

Paper-II

Marks :100

(i) Basic human needs- food, clothing, shelter, health, education, recreation and their bearing on human life and welfare with special reference to Bangladesh.

(ii) Major social evils and social problems in Bangladesh- poverty, unemployment, ill health, beggary, over-population, illiteracy, drug addiction, crime and delinquency-their causes, effects and remedies.

(iii) Constitutional guarantee of social welfare and social security in Bangladesh, Social Welfare in the five-year plans of Bangladesh.

(iv) Social Services under Social Service Development: Urban Community Development, Rural Social Service, Child Welfare, Correctional Services, Medical Social Work, Training and Rehabilitation Programmes for the Handicapped.

(v) Social Services outside Social Service Department: BRDB, Family Planning, Youth Welfare, Labour Welfare, Co-operative and Women Welfare.

(vi) Social Work Methods, types and importance of social work methods, interrelatedness of social work methods.

(vii) Definition, scope and significance of social Case Work, social group work, community organization and community development.

(viii) Social Case Work as a problem-solving process - its elements, steps and methods.

(ix) Use of Social Group Work as a problem-solving process in the context of Bangladesh. Scope and importance of Community development in Bangladesh.

(x) Definition and role of Social Administration in promoting social welfare in Bangladesh. Social Action as method of social change.

International Relations

Paper-I

Marks : 100

1. Principles of International Relations : Nature, Scope and Development of International Relations as an academic discipline.
2. Evolution of the International society, Development of the modern state system.
3. Elements of International Politics : Power, National Power, Geo-politics, Geo-economics, Regionalism.
4. Concepts of power, balance of powers, balance of terror, polarity of power, national power and collective security.
5. Global environmental degradation and its causes, nature and consequences-Rio Summit- Kyoto Protocol.
6. Concept of Civil Society and Human Rights – Human Rights as foreign policy instrument, Relations between Human Rights, National Development and World Peace.
7. Foreign Policy : Objectives, Determinants, Diplomacy, Coercions and Force, Bargaining.
8. Elements of International Economic Relations : Trade, Balance of Trade, Trade Blocs.
9. Arms Race Issues : Arms Control and Disarmament, Theories of Deterrence.
10. Various approaches to the study of International Relations : Traditionalists and Behavirouralists, Various Perspectives of International Relations : Realism, Pluralism, Globalism and Marxism.

11. International Relations Theory
Game Theory
Collective Security Theory
Balance of Power Theory
System Theory
Conflict Theory
Integration Theory
Decision Making Theory
Lateral Pressure Theory

12. Different Perspective of International Political Economy : Realism, Mercantilism, Structuralism and Radical Theories of International Political Economy, Theories of Imperialism and Dependency, Sustainable Development : Concepts and Theories.

International Relations

Paper-II

Marks : 100

1. Evolution of International Relations since 1914,
The First World War and the Second World War
Birth & Demise of the Cold War-Sino Soviet Conflict and Cooperation
European Imperialism and its Consequences.

B. Global Security Issues
Future World Order Questions
Global Arms Trade
Internatinal Terrorism
Ethnic Conflict and Territorial Fragmentantion
Peace Research and Future Perception of Security.

2. A New World Order-post-cold war US foreign policy and impact of 9/11. The End of History and 'The Clash of Civilizations', Resurgence of Russia in the New Millennium, Chinese preparedness to play global role, Japanese nuclear ambition.
3. World - Ethnic conflicts in the post-cold War-the cases of Bosnia, Kosovo, Rwanda, Chechnya, Tamil Crisis, Moro Problem, Darfur Crisis.
4. Changing Role of the UNO
Implications
The UN and Peaceful Settlement of Disputes
The UN and Regional Arrangement
The UN Charter and Regionalism : Functionalism and Neo-Functionalism
The question of restructuring the UN.
5. WTO and regional trading blocks :
BIRD, IMF, ASEAN, SAARC, GCC, APEC.
Role of the MNCs
Role of NGOs

6. Non-Aligned Movement and Commonwealth.
7. Major international Flashpoints: Palestine, Afghanistan, Iraq, North Korea and Kashmir, South Africa's transition to multiracial democracy.
8. Enlargement of NATO and EU and its consequences.
9. Feminism and Post-Feminism.
10. Policy Issues and International Politics :
Bangladesh, India Japan, UK, USA.

Public Administration

Paper I

Marks : 100

(Administrative Organization : Theories and Behaviour)

1. Meaning, nature & scope of Public Administration
2. Impact of Science & Technology, Industrialization, Urbanization on Public Administration.
3. Organization Theories, Classical, Neoclassical & Modern.
4. Principles of organization, Hierarchy, Span of control, Unity of command, Departmentalization, Line and staff, integration VS Disintegration, Centralization VS Decentralization.
5. Policy Formulation & Decision Making.
6. Paradigm of Public Administration. Politics-Administration Dichotomy.
7. New Public Administration. Issues and Challenges.
8. Contribution of Elton Mayo C.I Barnard, Herbert Semon, Henry Fayol and Marry Parker Follet on Public Administration.
9. Max Weberian Ideal Type of bureaucracy, Criticism labelled again Max Weberian bureaucracy, Reutilization of bureaucracy.
10. Theories of Motivation, Role of Motivation on Productivity, Morale & Efficiency.
11. Theories of Leadership. Role of Leadership in Organizational Effectiveness.
12. Co-ordination, Delegation, Communication & Supervision.

Public Administration

Paper II

Marks : 100

(Public Administration in Bangladesh)

1. Historical Background of the Growth of Civil Service in Bangladesh.
2. The Philosophy of the Constitution of Bangladesh and it's provision on Public Administrative System, Secretariat, Attached Departments, Directorate and their relationship, public corporation : purpose, structure, Functions.
3. Personal Administration-Human Resource Development, Recruitment, Role of Public Service Commission & Establishment Division of the Government of Bangladesh.

4. Training System-Role of Bangladesh Public Administration Training Centre (BPATC), Bangladesh Academy for Rural Development (BARD), National Local Government Institute (NLGI).
5. Conditions of Service; Pay Structure, Incentive, Discipline, Retirement and pension.
6. Development Administration, Development Planning, Issues and Processes, Organization & Problems, Role of Civil Servants in Development, Preparation of Different types Development plan; Plan Implementation Strategies; Institutions & Processes : Development Performance, Monitoring and Project Impact Evaluation, Role of Planning Commission & Executive Committee of National Economic Council.
7. Financial Administration in Bangladesh, Fiscal Policy & Monetary Policy, Ministry of Finance, Internal Resource Mobilization, Role of Comptroller & Auditor General, Budgetary Process, Performance Budgeting.
8. Administrative Reforms in Bangladesh, Recommendations of the main reform committees, Recent trend in Administrative Reforms, Political Commitment to administrative reforms.
9. Corruption, Causes & remedies, Transparency & Accountability in Public Service.
10. Bureaucracy in Democracy : Bureaucracy & Development.
11. Rule of Law, Protection & Promotion of Human Rights and Role of Law Enforcing Agencies.
12. Control of Public Administration, Role of Executive, Legislature and Judiciary.
13. Good Governance : Decentralization, Peoples Participation & Role of Civil Society, Issues & Challenges of Corporate Governance.
14. Impact of E-Governance on Public Administration.
15. Field Administration, Regional, District & Local Level Administration.
16. Non Governmental Organization (NGO) & Local Government, Government – Non Governmental Organization Interface.
17. Rural Development and National Development.

Home Economics

Paper–I

Marks : 100

Part –I : Home Management and Housing

1. Definition, meaning and scope of Home Management
   a. Home Management as a course of study.
   b. As a responsibility of manager of family.
   c. Scope and application of management principles.
   d. Socio-cultural & economic changer & its effect on home management.

2. Functions of Home Management
   a. Function of a home manager
   b. Management Process :
      (i) Goal setting, (ii) Planning& decision making, (iii) Organizing
      (iv) Controlling, (v) Evaluating (vi) Communicating.
3. Management of Resources in Day to day living
   a. Definition, classification & characteristics of resources.
   b. Guidelines for the use of resources.
   c. Motivational components in the management of resources.

4. Financial Management
    a. Family Income-types & income of budgeting income.
    b. Family expenditure & means of controlling it.
5. Management of Energy & Time :
    a. Courses of control of fatigue.
    b. Ways of improving work in the home same time.
        (i) effective use of body posture.
        (ii) effective measure of work simplification.

Family Housing & Interior Decoration :

    c. Housing needs of the family.
    d. Basic principle of House Planning & site selection.
    e. Building materials-knowledge of traditional, low cost & modern materials.
    f. Home furnishings in Interior decoration
        (i) Art principle & elements of design in home furnishings.
        (ii) Arousing furniture & accessories, light & colour in interior decoration.

Part-2 : Art, Family, Clothing & Textiles

1. Planning the Family wardrobe
    a. Special emphasis on budget, occupation, climate, family composition, fashion accessories etc.
    b. Art elements of principles its relation to choice of clothing & design.
    c. Personality & selection of clothing.
    d. Care & storage of clothing.
2. Textile Fibers :
    a. Sources & classification of fibers
    b. Characteristics of fibers-
        (i) Physical characteristics
        (ii) Chemical characteristics
        (iii) Basic Performance characteristics.
3. Identification of Textile fibers :
    a. Physical methods-feeling test, moisture test, burning test.
    b. Chemical and other methods
4. Finishing Processes of fibers :
    a. Objective & methods of fiber finishing
    b. Process of manufacturing fiber
    c. Classification of woven & knitted fabrics.
    d. Dyeing and Printing of fiber & fabrics.

5. Fashioning clothing and Textiles
    a. Definition of fashion & fashion promotion
    b. Factors inflecting changer in fashion
    c. General economic importance of fashion & its implication on textile industry.

Home Economics

Paper–II

Marks : 100

Part–I : Child development & Family Relation

1. Meaning of growth & development –
   a. Principle of Childs development.
   b. Methods of studying child's behaviour and development.
2. States of child's development
   a. Characteristics of child's nature at different stages of development
      (i) Early childhood
      (ii) Middle childhood
      (iii) Preadolescent
      (iv) Adolescent.
3. Different aspects of development-
   (i) Physical development & maturation
   (j) Mental development
   (k) Social development
   (l) Emotional development
   Factors effecting development at different stages.
4. Adolescence-
   (i) Physical champers in adolescent years
   (ii) cognitive & intellectual development
   (iii) Social & personality development
   (iv) Problems of adolescence-aggression, juvenile delinquency, addiction to drugs –causes & remedies
5. Functions of Family :-
   a. Stages of family life cycle and changer in family functions.
   b. Changer in family function due to urbanization, industrialization, women's employment etc.
   2. Family Relations-
      a. Factors influencing family relation
      b. Relationship between parents & children.

Principles of child's guidance at different stages of development

      d. Family crisis – effect on child's development, ways to improve family relations and family solidarity.

Part-II : Food & Nutrition

1. Basic Knowledge of Food & Nutrition
   a. Function of food in the body
   b. Relation between health, food and nutrition
   2. Classification functions, food sources & deficiency diseases of the following nutrition-
      a. Carbohydrate, (b) Proteins, (c)Lets, (d) Vitamins, (e) Minerals.

3. Balanced Diets

a. Food grows & their significance
b. Principles of planning balanced diets using food groups.
c. Factors influencing planning of balanced diets.
d. Balanced diets in pregnancy, lactation, infamy, childhood & old age.

4. Therapeutic Diet
   a. Meaning & planning of Therapeutic diets.
   b. Kinds of Therapeutic diets.
   c. Diet Therapy in different diseases-diabetes, high blood pressure, heart disease, Renal diseases & liver diseases.
5. Food Contamination and Food Spoilage-
   (a) Censer of food contamination, food borne diseases.
   (b) Types of good spoilage, characteristics of spoiled foods.
   (c) Ways of preventing food contamination
   (d) Principles and methods of food preservation.
6. Nutrition situation in Bangladesh
   a. Etiology of malnutrition-PEM, IDA, IDD & other micronutrient deficiencies.
   b. Nutritional assessment-anthropometrical, clinical & biochemical methods of assessing nutritional status.
   c. Role of government & NGO in nutritional sector-Food supplementation, fortification & rehabilitation.

Anthropology

Paper-I

Marks : 100

Meaning and Definition of Anthropology

Definition of Anthropology. Anthropology and its relation with other social science.

2. Schools of Anthropology
   Historical Development of Anthropology. Schools-Evolutionism, Diffusions, Frustrations, structuralism, and structural functionalism.

3. Anthropological Research Methods
   Participant Observation, in-depth interview, focus group discussion, Case study and oval history.

4. Kinship, family and Marriage
   Kinship-Definition, Classification and types. Role and Function of family. Marriage-definition, type, incest and Taboo.

5. Religion
   Religion-Definition, evolution, theories, Role and Function of religion. Magic and Science.

6. Social Change
   Change, Evolution and Development. Theories of Social change. Factors of social change.

7. Political Organization
   Meaning and definition, Type, Structure, Power and Leadership in small communities.
8. Economic Organization
   Meaning and definition, ownership and inheritance, Division of labour, tools and Technology, trade and market system, Exchange, reciprocity and redistribution.
9. Archaeology
   Archaeology and prehistory, Major Archaeological discoveries, Archaeological sites in Bangladesh.
10. Anthropology and Bangladesh society, culture, importance of Anthropological studies in Bangladesh. Major Anthropological works in Bangladesh scope of Anthropological researches in Bangladesh.

Anthropology
Paper-II
Marks : 100

1. Anthropology in the present world : Understanding the colonialism. Role of Anthropologists in developed and developing countries.
2. Prehistory and Early Civilizations : Pre-history-Stone age, copper age, Bronze age and Iron age. Early Civilizations—Egyptian, Babylonian, Indus, Chinese, Greek and Roman.
3. Technique of production and social change : Primitive communism, slavery, feudalism, capitalism, socialism and Asiatic mode of production.
4. Races and Human Variation : Definition and problems, biological and social perspective, myths and conflicts, Ethnology and Bengali population.
5. Ethnic Minorities in Bangladesh : Ethnic Minorities—Definition, Number of groups and distribution, characteristics, origin, culture, transformation and mainstreaming.
6. Poverty and Poverty Alleviation : Poverty—Definition and measurement, urban and rural poverty, poverty alleviation—approaches of government and non-government agencies in Bangladesh.
7. Environment and Sustainability : Environment—Definition, Ecosystem and major Ecosystem of Bangladesh, Critical Environmental issues and concerns, sustainable environmental programmes and projects in Bangladesh.
8. Urban Society and Culture : Definition, Urbanization and Urbanism, growth of urban centres, urban problems in Bangladesh.
9. Development Anthropology and Bangladesh: Importance of Development Anthropology and Bangladesh, Scope of Research, Policy and Planning Role, Prospect of Development Anthropology in Bangladesh.

LIBRARY AND INFORMATION SCIENCE

Paper - I

Marks : 50

Part-A : History of Printing, Books and Libraries Marks – 50

I. Evolution and development of paper, writing, printing press and book making from the earliest age to present times.

II. History of libraries during ancient period. Babylonian and Assyrian libraries; Egyptian, Greek, Roman libraries.

III. Libraries during the Middle ages, Renaissance and Reformation. Byzantine libraries; Muslim libraries in Baghdad, Basra, Constantinople, Persia, Damascus, Southern France, Cairo, Algiers, Morocco, Cordova, Seville, Toledo, Malaga, Granada(Spain); Turkey, Egypt, Sicily(Italy); Samarkand, Vatican Library(Rome); Assurbanipal Library (Mesopotamia); Nalanda University Library(Patna); Alexandria Library(Egypt), Pergamum Library, Monastic and Cathedral Library.

IV. Libraries in the modern world. Bibliotheque Nationale (Paris), Lenin State Library (Moscow), National Diet Library(Tokyo), The British Library(London), Library of Congress (Washington DC).

V. Status of libraries in Bangladesh.

Part-B : Development of Information Resources Marks – 50

1. Principles of collection development; Acquisitions policy of library materials; Evaluation and selection of library materials.
2. Criteria of selection of non-fiction and fictions, AV materials and electronic resources.
3. Principles of selection and evaluation in different kinds of information Institutions: School, College, University, Special, Public and National libraries.
4. Aids and guides to selection: *International:* subject guide to BIP, Whitaker's book list, CI, BNB, INB, Publishers weekly, BRD. *National:* Bangladesh national bibliography, Bangla sahitya granthapanji, Shishu Sahitya granthapanji, Books in print from Bangladesh, Boiar khabar, Boi, trade catalogues.
5. Book reviews and Annotations.
6. Copyright and censorship; Operation of copyright laws; Copyright law of Bangladesh, 2000; Selection of controversial materials; Weeding Banned books.

LIBRARY AND INFORMATION SCIENCE

Paper - II

Marks : 100

Part-A : Organization of Information **Marks – 50**

1. Bibliographical/Technical reading of a book. Elements in catalogue entry.
2. Definition, purpose, functions of a catalogue.
3. Characteristics of an ideal catalogue; comparative analysis of different physical forms of catalogue.
4. Types and kinds of catalogue: The Inner form construction of classified and Dictionary catalogue.
5. Sears list of subject headings: Uses, Purposes of subject headings. Steps to subject determination. Principles of construction directions for using the list. Construction of subject headings using various sub-divisions.
6. Basic elements of automated cataloguing. Development of MARC, OPAC. Major variable data fields of USMARC 3 formal. OPAC vs. card, microfiche, printed catalogues. Superiority of online catalogue, Reasons for introducing automated online integrated catalogue.
7. Comparative studies amongst DDC, UDC, LC classification schemes.
8. Purposes of classification.
9. Principles of book classification.
10. Mnemonic values of DDC.
11. Notation: Definition, functions, criteria of good notation.
12. Rules for classifying books.

Part-B : Bibliography and Reference Service **Marks – 50**

1. Definition, use, importance and scope of Bibliography.
2. Different types, examples, sources of Bibliography.
3. Bibliography vs. Catalogue.
4. Methods of preparing Bibliography; various styles and systems of preparing entries.
5. Introduction to major national bibliographies of the world: BNB, CNB, INB, Bangladesh National Bibliography.
6. Bibliographical control, Copyright.
7. Bibliographical services in Bangladesh.
8. Kinds of reference services, sources, materials.
9. Evaluation of reference materials.
10. Reference functions.
11. Reference sources in Bangladesh. Major encyclopedias, bibliographies, biographical sources, catalogues, indexes, abstracts published in Bangladesh.

PHYSICS

Paper - I

Marks : 100

(a) Mechanics :

Particle Dynamics: Newton's law of motion, Motion in one dimension, Motion in a plane, Work, energy and power, Conservation laws, Conservative force, Mass-energy relation.

Rotational Motion: Angular velocity, Angular acceleration, Uniformly accelerated angular motion, Torque, Kinetic energy of rotation, Angular momentum, Moment of inertia.

Gravitation: Newton's law of gravitation, variation of acceleration due to gravity, Gravitational field and gravitational potential, Calculation of potential and force in simple cases.

(b) Properties of Matter :

Elasticity : Stress and strain, Hooke's law, Elastic modulii, Bending of beams, Torsion.

Surface Tension : Adhesive force, Cohesive force, Molecular theory of surface tension, Surface energy and surface tension, Angle of contact and capillarity.

Viscosity : Newton's law of viscosity, Streamline and turbulent motion, Poiseulle's formula, Bernouli's theorem, Applications.

(c) Waves and Oscillation :

Waves : Transverse and longitudinal wave, Traveling and stationary wave, Vibration in strings, Resonance, Beats, Doppler effect.

(d) Heat, Thermodynamics and kinetic Theory of Gases :

Heat and Temperature : Concept of temperature, Thermal equilibrium, Temperature scale, Mechanical equivalent of heat, quantity of heat, Specific heat and heat capacity.

Transmission of heat : Conduction, Convection and Radiation, Conduction of heat in solids, Co-efficient of conductivity, Measurement of conductivity of a poor conductor.

Thermodynamics : First law, difference between Cp and Cv for an ideal gas, Adiabatic process for an ideal gas, Second law, Entropy and disorder, Absolute scale of temperature, Thermodynamic functions, Maxwell relations, Clausius-Clapeyron equation, Gibbs phase rule.

Kinetic theory of gases : Basic assumptions, Equation of state of an ideal gas, Kinetic interpretation of temperature and pressure, Mean free path, Equipartition law, Van der Waal's equation of state.

(e) Electricity and magnetism :

Charge and Matter, Electric field, point charge in an electric field, Dipole in an electric field.

Gauss's law and Coulomb's law : Application to a spherically symmetric charge distribution and a charge sheet; Electric potential: potential and field strength; potential due to a point charge; Due to a dipole; Calculation of E from V.

Capacitance and dielectric : Calculation of capacitance, Dielectric and Gauss's Law, Energy storage in dielectric.

Current and Circuits : Ohm's law, Resistivity and atomic view, Electromotive force Kirchoff's law, Wheatstone bridge, Potentiometer.

Magnetic field: Definition of B, Ampere's law, Biot-Savart law, Magnetic force on a current, Torque on a current loop, Electric meters.

Faraday's law : Inductance, Energy density and the magnetic field, Diamagnetism, Paramagnetism and Ferro-magnetism.

Electromagnetic Oscillation : LC oscillation, Maxwell's field equations.

Alternating current : Alternating emf, LCR circuit, Effective of RMS value of voltage and current.

(f) Optics :

Nature and propagation of light : Light and the electromagnetic spectrum, Velocity of light, Huygen's principle and the laws of reflection and refraction, Total internal reflection.

Interference and Diffraction : Young's experiment, Coherence, Michelson's interferometer, Diffraction from single slit, double slit and grating, X-ray diffraction and Bragg's law, Resolving power.

PHYSICS
Paper - II
Marks : 100

(a) Classical Mechanics and Special theory of Relativity :

Conservation laws of a system of particles. Rocket motion. Generalized coordinates.

Euler-Lagrange equations of motion. Hamilton's Principle.

Principle of least action, Hamilton's equation of motion.

Postulates of special theory of relativity. Lorentz transformation.

Relativistic equations of motion.

(b) Quantum Mechanics :

Schrodinger equation. Postulates of quantum mechanics. Probability in quantum mechanics.

Fundamental commulation relations.

Heisenberg's uncertainty relations.

Operators and Eigenvalue equation.

Eigenvalue and Eigenfunctions.

Hermitian operators.
Eigenvalues of the angular momentum operator. Spin angular momentum operator.
Approxmation methods. WKB Approxmation.

(c) Atomic and Molecular Physics :
Quantum character of radiations.
Photoelectric effect. Compton effect.
Wave-particle duality. De Broglie wave.
Electron diffraction.
Rutherford experiment
Bohr's theory and hydrogen atom.
Atomic spectra.
Pauli's principle. Electronics configuration of atom.
Production of X-ray. Moseley's law.
Molecular spectra.
Laser. Three and four level lasers.
Properties of a laser beam. Ruby, He-Ne,
Nd : Y and CO_2 lasers. Applications of lasers.

(d) Nuclear Physics :
Constituents of Nuclei, Nuclear density, Nuclear spin and angular momentum, Nuclear force.
Nuclear binding energy, Liquid drop model, Shell model.
Radioactive decay, Decay law.
Radioisope-productions and uses.
Alpha particle emission, Beta decay. Gamma radiation.
Nuclear reaction, Q-value.
Nuclear fission and fusion. Nuclear reactor.
particle accelerators-Van-de-Graff accelerator, Linear accelerator, Cyclotron, Sychrotron.
Elementary particles.

(e) Solid State Physics :
Crystalline nature of solids. Unit cell. Classification of solids-lonic, Valence and Vander Waals Crystals. Madelung constant. Theory of specific hearts. Einstein and Debye model.
Defects in srystals-Schottky and Frendel types. Dislocations. Consequences of defects on Mechanical properties.
Band theory of solids.
Semiconductors-Extrinsic, Semiconductor, Density of states. Charge carrier.
Superconductivity. Introduction to high Tc superconductivity.

(f) Electronics :
Semiconductor diode. p-n junctions.
Breakdown Avalance and Zener Mechanism
Rectification.

Bipolar Junction Transistor (npn & pnp)
Transistor action. Amplifiers (CB, CE & CC)
Operational Amplifier. Inverting amplifier non-inverting amplifier, Adder subs tractor, Comparator, Integrator, Differentiator, FET and MOSFET Applications.
SCR and TRIAC action and characteristics.
Modulation and Demodulation (AM, FM)
Television and RADAR.

APPLIED PHYSICS
Paper - I
Marks : 100

Electrostatics	:	Coulomb's law, The electric field, Dipole in an electric field, Potential and field strength, Capacitance, Dielectric, Gauss's law.
Steady Current	:	Ohm's law, Heating effect of current, Electric power and energy, Kirchoff's law, Thevenin's theorem, Norton's theorem, Superposition theorem.
Magnetic effect	:	Ampere's law, Forces between currents, Biot-Savart law of current and Faraday's law, Lenz's law, Self and mutual inductance.
Electromagnetic Induction	:	L.R circuits.
Alternating Current	:	Generation of alternating E.M.F. Impedances in A.C. circuits.
Electron Emission and Electron Ballistics	:	Work function, Thermionic emission, Field emission, Secondary emission, Photoelectric effect and emission, TV picture tube, Electrostatic and Magnetostatic deflection, CRT, Electron optics and Electron microscopy.
Physical Electronics	:	Electron theory of metals, Fermi Dirac distribution function, Fermi level, Band theory of solids, intrinsic and extrinsic semiconductors, Hall effect.
Electronic Devices	:	Diode, BJT, SCR, JFET, MOSFET, LED, LCD, Solar cell, LASER.
Rectifier circuits	:	P-N junction diode, Load line of a diode circuit, Half wave and Full wave rectifier, Bridge rectifier Filters, Zener diode and voltage regulation.

APPLIED PHYSICS
Paper - II
Marks : 100

Transistor Equivalent Circuit	:	A.C equivalent circuit with Y.Z and H parameters for CB, CE and CC Configuration. Small signal analysis of a transistor amplifier using H parameter at low frequency, small signal JFET parameters.

Transistor Amplifier Circuits	:	Different methods of transistor biasing, D.C and A.C operating characteristics, Amplifying action of a transistor, Classification of amplifiers, Tuned amplifier, Power amplifier, Negative feedback amplifier.
Oscillator Circuits	:	Principle of positive feedback, Tuned collector oscillator, Hartley oscillator, Phase shift oscillator, negative resistance oscillator, Crystal oscillator, Frequency stability.
Pulse and Switching circuits	:	Wave shaping, Clipping and Clamping circuits, Astable, Monostable and Bistable multivibrators. Schmitt trigger, Blocking oscillator, Voltage time base generators.
Digital Circuits	:	Logic gates, Combination logic circuit design, Clock signal and clocked Flip-Flops, Synchronous and asynchronous counter design, Half adder, Full adder, Digital to Analog and Analog to Digital converter.
Operational Amplifiers	:	Differential amplifier circuits, Ideal operational amplifier, Inverting and non-inverting amplifier, Summing amplifier, Integrator and differentiator, Active filters, Multivibrator with op.amp.
Communication	:	Different types o f modulation and demodulation, Super heterodyne receiver, Noise in radio communication, Digital communication, Mobile telephony and Cellular telephony, Principles of TV and RADAR.
Microprocessors and Computers	:	Microprocessors as the CPU of microcomputer, General purpose and single chip microprocessor, Organization of RAM, Static and dynamic RAMs, ROMs, PROMs and other types of memories, The computer system, Input output devices, CPU structure and function, computer control system.

CHEMISTRY

Paper - I

Marks : 100

Gas Laws, Kinetic theory of gases, Liquifaction of gases, Energy changes, Enthalpy changes & determination, The law of energetics, Elementary principles of thermodynamics, the nature of $\triangle S$, $\triangle H$ and $\triangle G$, Electro chemistry-Electrode potentials, Voltace cells, Redox electrodes, The Nerust equation, Colligative properties of solutions, Phase rule, Chemical equilibria and chemical kinetios, pH and buffer solutions, Conductance Theoretical aspects of chemical equilibria and chemical kinetios, pH and buffer solutions, Conductance Theoretical aspects of chemical and instrumental methods of analyses and their applications.

Atomic Structure, Periodic table and Classification of elements, Chemical bonds, Oxidation and reductions, Detailed group chemistry.

Radioactivity, Nuclear reactions and atomic energy, Elementary aspects of environmental chemistry.

Organic compounds-aliphatic, aromatic and heterocyclies, Synthesis and chemical properties of different classes of compear, Confirmation, Stereochemistry, Optical activity, General concepts of nucleophilic, electrophilic and free radical reactions.

Aromatic and heterocyclic substitution reactions.

Principles of manufacturing common organic and inorganic industrial products. Disposal of Industrial wastes.

CHEMISTRY

Paper - II

Marks : 100

This Paper should contain advanced Topics of Physical, Inorganic and Organic Chemistry including Chromatography and Spectroscopy.

Acids, Bases, Nucleophiles, Electrophiles.

Hard and soft Nucleophiles and electrophiles Molecular or bitals & Frontier or bitals-HOMO & LUMO Kinetics and energetics in reaction mechanism. Comprehensive treatment of solvolytic reactions substitution reactions of ambidient nucleophiles, Multicentre addition reactions, Carbonium ion rearrangements.

Chirality, Molecular dissymmetry, Atomic asymmetry & conformational asymmetry, Circular bifreingence & circular dichroisers, Cotton effect, Optical rotatory dispersion and their application, Purity of optical analysis, Conformational analysis.

Atropisomerism.

UV, IR, Raman, ESR, ^{1}H & ^{13}c NMR, Mass spectrometry-Principles and utility (application).

Different chromatographic techniques-

Principles and applications, Advantages & disadvantages.

Carbohydrates & Polysaccharides, Cellulose, Aminoacids, Proteins, Vitamins, Hormones, Antibiotics, Alkaloids, Dyes.

APPLIED CHEMISTRY

Paper - I

Marks : 100

1. Importance of Chemical technological processes. Development of Chemical technology, Classification of Chemical technological processes.

2. Techno-economic feasibility study of a project. Site selection for chemical industry. Unit process and unit operation. Design and implementation of a chemical project.

3. Chemical Process Industries: Fundamentals of Chemicals Industries, Importance of Chemical Technology for Industry. Pre-conditions for setting up of a new Chemical Industry. Problems of Chemical Process Industries in Bangladesh and their solutions.

4. Fluid Mechanics : Types of fluid, General properties of fluid, Fluid statics, Fluid dynamics, Euler's equation, Bernoulli's equation, Fluid flow measurement.

5. Corrosion : Corrosion damage. Types of Corrosion. Corrosion prevention. Electrochemical aspects of Corrosion, Corrosion Testing.

6. Metallurgy of Iron : Detailed Study on Pig iron, Wrought iron and steel.

7. Coal and Petroleum.

8. Principles of industrial separation processes. Distillation: Design & operating characteristics of plate column, operation efficiency. Analysis of fractionating column by McCode-Thiele method and enthalpy-concentration method. Construction details of plate column, sieve column.

9. Refrigeration and Air conditioning : Basic theory. Compression and Absorption Refrigeration Cycles. Ammonia Absorption machines. Refrigerants.

10. Air and water pollution. Greenhouse effect. Ozone hole. Kyoto protocol. Industrial waste management.

11. Water conditioning and water treatment. Physical and chemical methods of treatment. Municipal water supply. Boiler feed water. Water treatment plants in Bangladesh. Electrodialysis, ultrafiltration, activated carbon absorption, BOD, COD.

APPLIED CHEMISTRY

Paper - II

Marks : 100

1. Sulphur and sulphuric Acid : Sources of sulphur, Recovery of sulfur from nature, Manufacture of sulphuric acid, Environmental aspects.
2. Fertilizer Industry : Technological aspects of Fertilizer industries of Bangladesh. Ammonia, Urea and triple sugperphosphate manufacturing processes. Environmental aspects.

3. Sugar industry : Manufacture of sugar from sugarcane and sugar beat. Utilization of byproducts. Sugar Industry in Bangladesh.
4. Coal : Coal deposits in Bangladesh. Composition, classification, carbonization, gasification. Utilization and environmental aspects.
5. Petroleum : Atmospheric and Vacuum distillation. Thermal cracking, catalytic cracking, Reforming, Hydrocracking. Products of petroleum processing and their uses. Petroleum refining industry in Bangladesh.
6. Glass and Ceramics. Composition, classification, manufacturing processes, special glasses and ceramic products.
7. Cement : Classification, strength of cement. Cement kilns. Manufacturing processes. Cement industry in Bangladesh.
8. Caustic-Chlorine Industries : Methods of production of caustic soda and soda ash. Electrolytic process for caustic soda and chlorine. Diaphragm, Mercury and Membrane processes. Caustic soda-chlorine industry in Bangladesh. Environmental aspects.
9. Plastic Industry : Polyethylene, polypropylene, polyvinyl chloride, polymethylacrylate, polystyrene.
10. Pulp, Paper and Rayon Industries : Manufacturing processes and their comparisons. Environmental aspects.
11. Soaps and Detergents : Manufacture of Soap, Detergent and Glycerine.
12. Leather Industry : Leather processing including Chrome and Vegetable Training.
13. Edible oils : Extraction, Purification and Hydrogenation, Different Tests for Oils.
14. Surface Coatings : Paints; Pigments; Varnishes; Lacquers-constituents, manufacture, classification and application.

MATHEMATICS

Paper - I

Marks : 100

Group-A. Algebra, Analytical Geometry, Linear Algebra.

1. Order properties of real numbers. Inequalities involving different types of means, Chebyshev's inequality.
2. Complex numbers. DeMoivre's theorem and its applications.
3. Summation of finite algebraic and trigonometric series.
4. Polynomials and their roots. Honer's scheme(synthetic division). Descartes rule of signs.
5. Relation between roots and coefficients. Symmetric functions of roots.

Analytical Geometry

1. Pairs of straight lines. Transformation of coordinates.
2. General equation of the second degree. Reduction to standard forms. Conics in general.
3. Planes and straight lines in three dimensions. Shortest distance between two straight lines.
4. Vector algebra with applications to geometry.

Linear Algebra

1. Algebra of Matrices. Systems of linear equations and their solutions.
2. Vector spaces over the field of real numbers. Subspaces. Linear dependence and independence of vectors. Basis and dimension.
3. Linear transformations. Rank and nullity.
4. Eigenvectors and eigenvalues.

Group-B. Differential and Integral Calculus (including Elementary Real Analysis)

1. Sets of real numbers. Supremum and infimum. The completeness axiom Dedekind's theorem. The Archimendian property.
2. Convergence of infinite sequences and series of real numbers. Standard theorems and tests of convergence. Absolute convergence.
3. Continuous functions. Intermediate value theorem. Uniform continuity.
4. The derivative. Rolle's theorem. Mean value theorems. Toylor's theorem with remainder. Taylor's series. Indeterminate forms.
5. Maxima, minima, tangents and normals.
6. Indefinite integrals. Techniques of integration. Recurrence Relations.
7. The Riemann integral. The fundamental theorem of calculus.
8. Improper integrals. Tests of convergence.
9. Determination of areas and volumes.

Five questions will be set from each group; candidates will be required to answer SIX questions, taking at least TWO from each group.

MATHEMATICS

Paper - II

Marks : 100

Group-A. Mechanics

1. General conditions of equilibrium. Principle of virtual work. Stable and unstable equilibrium. Centre of gravity.
2. Rectilinear motion, simple harmonic motion. Motion in a plane. Motion under a central force.
3. Dynamics of rigid bodies. Moments of inertia. A' Alembert's principle.
4. Motion about a fixed axis.
5. Lagrange's equation for holonomic systems.

Group-B. Methods of Applied Mathematics

1. Ordinary differential equations of first and second order.
2. Liner equations with constant coefficients.
3. Solution of differential equations in series.
4. Beata and Gamma functions.
5. Special functions : Legendre, Hermite and Languerre polynomials; Bessel functions. Generating functions, recurrence relations and other properties.
6. Complex functions. Differentiability, Cauchy-Riemann equations. Analytic function. Complex integration. Cauchy' theorem and Chuchy's integral formula. Taylor and Laurent expansions. Singularities, poles and residues.
7. Cauchy's residue theorem. Evaluation of definite integrals.

Five questions will be set form each group; candidates will be required to answer SIX questions, taking at least TWO from each group.

APPLIED MATHEMATICS

Paper - I

Marks : 100

Group-A : Statics

(a) Forces acting in a plane, parallel forces, moments and couples.
(b) Equilibrium of coplanar forces. Astatic, stable and unstable equilibrium.

(c) Work, Virtual work.
(d) Centre of gravity. Forces in three dimensions.

Group-B : Dynamics

(a) Motion in a straight line, Simple harmonic motion.
(b) Motion in a plane referred to Cartesian and polar coordinates. Radial and transverse velocities; central, tangential and normal acceleration. Central forces.
(c) Motion in resisting medium.
(d) Motion in three dimensions.

Group-C : Mathematical Methods

(a) The Laplace Transform : Definition, existence and basic properties. Differentiation and integration. Inverse Laplace transform and convolution. Solution of linear differential equations with constant coefficients.
(b) Bessel's Equation : Solution, Generating function, Recurrence relation. Orthogonality.
(c) Legendre's Equation : Solution, Generating function, Recurrence relation, Rodrigui's formula and orthogonality of Legndre Polynomial.
(d) Fortier Series : Fortier Coefficients, Sine and Cosine series, Dirichlet's theorem, Properties and applications.

APPLIED MATHEMATICS

Paper - II

Marks : 100

Group-A : Real Analysis

(a) Metric Spaces : Definition and examples. Open and closed sets, Compact sets, perfect set and cantor set.
(b) Sequence : Convergent sequence, bounded sequence, subsequence, Cauchy sequence, and completeness of IR.
(c) Differentiation : Continuous function. Derivative of a function. Rolle's theorem, Mean-value theorem, Toylor's theorem.
(d) Functions of Several Variables : Limit and Continuity. Partial differentiation. Schwarz's theorem, Young's theorem.

Group-B : Complex Analysis

(a) Complex Functions : Single and many valued functions. Limit, Continuity and differentiability of complex function.

(b) Analytic functions : Necessary and sufficient conditions. Harmonic functions. Mobius transformation and power series.

(c) Complex integration : Zeros of analytic functions. Cauchy's theorem. Morera's theorem, Cauchy's integral formula. Singularities, Classification of singularities.

(d) Complex integration : The open mapping theorem, Taylor's and laurent series. Fundamental theorem of algebra. rouches theorem. The residue theorem. Contour integration.

Group-C : Numerical Analysis

(a) Solution of algebraic and transcendental equation, Interpolation.

(b) Numerical solution of linear and non-linear system of equations.

(c) Numerical differentiation and integration.

(d) Numerical solutions of ordinary differential equation.

Group-D : Hydrodynamics

(a) Velocity and acceleration of fluid particles. Steady and unsteady flows. Uniform and non-uniform flows. Stream lines, path lines, vortex lines and velocity potential. Rotational and irrotational flows. Equation of continuity.

(b) Euler's equation of motion, conservative field force. Lamb's equations of motion. Bernouli's equation.

(c) Motion in two-dimensions, stream function and its physical meaning, velocity in polar coordinates, relation between stream function and velocity.

(d) Sources, sinks and doublets. Complex potential and complex velocity, stagnation points, Complex potential due to a source and a doublet.

Circulation and vorticity, relation between circulation and vorticity. Kelvin's Circulation theorem.

BOTANY

Paper - I

Marks : 100

Plant Diversity : Morphology, Anatomy and Reproduction. (Microbiology : Mycology and Plant pathology : Phycology: Higher Cryptogams : Angiosperms : Plant anatomy : Embryology of Angiosperms)

Microbiology :

1. Nature and structure of simple RNA virus (TMV) and DNA virus(T2 Phase), multiplication and transmission.
2. Prion and viroid : Structure, properties and importance.
3. Bacteria : Classification (different types), reproduction, Bacterial photosynthesis, transformation and transduction.
4. Economic importance of microbes

Mycology and Plant pathology :

1. Modern classification of fungi and the bases of classification
2. Economic importance of fungi
3. Concept and causes of plant diseases
4. Stages in the development of plant diseases : inoculation, infection, growth and reproduction of the pathogens, dissemination of pathogens, over-wintering and over summering of pathogens)
5. Control of plant diseases.
6. Symptom, causal agents, disease cycle control measures of the following diseases : i. Blast of rice, ii. Stem rust of wheat, iii. Late blight of potato, iv. Stem rot of jute, v. Red rot of sugarcane, vi. Tungro disease of rice, vii. Panama disease of banana.

Physiology :

1. Modern classification of algae based on different characters.
2. General characteristics of all the major division of algae.
3. Range of vegetative structures in algae.
4. Phytoplankton-General features, biological and economic importance.

Higher Cryptogams :

1. Characteristic features and methods of reproduction with examples.
2. Distribution of bryophyte and pteridophyte genera in Bangladesh with examples.

Angiosperms :

1. Concept about ICBN, cytotaxonomy, chaemotaxonomy, ecotype and biosystematics.
2. Different systems of classification(i) Artificial; (ii) Natural and (iii) Phylogenetic.
3. Definition and importance of herbarium. Information and activities of world herbaria including Bangladesh.

Plant anatomy :

1. Stele in Pteridophyte
2. Vascular tissue system in angiosperms.
3. Meristem (origin, classification, structure, development and function)

Embryology of Angiosperms :

1. Mega-sporogenesis and Mega-gametogenesis.
2. Micro-sporogenesis and Micro-gemetogenesis.
3. Different types of embryo sac and their development (with examples).

Botany

Paper-II

Marks : 100

Functions and Applications.

(Plant Physiology and Biochemistry : Cytology and Cytogenetics : Genetics and Molecular Genetics : Tissue Culture : Horticulture : Ethnobotany : Ecology.)

Plant Physiology and Biochemistry :

2. Photosynthesis : Details of C3 and C4 pathways.
3. Comparison between C3, C4 and CAM pathways.
4. Respiration : (i) Aerobic respiration, Glycolysis, (ii) Anaerobic respiration, fermentation with special reference to alcohol fermentation.
5. Physiological and biological nitrogen fixation.
6. Mechanism of salt absorption.
7. Dormancy, Phtotoperiodism and Vernalization.
8. Biosynthesis of some important carbohydrates (a) Sucrose, (b) Starch and (c) Cellulose.
9. Alkaloids : (a) Classification with examples and distribution and (b) importance of alkaloids.
10. Fats : (a) Chemical constitution of fatty acid and (b) Biosynthesis of fatty acid.

Cytology and Cytogenetics:

1. Chromosome : Physical structures
2. Karyotype and genome analysis
3. Chromosomal aberrations

Genetics and Molecular Genetics :

1. Mendel's Laws of inheritance
2. Sex determination
3. Physical structure and chemical composition of DNA and RNA
4. Plasmid : Structure, function and importance.
5. Recombinant DNA(rDNA) : Method of construction and importance.
6. Genetic engineering for crop improvement.

Tissue Culture :

1. Cell suspension culture.

2. Somatic embryogenesis.
3. Haploid production.
4. Clonal propagation and its commercial application.

Horticulture :

1. Classification of fertilizer, composition, doses, application and procedures
2. Application of growth regulating chemicals in horticulture

Ethonobotany :

1. Ethno-botanical research in Bangladesh
2. Medicinal plants of Bangladesh, their conservation and sustainable use.

Ecology :

1. Methods of studying vegetation.
2. Ecosystem : (i) Structure and components of ecosystem, (ii) Pond ecosystem
3. Pollution : Kinds of pollution, harmful effects, effects of dams and embankment on vegetation.
4. Methods of measurement of primary production. Factors limiting primary productivity in aquatic and terrestrial communities.
5. Environmental hazards : Green house effect, ozone depletion, desertification, aridity and drought. Salinity flood and water logging in the light of Bangladesh condition.
6. Different forest types and forest area of Bangladesh, causes of depletion of forests of Bangladesh and the ways and means to prevent it.

Zoology

Paper-I

Marks-100

Animal Biodiversity.

(a) Concept of biodiversity.
(b) Classification of major phyla up to classes with diagnostic characteristics and examples.
(c) Morphology, biology and life-history of *Entamoeba, Paramecium* and Eimeria.
(d) Canal systems and affinities of Porifera.
(e) Morphology, reproduction and life-history of *Obelia*. Polymorphism and coral reefs in Cnidaria.
(f) Life-history and parasitic adaptations of *Fasciola hepatica*, and *Taenia solium* and *Ascaris*, Epidemiology and Control measures.
(g) Mode of life and reproduction of *Nereis* and *Hirudo*; Vermicomposting.
(h) Mouth parts of insects, Respiration, Exceretion and Metamphosis in insects.
(i) Biology, mode of life and reproduction of Pila and Sepia. Structure and formation of shell in Mollusca, Economic importance of mollusca.
(j) Morphology and reproduction of *Astropecton, Echinus* and *Cucumaria.* Water vascular systems in Echinodermata.
(k) Morphology and mode of life of *Ascidia*, *Branchiostoma*, *Petromyzon* and *Myxine.* Metamorphosis in Ascidia. Affinities of Ascidia.
(l) Morphology, digestive and respiratory system of Scoliodon and *Labeo rohita*. Types of Scales and fins in Pisces.
(m) Mode of life, reproduction and parental care in Amphibians. Economic importance of toad and frogs.
(n) Venomous Snakes and Snake bites, Morphology, habit and habitats of crocodiles and alligators. Dinosaurs.
(o) Flight adaptation, Migration of birds, Flightless birds.
(p) Egg laying mammals and marsupials; aquatic mammals.

General Zoology

Paper-II

Marks-100

Cytology, Genetics and Evolution.

(a) Ultrastructure of an animal cell; Structure and functions of different organelles of cells; Mitosis and miotic cell divisions; Chromosomes.
(b) Nucleic acids; Structures of DNA and RNAs; replication of DNA, transcription of mRNA and translation (Protein synthesis).
(c) Mendelian rations and their modifications, linkages and crossing overs; multiple alleles, blood groups; epistasis; gene interactions.
(d) Genetic engineering, steps in preparing insulin from genetically engineered E. coli.
(e) Evidences of evolution; early theories of evolution; Darwin's Natural Selection theory of evolution, Speciation; allopatric and sympatric evolution.

Ecology

(a) Ecosystem, food chain, food web; food pyramids, ecosystem of a typical pond.
(b) Causes of environmental degradation; air, Water and Soil pollutions.
(c) Effects of pollution on human health and the economy of Bangladesh.

Wild-life

(a) Wild-life fauna of Bangladesh; Principles and Significance of wild-life conservation in Bangladesh.
(b) National parks, game reserves and Sanctuaries.
(c) Ecotourism.

Zoogeography.

(a) Zoogeographical regions and their characteristics, bird and mamalian fauna.
(b) Wallace's line and Weaver's line, endemic fauna.
(c) Oriental Region and its relationship with Bangladesh.

Human Physiology, reproduction and population dynamics.

(a) Physiology of digestion, Circulation, respiration and excretion.
(b) Metabolism: Carbohydrate and protein metabolism.
(c) Gametogenesis; ovarian cycle; role of hormones in ovarian cycle; fertilization, implantation, placenta and birth.
(d) Principles of population dynamics; human population and its control strategies in Bangladesh; and principles of birth control practices.

Embryology.

(a) Egg types, fertilization, Cleavage types and gastrulation.
(b) Early embryonic development of *Amphioxus*.

Economic Zoology.

(a) Culture of Carp, Prawn and Shrimps in Bangladesh. Factors responsible in decline of fishery resources in Bangladesh.
(b) Major insect pests of rice, jute, sugarcane and stored products: Biology, nature of damage and control measures of these major pests.
(c) Apiculture and Sericulture in Bangladesh.
(d) Role of mosquitoes in transmission of diseases in human. Malaria eradication and measures of mosquito controls.

Biochemistry

Paper I

Marks-100

A. Biophysical Chemistry

(i) Atomic structure: Fundamental particles, atomic number, atomic mass, isotopes, relative atomic mass, the mole concept, atomic models, Avogadro constant.

(ii) Periodic property: Periodic table, Mosley's law, ionization potential, electron affinity and electro negativity.

(iii) Gas laws, Ideal gas equation, Kinetic theory of gases, Dalton's law of partial pressure, van der Waals equation.

(iv) Thermodynamics: First and second law of thermodynamics. Enthalpy, entropy and free energy change, Standard free energy change of chemical and biochemical reactions.

(v) Solution: Types of solution, Collogative properties of solutions, Osmosis and osmotic pressure, Molecular weight determination by the use of osmotic pressure.

(vi) Acids and bases: Brown stead-Lowry concept of acids and bases, Lewis concept, netralisation, indicators, ion product of water, p^H, Buffer, Handerson Hasselbalch equation, biological buffers, buffering capacity.

(vii) Spectrophotometry: Beer-Lambart laws, optical density, standard curve and its use for quantitative determination of biochemical substances.

B. Organic Chemistry

(i) Aliphatic compounds: Hydrocarbon, Alkanes, alkenes, alkynes-their nomenclature, structures, properties and reactions. Alcohols, aldehydes, Ketones, carboxylic acids and derivatives-their nomenclature, structures, physical and chemical properties and reactions.

(ii) Aromatic compounds: Aromatic hydrocarbons, nitrobenzenes, aromatic amines, deazonium salt, phenols-their structures, preparation,properties and reactions.

C. Biomolecules:

(i) Carbohydrates: Nomenclature, classification, structures and important reactions, mutarotation and optical properties. Some important polysaccarides-Starch, glycogen, cellulose, mucopolysaccarides-their structures and functions.

(ii) Proteins: Biological functions of proteins, Classification of amino acids, their structures and properties, essential amino acids, identification of amino acids, classification of proteins, primary, secondary, tertiary and quaternary structures of proteins. Sequencing of proteins.

(iii) Lipids: Classification, biological function, characterization of fat's and oils, essential fatty acids, role of phospholipids, glycolipids and cholesterol in membrane formation. Structures of phospholipids, glycolipids and cholesterol.

(iv) Nucleic acids: Purines and pyrimidines, nucleosides, nucleotides, Classification of nucleic acids-DNA double helix, other structures of DNA. Types of RNA-their structures and functions.

D. Nutrition

(i) Classification of food, importance of carbohydrate, proteins and fat, their energy values. SDA, RQ.

(ii) Balanced diet chart for different physiological condition, nutritional diseases and nutritional status of people in Bangladesh.

(iii) Vitamins: Classification, structures, dietary sources, recommended daily allowances, deficiency symptoms and functions of different vitamins. Coenzyme activity of Vitamin B Complexes.

(iv) Minerals and trace elements: Biochemical functions, sources, daily requirements and deficiency symptoms.

Biochemistry

Paper-II

Marks-100

A. Intermediary Metabolism :

(xvii) Enzymes, characteristics, classification, active sites, enzyme activity units, factors affection enzyme activit, Michaelis-Menten equation, significances of Km and Vmax, Inhibition of enzymes, Allosteric enzymes.

(xviii) Carbohydrate Metabolism: Glycolysis, TCA cycles, Pentose phosphate pathway-their regulation and energetics. Gluconeogenesis.

(xix) Lipid metabolism: Detradation of triglycerides and phospholipids, oxidation of fatty acids, ketone bodies, production of energy by complete oxidation of palmatic acid, fatty acic biosynthesis and its regulation, biosynthesis of cholesterol.

(xx) Protein Metabolism: Outline of metabolism of amino acids by transamination, deamination and decarboxylation, glucogenic and ketogenic amino acids, urea cycles.

B. Physiology

(i) Blood: composition, function, blood cells, blood grouping, Heart structure and coronary heart diseases.

(ii) Digestion: Dtructure of the gastrointestinal tract, composition of digestive juices, Digestion and absorption of carbohydrates, proteins and fat.

(iii) Structure and functions of liver, lung and kidney.

C. Endocrinology:

Classification of hormones, mechanism of hormone actions, synthesis, physiological functions and biochemical functions of Pituitary, thyroid, parathyroid, pancreatic and gonad hormones.

D. Clinical Biochemistry:

2) Diagnostic importance of ALT, AST, CK, LDH, acid phosphotase, alkaline phosphotas, urea, uric acid, billirubin, glucose, cholesterol, calcium ion, iron ion, phosphate and bicarbonate ion. Genetic basis of some Biochemical disorders-phenylketonuria, alkaptouria, sickle cell anemia, thalsamia, gout.

3) Biochemistry of some diseases: Diabetes, Jaundice, Cholera, Diarrhoea.

E. Molecular Biology :

(i) DNA replication, Structure of m-RNA. Transcription, structures of t-RNA and ribosomes, Translation, Genetic code, Mutation, DNA sequencing, Northern blotting, Southern blotting and Western blotting.

(ii) Restriction enzymes, Vectors, DNA ligase, Cutting and joining of DNA, cDNA, reverse transcriptase, transformation. Host control restriction and modification,cloning of particular gene in different vectors, Polymerase chain reaction (PCR), Human Genome Project.

(iii) Regulation of Gene expression, Lac operon and arabinose operon, Catabolic repression.

Pharmacy

Paper –I

Marks-100

(a) Chemical bonds: Electronic concept of valency, different types of chemical bonds, theories of covalent bonding and hybridisation.

(b) pH and buffer: Determination of pH of acids and bases, salt solutions and buffers. Preparation of buffers. Buffers in pharmaceutical and biological systems.

(c) Principles and applications of absorption spectroscopy such as UV- Visible spectrophotometry, nuclear magnetic resonance spectroscopy and mass spectrometry.

(d) Separation techniques: Basic principles of chromatography, layer chromatography, ion exchange chromatography, gas chromatography, gas liquid chromatography and high performance liquid chromatography. Applications of chromatography in pharmaceutical fields.

(e) Quality control and quality assurance: Method validation, calibration, SOP and CGMP.

(f) Chemistry, SAR and mechanism of action and pharmacological properties of individual class of drugs.

(i) Analgesics and antiinflammatory agents.
(ii) Antihistamines.
(iii) Antibiotics.
(iv) Antihypertensive agents.
(v) Antidiabetic drugs.

(g) Vitamins and antioxidants: Classification and uses of vitamin preparations. Properties and uses of antioxidants.

Pharmacy

Paper-II

Marks-100

(a) Pharmaceutical dosage forms.

(i) Tablets: Manufacturing of tablets by wet granulation, dry granulation and direct compression, advantages and disadvantages of different processes, common tableting problems and evaluation of tablets.

(ii) Capsules: Classification, advantages and limitations of capsule dosage form, properties of capsules, formulation of capsules, problems in capsule manufacturing, quality control of capsules.

(iii) Suspensions: Advantages and disadvantages, aggregated and dispersed systems, formulation of suspensions, stability of suspension, quality analysis of suspension.

(iv) Emulsions: Applications, advantages and disadvantages, theory of emulsion, formulation of emulsion, classification of emulsifying agents, HLB values of surface active agents, quality analysis of emulsion.

(vi) Sustained release drug delivery systems: Principle of SR dosage forms, advantages and limitations of SR dosage forms, classification and types of SR dosage forms, drug release mechanisms from SR dosage forms, dose calculation for SR dosage forms.

(vii) Parenteral products: Classification of parenteral products. Formulation considerations. Vehicles, additives and containers.

(b) Skin creams and dental products: Introduction, classification and formulation of skin creams. Anticaries and antiplaque agents. Properties and types of dentifrices, formulation of powder dentifrices and pasts.

(c) Biopharmaceutical consideration: pKa and gastrointestinal absorption, important pharmacokinetic parameters such as biological half life, apparent volume of distribution, area under the curve, elimination rate constant etc. First pass effect, bioavailability and bioequivalence studies.

(d) Pharmacy act, new drug policy of government, drug act, drug rules, poison act, poison rules, dangerous drug act and dangerous drug rules as in force in Bangladesh.

Soil, Water and Environment

Paper-I

Marks- 100

Soil formation: soil forming materials–rocks and minerals primary and secondary minerals; silicate and non minerals; clay minerals – their formation and importance weathering of rocks and minerals; soil profiles and pedons; formation of soil horizons; master horizons and diagnostic horizons; factors of soil formation; important soil forming processes; major soil groups of the world.

Physical properties of soil: soil as a three – phase disperse system; mass and volume relationship of soil constituents; soil texture; soil structure – classification, evaluation, management and importance; soil water – energy state of soil water, soil water potential; retention and movement of water in soil; concepts of available water; soil air and soil temperature.

Irrigation and drainage: sources and quality of irrigation water; methods of irrigation; irrigation requirements of major crops of Bangladesh; irrigation projects in Bangladesh; drainage – types and benefits.

Soil survey and soil classification: different types of soil survey; techniques of soil survey; agricultural and non agricultural uses of soil survey data; soil Taxonomy; properties and uses of soil orders.

Land evaluation: concept of land evaluation; techniques and importance of land evaluation; land use planning.

Soil of Bangladesh: general condition of soil formation in Bangladesh; nature of soil forming factors; dominant soil forming processes; characteristics of major soil groups; agro ecological zones of Bangladesh.

Soil, Water and Environment

Paper-II

Marks- 100

Chemical properties of soil: chemical composition of inorganic components of soil; humus – its characteristics and importance; soil solution – composition and importance; ion exchange in soil – origin of ion exchange properties, ion exchange capacities of various soil constituents, importance; soil reaction – measurement of soil acidity, importance of soil pH; liming of acid soil; non – biological fixation of N, P, and K in soil.

Biological properties of soil: macro microorganisms in soil – their morphology, structure and classification; factors affecting microbial growth in soil; nitrogen and sulphur transformation in soil; biological N_2- fixation; bio-fertilizer.

Soil fertility and plant nutrition: concepts of soil fertility and soil productivity; essential nutrient elements – macro – and micronutrients; physiological function of N,P and K; fertilizers – sources, types and grades; fertilizer law; diagnosis of fertilizer needs in soil; methods of fertilizer application; residual effects of fertilizer; manures and compost; nutrient status and fertilizer needs of different AEZ of Bangladesh.

Soil pollution: sources of pollutants in soil; effects of soil pollution on ecosystem and food quality; permissible limits of heavy metals in soil, plants, sewage sludge, city wastes, irrigation water, industrial wastes and effluents; waste management.

Soil degradation and conservation: types and processes of soil degradation; assessment of soil degradation; soil quality – concept and assessment; soil conservation and reclamation – principles of soil conservation; agronomic and mechanical practices of soil conservation.

Accounting

Paper-I

Marks : 100

Financial Accounting

1. Introduction-Definition of Accounting, Objective, Need and Importance of Accounting, Users and Uses of Accounting Information. Brief History of Accounting, GAAP-Operating Guidelines. Basic Accountings Equation-International Accounting Standards-Accounting Profession.

2. The Recording Process-The Account-Rule of Debit and Credit, Expansion of Basic Equation, Journal, Ledger, Trial Balance, Adjusting Entries, Closing Entries, Correcting Entries, Work Sheet, Closing Entries, Financial Statement Preparation for Sole Proprietorship and Companies.

3. Inventory Accounting System-Perpetual & Periodical-Valuing Inventory at the Lower of Cost or Market(LCM).

4. Internal Control-Cash & Bank, transactions -Bank Reconciliation Statement.

5. Depreciation-Definition, factors and methods of changing deprecation.

6. Cash flow statement-Importance-Preparation of cash flow statement.

7. Accounting for Common stock Issue, Treasury Stock and Preferred Stock, Dividends and Retained Earnings-Bonus Shares or Stock Dividend.

8. Elementary Idea about Integrated Accounting System as practised in the sector Corporations in Bangladesh.

9. Elementary Idea about Social and Government Accounting-Feature of Government Accounting-CAG, his functions-Annual Account-Departmentation of Accounts.

10. Environmental or Green Accounting.

11. Financial Statement Analysis-Use and limitations-Vertical & Horizontal Analysis.

Accounting

Paper-II

Marks : 100

A. Cost Accounting : 50

1. Introduction : Meaning, Objective, Function and Importance of Cost Accounting. Financial Accounting Vs Cost Accounting. Methods & Types of Costing. Elements of Cost, Statement of Cost, Cost Concept, Cost classification. cost Accounting Vs Management Accounting
2. Accounting for materials, labor and overhead.
3. Accounting procedures for Job, Batch and Contract Costing.
4. Accounting Procedures for Process for Costing-Valuation of Work-in-Progress. Equivalent Production, Costing for By-Product & Joint Product.
5. Budgetary Control and Elementary Idea of Standard Costing.

B . Auditing : 25

1. Introduction : Objective, Advantage, Procedures and Techniques of Auditing, Audit Program, Various Modes of Conducting Audit.
2. Errors & Frauds-Nature & types, Auditors duty, Preventive Measures.
3. Internal Audit-Internal check and Internal control-Object, Procedures & Auditors Position.
4. Vouching-Verification and Valuation of Assets and Liabilities-Auditors Duties & Liabilities.
5. Auditing standards and Auditing Profession in Bangladesh.

C. Income Tax : 25

1. Principles of Public Finance-Objective of Taxation. Types of Taxes in Bangladesh, Incidence shifting of Burden-Internal Resources mobilization.
2. Income for Tax Purpose, Characteristics, Classifications and Heads of Income.
3. Assessment procedure of Income Tax for Individuals and companies.
4. Income Tax Authority in Bangladesh.

FINANCE

Paper-I

Marks : 100

Business finance-nature objectives-scope of Business Finance goals and functions of business finance-Financial Manager-Controller and Treasurer Functions-Sources of financial Information-Sources of short term. Intermediate term and long term financing.

Corporate Planning and financial Management-Funds Flow Analysis-Approaches to Financial Forecasting-Managing Cash Position-Management of Working Capital-Capital Budgeting-Cost of Capital Structure Theory-Financial Leverage-Planning the Capital Structure-Corporate Taxes-Personal and Corporate Taxes.

Ratio Analysis-Time-series Analysis-Projection of Financial Requirements-Pro-forma Statements-Role of Financial Markets-Primary and Secondary Securities Market-Dividend policy-Issue of Bonus Shares-Right share-Valuation of Share.

Insurance Meaning-Objectives of functions-Types-Life, Property and others-Principles of insurance : Insurable interest, Indemnity, Subrogation, Contribution, Utmost Good Faith, Proximate Course; Reinsurance; Insurance marketing; Insurance pricing; Insurance in Bangladesh-Insurance Corporations and Private Insurance Company Operations in Bangladesh.

Financial Institution-BSB. BSRS and ICB-Operation of Securities Exchange Commission and Stock exchange in Bangladesh.

FINANCE

Paper-II

Marks : 100

Need for Banks and Banking-Commercial and Central Banking-Banker-customer relationship-Negotiable Instrument Act-Comparative Banking-Fund Management and Measures of Performance of Banks

Deposit Management-Capital Management- Management of Reserves-Liquidity Management-Loans and advances, Cash Credit, Overdrafts-Loan Management-Loan policy, Tools of credit analysis-Classification of loans-Problem loans, symptoms, causes and remedies of problem loans.

Financial Service Consumer-Identifying and Targeting Financial Prospects-Development and Management of Financial Products-Pricing of Financial Service-Islamic Banking-Mode of Investment-Characteristics of Rural Economy of Bangladesh-Need for Funds in Rural Areas-Role of Rural Credit-Micro Finance-sustainability of micro finance-Foreign Exchange Reserve Management-Banking Reforms committee recommendation-Regulatory Arrangement of Bank-Impact of Regulation and Supervision of Financial Institutions-Investment Management of Bank Funds.

Electronic Banking-Opportunities, Legal Framework-e-payment Systems; Cheques Collections, Debit and Credit Cards, Lock Box, Clearing House-ATM and Tele Banking Banking system in Bangladesh - Bangladesh Bank-Nationalized Commercial Banks-Private Commercial Banks and Development Bank Operations in Bangladesh.

MARKETING

Paper-I

Marks : 100

Introduction : Definition of Marketing, Core Marketing Concepts, Company Orientation Toward the Marketplace : The Production concept, The Product Concept, The Selling Concept, The Marketing Concept, The Customer Concept, The Societal Marketing Concept, The Application of These Concepts in Bangladesh.

Scanning the Marketing Environment: Actors of Microenvironment, Analyzing Needs and Trends in the Macro environment, Identifying and Responding to the Major Macro environment Forces: Demographic, Economic, Natural, Technological, Political-Legal, Social-Cultural.

Segmenting, Targeting, and Positioning: Market Segmentation: Definition of Market Segmentation, Levels and Requirements for Effective Market Segmentation, Bases for Segmenting Consumer and Business Markets.
Target Marketing : Evaluating Market Segments, Selecting Target Market Segments.
Positioning by Competitive Advantage: Choosing a Positioning strategy, Communicating and Delivering the Chosen Position.

Product, Services, and Branding:
Product: Definition, Levels of Product, Product Classifications, Product Mix, Definition, Stages, and Strategies of Product Life Cycle.
Services: Definition, Characteristics and Marketing Strategies for Service Firms.
Branding: Definition, Brand-Name Decisions, Brand Strategy Decisions: Line Extension, Brand Extension, Multi brand, New Brand.

Pricing Approaches and Strategies:
Pricing Considerations and Approaches: What is a Price? Factors to Consider When Setting Prices, General Pricing Approaches.
Pricing Strategies: New-Product Pricing Strategies, Product Mix Pricing Strategies, Price Adjustment Strategies, Initiating and Responding to Price Changes.

Advertising, Sales Promotion, and Public Relations:
Advertising: Definition, Setting Advertising Objectives, Setting the Advertising Budget, Developing Advertising Strategy, Evaluating Advertising.
Sales Promotion : Definition, Sales Promotion Objectives, Major Sales Promotion Tools, Developing the Sales Promotion Programs.
Public Relation: Definition, The Role and Impact of Public Relations, Major Public Relation Tools.
Marketing Channel and Supply Chain Management: Supply Chain and Value Delivery Network, The Nature and Importance of Marketing Channel, **Channel Behavior and Organization:** Vertical and Horizontal Marketing Systems, Multi channel Distribution Systems, **Channel Management Decisions:** Selecting, Managing, Motivating and Evaluating Channel Members.

Marketing in Bangladesh: Marketing Problems and Prospects of Consumer Products in Bangladesh, The Role and Functions of BSTI, EPB, EPZ and Stock Exchange in Marketing in Bangladesh.

MARKETING
Paper-II
Marks : 100

Managing Integrated Marketing Communications: The Communication Process, Developing Effective Communications: Identify the Target Audience, Determine the Communication Objectives**,** Design the message, Select the Communication Channels, Establish the Total Marketing Communication Budget, Deciding on the Marketing Communication Mix: The Promotional Tools, Factors in Setting the Marketing Communications Mix, Measure the Communications' Results, Managing the Integrated Marketing Communications Process.

Personal Selling and Direct Marketing:
Personal Selling: Definition, Steps in the Selling Process, Personal Selling and Customer Relationship management.
Direct Marketing: Definition, Growth and benefits of Direct Marketing, Forms of Direct Marketing, Integrated Direct Marketing, Catalog Marketing, Telemarketing and E-Commerce.

Company and Marketing Strategy: Definition of strategic Planning, Defining a Market-Oriented Mission, Setting Company Objectives and Goals, Designing the Business Portfolio, Planning Marketing: Partnering to Build Customer Relationship, Marketing Process, Managing the Marketing Effort.

Creating Competitive Advantages:
Competitor Analysis: Identifying Competitors, Assessing Competitors, Selecting Competitors to Attack and Avoid, Designing a Competitive Intelligence System.
Competitive Strategies: Approaches to Marketing Strategy, Basic Competitive Strategies, Competitive Positions, Market Leader Strategies, Market Challenger Strategies, Market Follower Strategies, Market Nicher Strategies.

Developing New Market Offerings : Challenges in New-Product Development, Organizational Arrangements: Budgeting for New-Product Development, Organizing New-Product Development, Managing the New-Product Development: Ideas, Idea Screening, Managing the Development Process: Development to Commercialization, Product Development, Market Testing, Commercialization, The Consumer-Adoption Process: Stages in the Adoption Process, Factors Influencing the Adoption Process.

Designing Global Market Offerings: Competing on a Global Basis, Deciding Whether to Go Abroad, Deciding Which Markets to Enter: How Many Markets to Enter, Regional Free Trade Zones, Evaluating Potential Markets, Deciding How to Enter the Market: Indirect and Direct Export, Licensing, Joint Ventures, Direct Investment, The Internalization Process, Deciding on the Marketing Program**:** Product.

Managing Retailing, Wholesaling and Market Logistics:

Retailing: Types of Retailers, Marketing Decisions, **Wholesaling:** Types of Wholesaling, Wholesaler Marketing Decisions, Market Logistics: Market-Logistics Objectives, Market-Logistics Decisions, Organizational Lessons.

Management(Basic)

Paper-I

Marks : 100

Introduction	Definition of management, concepts, phases of development, importance, functions, principles, managerial skills, organization.
Scientific & Modern Management	Concepts and importance, different aspects of scientific management, results of Taylor's experiment, merits and demerits of scientific management, features of modern management, Fayol's principles of modern management.
Corporate Management	Separation of ownership and professional management, methods of company management, board of directors, size, qualification, methods of appointment, functions, duties and responsibilities, powers, code of conduct, corporate executive and chief executive officer(CEO).
Office Management	Importance, methods of office Management, co-ordination of various departments, filing and indexing, preparation of reports and Commercial documents, Meetings and resolutions, company/ corporate secretary.
Human Resource Management	Importance, selection and recruitment of staff, training, appraisal, Compensation, promotion, termination, retirement, personnel administration.

Management(Process)

Paper-II

Marks : 100

Introduction	Management thought, management and society, social responsibility, ethics, internal and external environment of organization, managing change, comparative management.
Planning	Importance, nature, purpose, types, steps, objectives, managing by objectives(MBO), strategic planning, decision making.

Organizing	Nature, formal and informal organization, Span of management, departmentation, organization structure, Line and staff concepts, delegation of authority, centralization, decentralization and re-centralization.
Leading	Managerial leadership, various approaches, leadership behavior and styles, situational leadership, motivation and motivators, various motivation theories and application, two-way communication.
Controlling	Basic control process, feedback and feed forward control, effective control, control techniques, Budgetary and non-budgetary control, preventive control, management audit.

Business Administration

Paper-1

Marks : 100

(a) Introduction, Nature and Importance of Business Administration, Administration as a Social Skill-principles of Administration, Social responsibility of Administration.

(b) Business Organizations- Forms of ownership in Bangladesh, Relative position of each form, sole proprietorship, partnership, joint stock company, co-operative society, combination and state ownership, considerations in the choice of specific form of ownership.

(c) Basic Process of Administration-Planning, Organizing, Assembling. Resources, Co-ordinating, Directing, Motivation and Co-ordinating.

(d) Planning-Types of planning: Goals, Objectives and Targets: Steps in Planning, Decision Making, Analytical Approaches of Decision Making-Policies and strategies.

(e) Organizing-Organization Structure, Departmentation, Span of Supervision-Delegation and Decentralization of Authority.

(f) Co-ordinating-Need for Co-ordination-Principles of Co-ordination-Techniques of Co-ordination.

(g) Directing-Nature and Characteristics of Direction-Consultative Direction-Leadership-Leadership styles.

(h) Motivating-Need for Motivation-Methods of Motivation, Incentives.

(i) Controlling-Need for Control-Basic Steps in Control-Strategic Control Points-Developing a Control System.

(j) Decision Making, Importance and Limitations of Rational Decision Making, Development of Alternatives, Nature and the Process of Evaluation of Alternatives, Selecting an Alternative, Modern Approaches to Decision Making, Evaluating the Importance of a Decision.

Business Administration

Paper-II

Marks : 100

(a) The Environment and Culture of Organizations, The Organization's Environment, The External Environment, The Internal Environment, Organization-Environment Relationships-The Organization's Culture.

(b) Strategy and Strategic Planning, The Nature of Strategic Management, Using SWOT Analysis to Formulate Strategy, Formulating Business-Level Strategies, Implementing Business-Level Strategies, Formulating Corporate-Level Strategies, Implementing Corporate-Level Strategies.

(c) Organization Design, The Nature of Organization Design, Universal Perspectives on Organization Design, Situational Influences on Organization Design, Strategy and Organization Design, Basic Forms of Organization Design, Emerging Issues in Organization Design.

(d) Organization Change and Innovation, The Nature of Organization Change, managing Change in Organizations, Areas of Organization Change, Reengineering in Organizations, Organization Development, Organizational Innovation.

(e) Nature and Purpose of Staffing, The Systems Approach to Staffing, Situational Factors Affecting Staffing, Systems Approach to the Selection of Managers, Selection Process, Techniques and Instruments, Orienting and Socializing New Employees.

(f) Basic Elements of Individual Behavior in Organizations, Understanding Individuals in Organizations, Personality and Individual Behavior, Attitudes and Individual Behavior, Perception and Individual Behavior, Stress and Individual Behavior, Types of Workplace Behavior.

(g) Leadership and Influence Processes, The Nature of Leadership, The Search for Leader Traits, Leadership Behaviors, Situational Approaches to Leadership, Related Perspectives or Leadership, Political Behavior in Organizations.

(h) Globalization and Management, What Globalization means, Globalization and Competitiveness, How Governments Influence Competitiveness, The Changing International Scene, A Brief Modern History of Globalization, Global Business Practice.

(i) Social Responsibility and Ethics, Ethics and Social Responsibility Today, The Changing Concept of Social Responsibility, The Shift to Ethics, The Tools of Ethics.

(j) Business Administrative Practices in Bangladesh.

Medical Science

Paper-I

(Physiology and Anatomy)

Marks-100

Part-I Physiology 50

(a) Physiology of basic tissues.

(b) Blood and circulatory system.

(i) Haemostasis.

(ii) Coagulation of blood

(iii) Cardiac cycle

(iv) E.C.G.

(v) Blood pressure.

(vi) Cardiac out put.

(vii) Physiology of shock.
(viii) Regional circulation.

(c) Respiratory system.
(i) Lung function tests.
(ii) Mechanism of rhythmic breathing.
(iii) O2 and CO2 carriage.
(iv) Regulation of respiration.
(v) Cyanosis and hypoxia.

(d) Digestion, Metabolism and Nutrition.

(e) Kidney and body fluid.
(i) Mechanism of urine formation and concentration.
(ii) Renal circulation.
(iii) Renal function tests.
(iv) Regulation of body fluids.

(f) Endocrinology and reproduction.
(i) Hypophysis.
(ii) Thyroid.
(iii) Parathyroid.
(iv) Pancreas.
(v) Adrenal gland.
(vi) Ovary and testis.
(vii) Reproduction and control of fertility in the male and female.

(g) Nervous system:
(i) General organization of nervous system.
(ii) Reflexes.
(iii) Cerebellum.
(iv) Hypothalamus.
(v) Emotion.

(h) Special senses:
(i) Vigual pathway.
(ii) Light reflex.
(iii) Accommodation reaction.
(iv) Vestibular apparatus.
(v) Pathway for test and audition.

Part-II Anatomy 50

(a) Anatomy of cells.
(b) Cell divisions.
(c) Elementary geneties.
(d) Tissues of the body:

(i) Epithelial tissue.
(ii) Connective tissue proper.
(iii) The skeletal system functions of the bones, Ligaments cartilages, structures of the bones and joints.

(d) The muscular tissues.
(e) The nervous system-structures of the nervous tissue-neurone and neuroglia; Central nervous system; peripheral nervous system and autonomic nervous system.
(f) The sense organs.
(g) Dermatomes.
(h) The skin.
(i) The circulatory system Heart, arteries, veins.
(j) The Respiratory System Nose, Throat, Larynx, Trachea, Bronchi and Lungs.
(k) Digestive system-Mouth, Pharynx, Oesophagus, Stomach, Intestines, Salivary glands, Liver, Gall bladder, Pancreas and Spleen.
(l) Urinary system-Kidneys, Ureters, Urinary bladder, Urethra.
(m) The reproductive system male and Female reproductive system.
(n) The endocrine glands.
(o) General embryology.
(p) Special embryology of the human body.

Medical Science

Paper-II

(Medicine and Pathology)

Marks : 100

Part-I Medicine 50

1. Objective : A graduate doctor will be able to :
   - Diagnose and manage various common medical conditions prevalent in the community (particularly in Bangladesh) and give proper counseling to patients and relatives.
   - Recognize, provide competent initial care and refer complicated cases to secondary and tertiary centers at appropriate time.
   - Diagnose and manage medical emergencies commonly encountered in hospital practice.
   - Demonstrate the awareness of the need to keep abreast of new knowledge and techniques in medicine.

Introduction to General Medicine

- Overview to medicine as a discipline and subject
- Approach to common symptoms of diseases : e.g. pain, edema, cough, vomiting, dysuria, paralysis, joint pain, weakness, enlarged lymph node, anaemia etc.

Blood transfusion

Clinical Medicine :

Nutritional Factors in diseases

- Energy yielding nutrients
- Protein energy malnutrition in adult
- The vitamins-deficiency and excess

Diseases due to infections

- Approach to infectious diseases-diagnostic and therapeutic principles
- General principles and rational use of antibiotics
- Dengue
- Enteric fever
- Amoebiasis, giardiasis.
- Kala-azar
- Malaria
- Filariasis
- Rabies
- Tuberculosis
- HIV/AIDS
- Leprosy
- Cholera, Diarrhoeal Disease

2. Approach to common symptoms of disease : Fever, Pain, Palpitation, Jaundice, Anaemia, Bleeding, Heamoptysis, Dyspnoea, Paralysis, Syncope, Ascitis, Oedema, Cough, Vomiting, Dysuria.

3. Nutritional, Metabolic and Environmental diseases : Protein energy malnutrition, Obesity, Diseases due to Vitamin deficiency and excess.

4. Respiratory disease : Bronchial asthma, Chronic obstructive pulmonary disease, Pneumonia, Pleural effusion, Pneumothorax, Bronchogenic carcinoma.
   Cardiovascular disease : Hypertension, Ischaemic heart disease. Acute rheumatic fever, Valvular heart disease, Heart failure.
   Blood disorders : Leukemia, Lymphoma, Hazards of blood transfusion etc.

5. Helminthic diseases
   - Nematodes
   - Trematodes

   HIV and infections in the immuno compromised conditions
   Syphilis, gonorrhoea.

6. Diseases of the cardiovascular system
   - Ischaemic heart disease

- Rheumatic fever and Rheumatic heart disease
- Valvular diseases of heart
- Infective endocarditis
- Hypertension and hypertensive heart diseases
- Cardiac arrhythmias(common)
- Heart failure – acute chronic
- Acute and chronic pericarditis, pericardial effusion & cardiac tamponade

Diseases of the gastrointestinal tract

- Peptic Ulcer disease and non-ulcer dyspepsia
- Malabsorption syndrome
- Irritable bowel syndrome and inflammatory bowel disease
- Acute viral hepatitis and chronic hepatitis
- Abdominal tuberculosis

Nephrology & Urinary System

- Nephritic & Nephrotic Illness
- UTI/Pyelonephritis
- ARF
- CRF

Neurological System

- Cerebrovascular diseases
- Meningitis : viral, bacterial and tuberculosis
- Encephalitis, viral
- Peripheral neuropathy

Water and electrolytes and acid-base homeostasis

- Diagnosis and treatment of specific fluid and electrolytic disorders

Endocrine and Metabolic diseases

- Diabetes mellitus
- Thyrotoxicosis
- Hypothyroidism and Iodine deficiency state
- Cushing's syndrome and Addisons disease

Connective tissue Disorder

- Rheumatoid arthritis and reactive arthritis
- Degenerative joint diseases including cervical spondylosis
- Gout

Geriatric medicine

Common Genetic Disorders

Common Immunologic disorders

7. Diseases of the blood
    - Anaemia : iron deficiency

- Common Haemolytic anaemia(Thalassaemia and acquired haemolytic anaemia)
- Common bleeding disorders(Thrombocytopendia and haemophilia)
- Agranulocytosis and aplastic anaemia
- Leukaemas : acute and chronic
- Lymphomas
- Multiple myelomas
- Blood transfusion

Diseases of the respiratory system

- Upper respiratory tract infections
- Pneumonias
- Tuberculosis
- Lung abscess and bronchiectasis
- Diseases of the pleura : Pleurisy, Pleural effusion & empyema. pneumotheorax.
- Chronic Obstructive lung diseases and corpulmonale
- Bronchial asthma & pulmonary eosinophilia
- Acute and chronic respiratory failure
- Neoplasm of the lung

8. Pancreatic disease : Acute pancreatitis, Chronic pancreatitis.

9. Liver and Biliary tract disease : Viral hepatitis, Chronic liver disease, cirrhosis of liver carcinoma liver, liver abscess.
10. Neurological disease : Cerebro vascular disease, Meningitis, Encepthalities, Epilepsy, Peripheral neuropathy, Management of unconscious patient.

11. Musculskletal disorders : Rheumatoid arthritis, Seronegative spondarthritis, Law back pain, Osteo-arthrtitis, Gout, Reactive asitritis etc.

12. Geriatic medicine : General principles of treating elderly, Health problem of the elderly.

13. Poisoning and drug overdose
    - Initial evaluation of the patient with poisoning of drug overdose
    - General principles of management
    - Treatment of common specific poisoning : OPC, sedatives, kerosene, alcohol, methanol, Dutra poisons
    - Venomous stings, insect bites, poisonous snakes and insects.

Emergency Medicine

- Cardiopulmonary resuscitation
- Acute pulmonary oedema and severe acute asthma
- Hypertensive emergencies

- Diabetic ketoacidosis and hypoglycaemia
- Status epileptics
- Acute myocardial infarction, shock and anaphylaxis
- Upper G.I bleeding and hepatic coma
- Diagnosis and management of comatose patient
- Drowning, electrocution

Common skin diseases : scabies, eczema, fungal infection

common psychiatric conditions : somatoform disorders, depressive illness, schizophrenia, substance abuse.

Clinical Methods in the Practice of Medicine

- History Taking
- Physical Examination
- Investigations
- Diagnosis
- Principles of treatment
- Interpersonal skills
- Communication skills
- Doctor-patient relationship
- Ethical Behavior
- Referral services
- Medical Certificate
- Common Clinical Procedures
    - Injections
    - Nebulisation
    - IV infusion
    - FIRST AID
    - Intubations
    - CPR
    - Hyper pyrexia
    - ECG
    - Skin Sensitivity Test

14. Clinical genetics : Introduction to medical genetics, Modern techniques of medical genetics, Down's syndrome, Klinefelter's syndrome, Turner's syndrome etc.
15. Immunologic disorders : Basic facts of Immunology, Immunologic deficiency diseases.
16. Sexually transmitted disease : Gonorrhoea, Syphilis, Non Gonococcal urethritis.
17. Skin disease : Scabies, Superficial fungal infection, Dermatitis, Psoriasis, Drug reaction etc.
18. Medical Psychiatry : Anxiety neurosis, Depression, Dissociative disorder, Somatoform, disorder etc.
19. Communication skill
20. Terminal Care

(a) Cell biology general concept.
(b) Inflammation, Degeneration, Necrosis and gangrene.
(c) Sterilization and disinfection.
(d) Disorder of growth :Tumors including cancers.
(e) Radiation, Hazards and prevention.
(f) Immunity, Immunization against common bacterial and viral infection. Immuno deficiency syndrome with special reference to AIDS.
(g) Common cause of diarrhoea and pathogenesis and complication. General reaction to trauma, hemorrhage and shock.
(h) Bacterial infections with special references to Enteric fever, Tuberculosis, Leprosy, Diphtheria, Whooping cough, Tetanus, Gas gangrene, Food poisoning, Strepto and Staphylococcal infections, Bacillary dysentery, Cholera.
(i) Common viral disease like poliomyelitis, Chickens pox, Measles, Viral hepatitis, Rabies, Herpeszoster, HIV. AIDS. Dengue.
(j) Common parasitic disease Ascariasis, Ankylostomasis(Hook worm infection).
(k) Common protozoal disease Malaria, Kala-Azar, Giardiasis.
(l) Sexually transmitted disease like, Gonorrhoea, Syphilis, elaneaid, Nongonococcal urethritis.
(m) Routine laboratory procedure for peripheral blood film Urine, Stool malarial parasite examine sputum for Gram stains and AFB examine Blood examine for Hb% and ESR.
(n) Special pathology for some diseases like Tuberculosis, Pneumonia, Bronchial Carcinoma, Chronic Bronchitis, Empygenia, Bronchicetasis, Respiratory failure, pleurisy, pleural effusions, Pneumoconiosis.
Liver disease like viral hepatitis, Hepatic amebiosis, liver abscess, primary and secondary carcinoma of liver
Collage disease like systemic lupus erythomatosus, Systemic sclerosis, Dermatomyositis-Rheumotoid arthritis.
Joint disease – Gout, spondylitis psoriatic arthritis. Osteo arthritis Seronegetive arthritis
Endocrine disease : Pituitary tumors, Acromegaly, Thyroid tumors, Hyperthyroidism, Hypothyroidism.
GI tract : Peptic ulcer disease, Carcinoma , Stomach Carcinoma, colon, renal disease: Acute and chronic glomerlo nephritis, Acute and Chronic pyeto nephritis. polycystic disease of Kidney, Renal artery stenosis, Renal failure.

Neurological disease : Cerebrovascular disease, multiple Meningitis, Epilepsy, multiple sclerosis, Neurosyphilis, ryopathy mysthesis grovis.

Cardiovascular disease : Congenital and acquired valvular heart disease. Ischemic heart disease, Hypertensive heart disease. cardiomyopathies Heart failure.

Dental Science

Paper-I

Marks-100

1. Oral Surgery and Anesthesia:

(i) Acute infections of the Oral cavity-Acute infections of the jaws, periapical abscess, pericoronal infections, dissecting subperiostial abscess, periodontal abscess, facial planes and spread of infections, acute cellulitis, ludwig's angina, cavernous sinus thrombosis, differential diagnosis of neck swelling and lymph node enlargement in and around the jaws and the neck.

(ii) Hemorrhage diseases, disorders and lesions and complications associated with oral surgery.

(iii) Extraction of teeth-Indications and contra-indications for extractions or other surgical operations.

(iv) Cysts of bone and soft tissue of the oral cavity-Classification, development of cyst, general consideration of cystic lesions, treatment, post operative complication.

(v) Wounds and injuries of the soft tissues of the facial areas-General consideration and classification of wounds: concussion, abrasion, laceration, penetrating wounds, gunshot wounds, burns, treatment of wounds & burns.

(vi) Fractures of the jaws-Etiology, classification, examination, diagnosis, management and complications of fractures of mandible, maxilla zygoma and other facial bones.

(vii) Surgical aspects of the oral tumours-Tumours of the hard tissues of the cavity, odontogenic tumours, osteogenic tumours, pregnancy tumours, tumours of the soft tissues of the oral cavity, carcinoma of the oral cavity, diagnosis and treatment.

(viii) The temporomandibular joints-Anatomy, painful temporomandibular joint, actiology symptoms, clinical findings, roentgen graphic findings and treatment of T.M.J. dislocation, Ankylosis with complications.

(ix) pre-prosthetic Surgery-Edentulous ridge criteria, types of oral and extra oral surgical procedures, abnormalities of soft & osseous tissues, Frenectomy, ankyloglosia, ridge extension procedures.

(x) Plastic Surgery-Embryology, etiology, classification objectives, surgical correction of lip, alveolus and palate.

(xi) Local anaesthesia-Infiltration nerve block technique, the art of local indications and contra-indications of local anaesthesia.

(xii) General Anaesthesia-Role of general anaesthesia in dentistry, indications for general anaesthesia, preoperative preparation for in-patient or our patient general anaesthesia.

2. Conservative Dentistry and Dental Radiology.

(i) Dental caries and classification of caries.

(ii) Class I and II cavity preparation in extracted molar teeth for silver amalgam restorations, Matrix band application, Insertion of lining materials, Amalgam plugging and finishing.

(iii) Class III and IV cavity preparation in extracted teeth and insertion and finishing of different anterior filling materials.

(iv) Class V cavity preparation in the extracted teeth and insertion and finishing of different filling materials.
(v) M.O.D. cavity preparation.
(vi) Retentive pin technique for different restoration.
(vii) Inlay preparation in the extracted teeth.
(viii) Jacket crown preparation in the extracted teeth.
(ix) Preparation of teeth for root canal treatment-Anaesthesia-isolation, surface sterilization.
(x) Root canal theraphy.
(xi) Endodonties in children.
(xii) Periodontal diseases and the dental pulp.
(xiii) Problems in endodonties treatment.
(xiv) Technique of dental and oral radiography.
(xv) Radiation Hazard.

Dental Science
Paper-II
Marks-100

1. **Prosthodontics.**

Complete Denture Prosthesis-

(i) Impression procedure, preliminary and final.
(ii) Construction of cast from impression, base or permanent base & wax rim.
(iii) Selection of teeth (Shade & Mould).
(iv) Alignment of teeth.
(v) Trial of complete denture.
(vi) Finishing of complete denture, fitting the finished denture (insertion).
(vii) Complaints of patients.

Partial Denture Prosthesis-

(i) Impression.
(ii) Treatment planning and mouth preparation.
(iii) Model Surveying.
(iv) Component parts of partial denture.
(v) Materials used in partial denture construction.
(vi) Design of partial dentures.
(vii) Wax pattern for cast denture and acrylic dentures.
(viii) Recording of occlusion.
(ix) Trial of partial denture.

Crown and Bridge Prosthesis-

(i) General indication of crown.
(ii) Tooth reduction steps & preparation of principle crown.
(iii) Full veneer crown.
(iv) Partial veneer crown.
(v) Inlay retainer.
(vi) Impression technique.
(vii) Construction of porcelain jacket crown.
(viii) Construction of veneered gold crown.
(ix) Construction of veneered jacked crown using resin.
(x) Abutment general principles retention and support.
(xi) Pontics.
(xii) Design of the pontic.
(xiii) Construction of bridge.

Cleft Plate and Oro-Facial Prosthesis-

(i) Obturation for intra oral loss at tissue by surgery.
(ii) Implant denture.

Orthodontics-

(i) Definition, Aims objectives and scope of Orthodontics.
(ii) Growth and development of jaws, face and skull.
(iii) Normal occlusion and its characteristics, factors responsible for establishment and maintenance of normal occlusion.
(iv) Soft tissue morphology and behaviour.
(v) Malocclusion, Types: Arch and skeletal classification.
(vi) Aetiology of Malocclusion.
(vii) Types, design of appliances and anchorage.
(viii) Appliances for different tooth movement.
(ix) Preventive, Interceptive and corrective treatment of Malocclusion.
(x) Extractions in orthodontics.

3. **Children Dentistry, Preventive and Community Dentistry-**

Children Dentistry-

(i) Scope and importance of pedodontics.

(ii) Diagnosis and treatment planning for child patient.
(iii) Diseases of the oral mucous membrane and related problem in children.
(iv) Nutritional factors in diseases.
(v) Child psychology and management of child patient in dental office.
(vi) Oral habits in children.

3. Preventive & Community Dentistry-

(i) Prevention of dental caries with fluorides.
(ii) Food and dental caries.
(iii) Prophylactic and operative technique in dental caries prevention.
(iv) Prevention of periodontal disease and dental caries in individual and mass level.
(v) Dental ancillaries.
(vi) Dental epidemiology, survey, and Introduction to Biostatistics.
(vii) Parent counseling and child behavior.
(viii) Planning for Manpower requirements in dental public health.
(ix) An approach to dental Health Education for school children.
(x) Field programme-for oral health surveys, motivation and oral Health Education.
(xi) In rural areas to conduct survey of dental disease, Provide dental health education and emergency treatment.
(xii) School-Health Programme-Dental care for school children and preventive Programme-Topical fluoride application and oral hygiene demonstration.

4. Dental Jurisprudence-

(i) Legal rights and protection.
(ii) Dental record keeping and person identification.
(iii) Ethics, Particularly as they apply to the dental surgeon in his relation with parents, the public and his colleagues.
(iv) The ethics of epidemiological studies and other projects.
(v) An outline of forensic odondology.

Agriculture

Paper-I

Marks-100

a) Production technology and costing of field crops- rice, wheat, maize, jute, sugarcane, tea, tobacco, lentil, groundnut, soyabean and mustard. External morphology and desirable qualities of these crops.
b) Production technology of horticultural crops-Banana, papaya, pineapple, potato, tomato, cabbage, cauliflower, brinjal, onion, garlic and chili. Post-harvest management (e.g. processing and storage) of these crops.
c) Importance of irrigation and drainage for crop production. Merits and demerits of different methods of irrigation. Irrigation seedling in crops. Quality of irrigation water in relation to crop production and soil condition.
d) Crop nutrition and fertilizer management: sources and available forms of plant nutrients, fertilizer and manners, judicious application of fertilizers and organic matters in different agro-ecological zones (AEZ) of Bangladesh. Use of Bio-fertilizers in agriculture and water management utilization of agriculture wastes. Scope and importance of bio energy, and generation of Bio-gas.

e) Major insect pests and diseases of rice, wheat, jute, sugarcane, potato and mango and their control measures.

f) Pesticides - their formulation, mode of action, methods of application residual effects with safety measures. Economic injury level and LD50. Integrated pest management (IPM) -concept, prospects and limitations.

g) The principles and practices of agricultural extension with special emphasis on program planning, transfer of technologies, communication, diffusion and leadership. Importance of rural youth, rural women and landless farmers in agricultural extension and their empowerment.

Agriculture

Paper-II

Marks-100

i) Plant genetic resources (PGR) -diversity of PGR and their conservation methods.

ii) Crop improvement- introduction, selection, hybridization and mutation breeding. Development of hybrid and modern varieties (MVs). Concepts of variety Act and intellectual property right (IPR), seed certification and variety release.

iii) Bio technology in Agriculture: Tissue culture, genetic engineering. GMO and bio safety regulations-environmental, social, legal and ethical issues.

iv) Plant growth regulators, growth retardants and phytohormones. Ripening chemicals- uses and abuses.

v) Concept and significance of seed viability and seed vigor. Testing seeds for purity, moisture, germination and vigor. Principles of seed crop production.

vi) Weed competition and factors affecting crop-weed competition. Allelopathic effects of weeds on crops and vice-versa. Herbicidal weed control in rice, jute, cotton and sugarcane. Integrated Weed Management (IWM).

vii) Environmental degradation and pollution (soil, water and air pollutions)-causes and impact on Bangladesh Agriculture. Management of drought, flood and soil salinity and other current environmental issues.

viii) Concept and scope of agro-forestry, present status of forest resources in Bangladesh, possible improvement of present land use system through sustainable agro-forestry. Multistoried tree production system, hill cultivation-SALT practices and their different models.

ix) Economic importance of fiber, oil, timber, medicine, rubber, narcotic and beverage crop plants and their products. Tapping system, composition and latex coagulation of rubber. Manufacturing process and changes in chemical composition in tea leaves.

Agricultural Economics

Paper-I

Marks-100

Agricultural Economics : Definition and scope of Agricultural Economics-Concepts and tools used in Agricultural Economics. Importance of the study of the discipline.

Production Economics : Production and cost functions, types of production function, stages of production, law of diminishing return, economic efficiency and profit maximization. Production with two variable inputs, least cost combination of factors; Enterprise combinations- Returns to scale and equilibrium in the long run.

Farm Management : Principles and functions of management, economic principles in farming. Data collection methods. Types of data collected by survey; sampling techniques. Analytical techniques: - cost accounting gross margin analysis, operating statement. Measures of whole farm performance, farm planning and budgeting.

Economic Growth and Development : Meaning and theories of economic growth. Characteristics of economic growth. Growth versus Equity. Economic and social indicators of development; Salient features of Bangladesh Agriculture: Employment problems. Government policies and strategies for agricultural development in Bangladesh.

Land Resource Economics : Concepts of land and land resources, factors affecting supply of land resources for economic use. Population and land resources, application of proportionality in land resources; land use intensity; economic returns of land resources land development costs and conservation of land resources. Tenancy and leasing arrangements; land reforms and land use planning in Bangladesh.

Agricultural Economics

Paper-II

Marks-100

Agricultural Prices : Meaning, role and functions of agricultural prices. Characteristics of agricultural prices. Factors affecting pricing of agricultural products. Determinants of demand, determinants of supply and relation to costs and production function. Factors influencing agricultural supply. Price variations over time and over space. Role of government in price determination and price support policies in Bangladesh.

Agricultural Marketing : Basic concepts of marketing approaches to the study of marketing, Marketing functions and marketing institutions, marketing channels. Marketing cost, margin, efficiency and marketing mix, market organization and integration. Input and output marketing. Government intervention in farm products, cooperative marketing.

Rural Development and Institutions : Importance and scope of rural development. Models of rural developments. Cooperatives as institution for rural development. Traditional cooperatives and new two-tier cooperatives, Principles and practices cooperation, Organization of cooperatives, Determinants of success and failure of old cooperatives. Integrated Rural Development-Stages of two tier cooperatives, and their position in institution building, poverty alleviation and women's development programmes of present day cooperatives.

Agricultural Finance : Its nature and scope, financial institutions in agriculture, role and classification of credit, evaluation of credit capacity, factors affecting cost of credit. Loan repayment plans and methods of computing loan repayment. Risks and uncertainties in agriculture, Strategies to reduce risks. Farm credit systems of Bangladesh Krishi Bank and BRDB Cooperatives. Poverty situation in Bangladesh. Micro credit and poverty situation.

Agricultural Engineering

Paper-I

Marks : 100

1. Agricultural Machinery : Type of primary and secondary tillage implements, principles of operations and their specific use; mechanical functions of seeding machines and planers, their types and uses and their maintenance; Functions and use of combine harvester, fertilizing, spraying and plant protection machines, weeding and thinning equipments; Present status and scope of utilization of power tillers, tractors and other power sources at the farm level of Bangladesh; Soil implement mechanics and Biomass resources and utilization in Bangladesh.
2. Irrigation & water management :
   Importance of irrigation and drainage practices in food and fodder production sources and quality of irrigation water. Advantages and disadvantages of surface and groundwater utilizations. Technological innovation in the field of water lifting devices :- traditional and modern methods. Reliability of irrigation water resulting from climate/geological phenomenon and O & M difficulties. Hydrostatic pressure on surfaces, Euler's equation, Bernoull's equation, Flow through-orifice, pipes, Flow over notches, open channels, Boundary layer theory. Scheduling of irrigation water and irrigation water distribution system.

3. Food Engineering Principles :
   Food preservation principles and processes. processes for preservation of vegetables, fruits, fish and meat products. Village processing food based on low level technologies in Bangladesh. Cold storage design, performance and operational characteristics. Sanitation and control of microbiological problems involved in the processing and storage of food. Quality control requirements of processed foods. Design and selection of food machinery, packaging materials, Homogenization and pasteurization.
4. Food Engineering : Food preservation principles and processes, Selection of good machinery, Food plant design and layout, Material handling systems and packaging aspects of food industries, Safety and hygienic measures in food plant, Water treatment and utilization in food plant, Water treatment and utilization in food plant, selection, operation and maintenance of food machineries.

Agricultural Engineering

Paper-II

Marks : 100

1. Advanced Agricultural Machinery :
   Design requirement and development aspects of various agricultural machineries and implements. Soil and tillage inter-action and its application in the design of tillage tools maintenance and trouble shooting of farm machineries and implements. Force system, equilibrium condition, frictional force system, centroids, structures, kinetics of particles and rigid bodies. Design of machine members, bearings, gears, and flexible power transmission elements. Welding, planer machine, shaper machine, milling machine. Primary and secondary tillage implements, fertilizer, sprayers, crop harvesting equipments.

2. Irrigation Engineering :
   Criteria for installation of water diversion and control structures and selection of water lifting devices including pumps. Methods of irrigation of different crops in given soil and topography; Factors causing water losses and estimation of application, conveyance, water use efficiencies. Importance of irrigation need at various stages of growth of important crops and its implication in irrigation system design.

3. Quality and environmental control requirements for processed food, Principles and methods of freeze drying, filtration, sedimentation and concentration, process extraction, distillation, chilling methods and cold storage; Processes for preservation of vegetables, fruits, meat, milk, fish and food products; Food regulations and compliance. Village level technologies of food processing.

4. Concept, scope and problems of On-farm water management; Influence of climatic factors and agricultural meteorology, Hydraulic machinery theories and types of pumps. Design of various hydraulic structures, earth embankments and their problems; Ground water and wells, problems of ground water development and management in Bangladesh, evaluation and assessment of irrigation project.

Animal Husbandry

Paper-I

Marks-100

Contribution of livestock in the farming system of Bangladesh. Classification of common farm and domestic animals with the description of different breeds of cattle, buffalo, goat and sheep.

Judging of goat and sheep for meat, milk and wool. Judging and selection of cattle and buffalo for productive purposes.

Chemical composition and microscopic structure of hides, skins and wool. Factors affecting the quality of hides and wool.

Prospect, potential and constraints of development of meat industry in Bangladesh. Factors affecting the quantity and quality of meat. Marketing of meat and meat products.

Development of technologies for processing and treatment of animal wastes. Environment pollution through animal wastes.

Farm planning and evaluation for commercial beef and buffalo production.

Ruminant and non-ruminant nutrition. Feed nutrients and their utilization in animal body.

Reduction of methane production by ruminants and improved productivity to dietary manipulation in the rumen.

Animal feed resources-conventional and unconventional. Nutritional evaluation of feeds. production and prospect of green forages in the existing crop farming system. Preservation of forages and its feeding to animals. Processing and utilization of feedstuffs and agro-industrial by products as animal feed.

Nutrient requirement of different types of animals. Formulation of ration for different animals for different purposes. Feeding during scarcity periods, like flood, drought etc.

Factors affecting nutritive value of feedstuffs. Anti-nutritional factors of feedstuffs.

Prediction of feed intake for livestock. Importance, present status and future scope of fees milling industry in Bangladesh.

Characteristics of important dairy cattle breeds. Selection of site for dairy farm. Judging and condition scoring of dairy cow. Role of cooperative in dairy development.

Definition, composition and structure of milk and colostrum. Factors affecting composition of milk. Food value, standard, grades and classes of milk. Milk collection, transportation and payment. Processing, transport and marketing of milk and milk products. Methods of preservation of milk.

Factors affecting the success of dairy farm (operating quality and quantity of milk).

Factors responsible for development of dairy industry in Bangladesh. Problems of dairy industry in Bangladesh and there possible solution. Dairy by-product in Bangladesh. Preparation of butter, ghee, ice-cream.

Dairy farm planning. Layout and prospects for successful dairy operation. Feeding, housing and management of dairy cows, calves and heifers. Planning for year-round feeds and fodder supply in dairy farm. Record keeping for successful dairy operation.

Origin, domestication and distribution of different poultry species. Classes, breeds, varieties and strains of chicken and ducks.

Housing principles of poultry. Poultry feed ingredients, their classification, nutritive value,

Artificial incubation, fertility and hatchability eggs. Selection of hatching eggs. Economics of hatchery business.

Production of duck, quail, geese and pigeon. Poultry processing plant.

Parent stock and commercial layer production. Egg production in small holder farmers condition.

Marketing of eggs-its problems and solution. Commercial broiler production and management in Bangladesh. Importance of poultry and poultry products.
Poultry farm planning and management. Bio-security in planning and designing of poultry farm.

Commercial poultry farming on village ames-problem, utility and caution.
Production and control measures for common poultry disease in Bangladesh.

Genetics and its contribution to livestock development. Linkage, crossing over and chromosome mappings, immunogenetics, mutation. Genotype-environment interaction and its implication in livestock production Partitioning of causes, phenotypic varition into its components.

Chemical basis of inheritance, genetic engineering, recombinant DNA technology and its application in livestock.

Estimation of heritability repeatability and genetic correlation. Estimation of breeding value, transmitting ability, most probable producing ability. Animal selection-aids to selection, selection purpose, selection limit.

Use of specialized computer programs for solving breeding problems. Genetic diversity, animal genetic resources, out breeding, out crossing, cross breeding, line crossing, and up-grading. Open nucleus Breeding system(ONBS), community breeding programme.

Portraits of economic importance, selection and breeding plan for the improvement cattle, buffalo, goat sheep and poultry.

Animal Husbandry

Paper-II

Marks-100

Importance of livestock in the socio-economic conditions of Bangladesh. Characteristics and constraints of livestock development in Bangladesh. Existing livestock production, marketing and disease prevention situation.

Livestock development strategies-dairy cattle, beef cattle, buffalo, goat, sheep, chicken, duck etc,

Animal slaughtering and meat quality aspect-status, problems, prospects.

Balanced feed-criteria, formulation procedure, problems, prospects and quality control.

Green feeder- Status, ways and means to attain self-sufficiency.
Livestock development through breeds and breeding-genetic resources, matching genotype, genotype-environment interaction, appropriate breeding tools, prevention of genetic crosior. In-situ breeding and conservation programe for valuable native animal genetic resources.

Major constraints of small holder dairy development in Bangladesh and ways and means to overcome them. Multiple ovulation and embryo transfer (MOET) technology in dairy cattle breeding.
Production of clean and sage milk and milk products in Bangladesh. Importation of powdered milk-causes, risk and ways of minimize it.

Small holder poultry production- an economic vehicle for rural women's livelihood-problems and prospects causes of poor production of indigenous chicken. Selection and come of hatching eggs. Principles of poultry feeding. Factors regulating profit margin from poultry farming.

Veterinary Science

Paper-I

Marks-100

1. (i) Definition and scope of veterinary science.
   (ii) Horizon of veterinary activities.
   (iii) Contribution of livestock and poultry to national GDP, employment and rehabilitation of distressful women.
2. (i) Important task of animal health and hygience : General measurement for the prevention and control of infectious diseases, effect of environment on animal health.
   (ii) Degestion and metabolism of carbohydrate, protein and fat in simple and compound stomach animals.
   (iii) Puberty and sexual maturity, factors affgecing puberty and sexual maturity in ruminants.
   (iv) Reproductive hormones, estrous cycle, gestation, parturition and lactation.
   (v) Endocrine glands, secretions, functions and regulations.

3. (i) Livestock and poultry industry : Programme of a farm activities in relation to each type of herd and flock health management including feeding, breeding, housing, application of biosecurity and harvesting of animal products and their marketing.

(ii) Formulation and preparation of ration for cattle, sheep, goat and poultry.

(iii) Breeds of animal and poultry and their important characters.

(iv) Animal by-products including hides, skins and leathers, their marketing at home and abroad.

4. (i) Isolation and identification of common bacteria, virus and fungus and collection of samples for bacteriological, virological and mycological examinations.

5. (i) Clinical tests for examination of blood, feces, urine and skin scrapings with their interpretations.

(ii) Principles and interpretations of different tests for liver and kidney functions.

(iii) Interpretation of hemostatic disorders such as coagulation time, bleeding time, prothrombin time and thrombocyte count.

(iv) Techniques of postmortem examination in animals and birds and systematic investigation of infectious, non-infectious diseases and other pathologic disorders.

(v) Methods of collection, preservation, fixation, processing and staining of pathologic specimens including dispatching them to diagnostic laboratory.

6. (i) Clinical Examination of animals

Determination of sex and age

Clinical diagnosis of diseases

(iv) Livestock and poultry diseases : Clinical findings, postmortem lesions, diagnosis, treatment, prevention and control of important parasitic (ascariasis, haemonchosis, fascioliasis, babesiosis, coccidiosis), infectious (anthrax, black quarter, hemorrhagic septicekmia, tuberculosis, paratuberculosis, enterotoxemia, foot and mouth disease, rabies, PPR, Gumboro disease, Newcastle disease, Marek`s disease, salmoinellosis, fowl cholera, colibacillosis, mycoplasmosis), non-infectious including metabolic diseases (milk fever, ketosisc pregnancy toxemia, grass tetany), diseases caused by nutritional (copper, cobalt, iron, zinc) and vitamin (A, D, E,B vitamins) deficiencies.

(v) Important diseases of small animal and zoo animal (hookworm, heartworm, mange, tuberculosis, anthrax, canine distemper, infectious canine hepatitis, psittacosis, amoebiasis) their diagnoses, treatment, prevention and control.

(vi) Diagnosis, treatment, prevention and control of important reproductive diseases (cysts in ovary and mesovarium, pyometra, endometriosis, retained placenta, abortion and stillbirth).

(vii) Uses of antibiotics, anthelmintics, insecticides, steroids and other hormones. Drug withdrawal and residue avoidance.

7. (i) Sampling procedures and use of t & F test for statistical analysis of the result of a scientific experiment.

8. Animal disease Act and Animal Slaughter Act and their implementation.

9. Importance of Veterinary Public health in Bangladesh and its drawback in comparison to developed countries.

10. Improved Variety feeds and fodder available in the country and their characteristics.

Veterinary Science

Paper-II

Marks-100

1. (i) The etiology, clinical findings, gross pathological changes, diagnosis, prognosis and treatment of common diseases of digestive, respiratory, cardiovascular, hematological and urogenital, nervous and integumentary systems.

   (ii) Principle of epidemiology, methods of epidemiological investigation, their application in the control of important infectious and non-infectious diseases of domestic animals and poultry.

   (iii) Common frauds practiced in sell of livestock and livestock products.

   (iv) Veterinary ethics and laws. Legislation against animal diseases in Bangladesh.

2.(i) Common characters and pathogenecity of following bacteria : Bacillus, clostridium, streptococcus, staphylococcus, eschedrichia, pseudomonas, brucella, salmonella, actinobacillus, actionomyces, shigella, pasteurella, listeria, leptospira, corynebacterium, mycobacterium and following fungus: Aspergillus, blasstomyces, cryptococcus, histoplasma, rhinosporidium, candida, microsporum, trichophyton of domestic animals and poultry.

   (ii) Common characters and pathogenecity of following viruses : The viruses of Goat pox, fowl pox, Marek`s disease, malignant catarrhal fever, IBR, infectious canine hepatitis, duck hepatitis, FMD, NCD, PPR, canine distemper, rabies, IBD ofdomestic animals and poultry.

   (iii) Immunity and its classification, types of immune response, cells responsible for immune response, antigen, vaccines, antibody, antibody production and serological test (Rapod plate agglutination test, HA, HI, FAT and ELISA).

3. (i) Principles of sedation, analgesia and premedication, common intravenous and inhalation agents used in anaesthesia.

   (ii) Methods of producing various local and regional anaesthesia, hazards associated with anaesthesia.

(iii) Operative technique of the common surgical diseases (Bloat, impaction, dystocia, dermoid cyst, cataract, gluocoma, atresia ani, abdominal hernias, phimosis, paraphimosis) including postoperative care.

4.(i) Properties and exposure factors of x-rays.

(ii) Hazards of radiation and the protective measures.

(iii) Radio-diagnosis and radio-therapy.

(iv) Examination of animal for soundness and certificate writing.

5. (i) Diseases and accidents associated with purturition : metritis, utero-vaginal prolapse, downers cow syndrome.

(ii) Collection and preservation of liquid and frozen semen of bulls and bucks.

(iii) Techniques of artificial insemination (A1) in cows and does, health management of A1 bulls and bucks.

(iv) Venereal and semen borne diseases in ruminants.

(v) Livestock population and cattle breeding policy in Bangladesh.

6. (i) Methods, standardization and evaluation of common drugs used in veterinary practice.

(ii) Poisonous plants (Datura, abrus, ricinus, strychnos), mycotoxins (aflatoxins, ergot) and minerals (arsenic, copper, lead, selenium, zinc) concerning the veterinarians.

7. (i) Role of veterinarian in public health.

(ii) Prevention and control of common zoonotic diseases (Anthrax, brucellosis, rabies, hydatidosis, scabies).

(iii) Food horne infections and intoxications.

(iv) Meat inspection and meat borne diseases.

Criteria to be followed for establishing a small scale dairy, goat and poultry farm.

9. Role of Drug control Authority and BSTI in Veterinary drug and product control.

10. The quarantine procedures to be followed to prevent disease transmission across the borders.

Fisheries

Paper-I

(Fisheries Biology and Management)

Marks-100

(i) General Ichthyology : Classification of major groups of fishes. External morphology: Body forms, shape and size, appendages and their origin. Scales and skeleton, coloration in fishes and its significance. Anatomy of different internal organ system: Respiratory, Digestive, Circulatory, Excretory and Reproductive. Swim bladder: origin and its role in buoyancy. Adaptive radiation in fishes. Receptors.

(ii) Biodiversity and Fishery Systematic : Definition, different types of biodiversity. Economic and ecological values of biodiversity. Causes of the loss of biodiversity: natural variation in time and space. Red list: present status of aquatic biodiversity and endangered aquatic species of Bangladesh. Protected areas of Bangladesh-important haor, river and lakes, exotic species. Conventional Biological Diversity (CBD), Sundarban, Coastal and Marine Biodiversity, Conservation-in situ and ex-situ. Scope of fishery systematic, species concepts and speciation in fish. Taxonomic characters, criteria for taxonomic categorization. Zoological nomenclature: Rules, International code, validity of names, homonymy, synonymy.

(iii) Fish Physiology : Classification of fish on thermal regulation. Physiology of Respiratory, Digestive, Circulatory, Excretory and Reproductive systems. Osmoregulation and Endocrine system. Special organs-light and electric organs.

(iv) Genetics and Fish Breeding: Mendel's laws of inheritance, principles of independent assortment. Interaction of genes, theory of chromosome inheritance and manipulation, gametogenesis. Sex-influenced and sex-limited inheritance, mutation.

Genetic variance and hybridization, heterosis and hybrid vigor, impact of hybridization. Gene and Brood banking.

Importance of fish-hatchery, status and rule of hatcheries in Bangladesh. Brood stock rearing strategy. Hatchery operation and management methods including cry preservation of fish gametes. Natural and artificial spawning of indigenous and exotic species, larvae and fry rearing techniques. Transportation of live fishes.

(v) Ecology : Concept of ecosystem, ecological niche, food chain, homeostasis and ecological balance. Population concepts, density, rates, nasality, mortality, age distribution and growth. Carrying capacity and ways of increasing the carrying capacity. Types of interaction between two species. Ecological classification of fresh water organisms.

1v) Ecology: concept of ecosystem, ecological niche, fold chain, homeostasis and ecological balance. Population concepts, density, rates, nasality, mortality, age distribution and growth. Carrying capacity and ways of increasing the carrying capacity. Types of interaction between two species. Ecological classification of fresh water organisms.

(vi) Limnology: Physical characteristics of inland water (light, colour, turbidity, temperature). Chemical characteristics of inland water (pH, oxygen, carbon-dioxide and other dissolved gases). Dissolved solids (phosphorus, nitrogen, calcium, magnesium, sodium, potassium, iron and silica). Role of nutrients in primary production. Biogeochemical cycles of nitrogen, phosphorus, carbon, silicon and iron.

Factors affecting primary and secondary production estimation of primary and secondary production. Bioturbation and its effects on productivity.

Phytoplankton: Characteristics, types, life history, flotation, distribution, seasonal succession and eutrophication. Phytoplankton bloom: factors, effects, control interaction with other organism.

Zooplankton: Characteristics, abundance, food and feeding habits, reproduction, movement, phytoplankton-zooplankton relations.

Benthos: Significance, distribution, factors, affecting distribution.

Periphyton: Major groups, characteristics, abundance, substrates, distribution in lentic and lotic habitats, Importance and relations with other organisms.

Bacteria: roles in bio-geochemical cycles, relations of plankton and benthos with bacteria. Aquatic vascular plants: Major groups, importance and influence on aquatic environment.

(vii) Fish Population Dynamics: The concept of unit stock, extimation of relative and absolute abundance of population, length-weight relationship, selectivity of fishing gear. Procedures for estimating

the parameters of the von Bertalanffy growth curve using data from length frequency analysis and hard part analysis; Stock-recruitment relationships, determination of spawning season and fecundity estimation. Definition and types of fish mortality, estimation of fishing mortality and natural mortality. Basic concept of fish yield, estimation of maximum sustainable yield(MSY) and maximum economic yield(MEY).

(viii) Fisheries Management: Importance and relation of life history data in fisheries Management. Protection against hazards-fish pass. Habitat improvement devices and measures. Restoration and conservation of open water fisheries: New fisheries management policy (NEMP), Community Based fisheries Management (CBFM) (Jalamohal, Oxbowlakes, Haors, Baors, rivers and Coastal fisheries). Fish Sanctuary, Fishery Regulations. Management problems and their mitigation measures. Role, principles, objectives, problems, and activities of Fisheries cooperative. Fish markets and marketing systems in Bangladesh. Recreational fisheries.

Fisheries

Paper-II

(Aquaculture and Industrial Fisheries Technology)

Mark-100

(i) Aquaculture: Resources, site selection, pond construction, pond preparation, pre-stocking management and post-stocking management. Extensive, semi-intensive and intensive aquaculture. Specialized aquaculture: cages, pen raceway and integrated farming system. Carps, pangas, freshwater prawn and tilapia culture. Use of Geographical Information System (GIS) for aquaculture planning and development. Coastal aquaculture: Shrimp, crabs, mollusks and seaweeds. Impact of coastal shrimp culture on the socio-economic condition of rural community. Basic engineering principle and designs for aqua farming, present status and future prospects. Feeding and aeration techniques in aqua farming. Wastewater treatment and disposal methods.

(ii) Disease and parasites: General signs of diseased fish. Significance and factors producing diseases: Parasitic Bacterial, Fungal and viral diseases in fish. Characteristics, pathogens, clinical signs, diagnosis and prevention and control measures. Prevention and control measures against common protozoan and metazoan fish parasitic diseases, disease of shellfish. Physiological factors of fish diseases. Prevention and control of zoonotic diseases.

(iii) Fish Nutrition: Role of nutrition in aquaculture. Dietary protein, lipid, carbohydrates, mineral and vitamins requirement for fish and crustaceans. Feed stuffs of Bangladesh : proximate composition, cost, nutrient bioavailability, palatability and formulation methods. Commercial feed types. Antinutintional factors in feed stuffs and feed, Brood stock nutrition, role of live food in nutrition.

(iv) Fish harvesting, handling and preservation: Types and use of commercial modern fishing gears and crafts. Techniques of location of fishing grounds. Fish finding techniques-radio direction finder(RDF), RADAR, LORAN(long range navigation) Dhaka, Navigator system, Satellite.
Fish detection: Acoustic equipment-echo sounder, Eco-Ranger, SONAR(sound navigation and ranging), net monitoring system. Aquaculture Harvesting system: Seine netting, falling gears, traps fishing, FAD(Fish aggregating devices)
commercial handing of fish and shellfishes: Principles, methods, types, storage and distribution.
Fish chilling and freezing: Principles, methods, types, storage and distribution.
Packaging of fresh fish: Materials for wholesale, traditional retail and airfreight packing.

(v) Fish processing: Fish curing: drying and dehydration, salting fermentation, smoking; Principles, raw materials steps, types and examination of processed product.
Fish canning: Principles, preparation of raw materials, methods, types of can materials, examination of processed product storage.

HACCP: Principles application in fish processing industry.
Planning and design of cold storage and fish processing plant.

(vi) Fishery Products and By-products: Fishery products and by-products of Bangladesh Scientific and technological development in fishery products.

Various minced and surimi based fish and shrimp products, fishcakes, fish pickles and fish soup powder.

Fishery by-products: Fish meal, fish Protein Concentration (FPC), fish Oil, shark fin rays, icing glass, fish maws, pearl, essence gelatin, fish glue, fish silage and pharmaceutical products.

Marine Science

Paper-1

Mark-100

Marine Ecology

a. Major ecological division of marine environment and its related flora and fauna.
b. floral and faunal study of sandy, muddy and rocky shore (St. Martin's Island, Kutubdia Island, Moheshkhali Island, Sonadia Island)
c. Energy flow in the marine environment
d. Biogeochemical cycle in the coastal and marine ecosystem.

2. Mangrove Ecosystem

(i) Occurrence and distribution of mangrove
(ii) Habitat
(iii) Ecological role
(iv) Economic role
(v) Flora and fauna of mangrove forest

(vi) Afforestation and deforestation
(vii) Problem in the mangrove forest(top dying disease, sedimentation)

3. Seaweed
Occurrence and distribution
Habitat
Ecological role
Biology of seaweed
Economic role

4. Estuarine and Coastal Process
i. Definition and general characteristics
ii. Types of estuaries
iii. Human activities and their implications
iv. port and harbor activities
v. Dredging and waste disposal
vi. fishing
vii. Study of the estuaries of Bangladesh (Karnafully river estuary, Pashur river estuary, Meghna estuary).

5. Oceanography:

a. Global distribution of land and water,
b. Physical-chemical properties of sea water,
c. Tide, wave & current of the Bay of Bengal,
d. Different elements in sea water (major, minor, trace and radioactive)
e. dissolved gases & nutrient distribution in sea water,
f. Marine natural products chemistry,
g. Importance of Plankton (Phytoplankton, Zooplankton)
h. Hydrocarbon resources of the Bay of Bengal & its commercial uses.

6. Navigation and Communication

a. Navigation equipments

I. Magnetic
II. Gyro compass
III. Sextant
IV. Radar

b. Means of communication

I. Signaling in morse code by light
II. Sound signal
III. International code of signals by code flags
IV. Semaphore
V. Wireless communication

c. Ship hygiene and safety precaution

I. Ship hygiene
II. Fire fighting and life saving appliances

7. Environmental Pollution

a. Types of marine pollution
b. Oil pollution and its impact on marine environment
c. Green house gases and effect
d. Eutrophication
e. International convention for the protection of marine environment (MARPOL/SOLAS) & biodiversity (CBD),
f. Impacts of development activities: Farakka barrage & Flood protection embankment, destruction of mangrove forest due to coastal aquaculture, human interferences in St. Martin coral island.

Marine Science

Paper-II

Marks-100

1. **Fish biology**
   a. Biology of commercially important fin and shell fishes of marine and coastal water of the Bay of the Bengal (Physiology, Feeding , Breeding, Life cycle, Migration, Seasonal Occurrence, Abundance, Distribution, Biodiversity)
   b. Stock assessment methods and population dynamics of fin and shellfish of the Bay of Bengal.
   c. Crafts and gears used in the Bay of Bengal.

2. **a. Marine Invertebrates & Chordates:**
   1. Classification and salient features of marine invertebrates of the Bay of Bengal.
   2. Classification and geographical distribution of marine chordates with special reference of fishes of the Bay of Bengal.

b. Integrated Coastal Zone Management (ICZM):

1. Definition and objectives of ICZM, multiple uses & issues of coastal zone management, tools for coastal zone management plan.

3. Hatchery operation and management

   a. Breeding criteria of marine species under controlled condition
   b. Hatchery facilities and equipments
   c. Hatchery design
   d. Water quality management
   e. Brood stock transportation
   f. Hatchery techniques
   g. Phytoplankton culture(Skeletonema costatum, Tetraselmis, Chlorella)
   h. Rotifer culture
   i. Artemia production
   j. Fry transportation and marketing

4. Culture of marine species

   a. Fish culture (Tilapia, Pangus, Mullet, Seabass)
   b. Shrimp (Peneaus monodon) farming
   c. Prawn (Macrobrachium rosenbergii) farming
   d. Pond and cage culture of crab
   e. Mollusk culture

f. Seaweed Caulerpa racemosa, Hypnea spp.) farming
g. Fish and shrimp nutrition
h. Disease of cultured species (fish and shrimp)
i. Feed preparation

5. Processing and microbiology
   a. Processing and preservation of marine species (fish,shrimp, crab).
   b. spoilage of fish shrimp and control methods.
   c. Detection and isolation of pathogenic organisms.
6. Marking of cultured species
   a. Local and international market
   b. Value chain
   c. Future possibility

7. Sustainable Aquaculture in Bangladesh
   a. Introduction to sustainability
   b. Environmental interactions
   i. Impacts of the environment on aquaculture
   ii. Impacts of aquaculture on the enviornment
   c. Nutrient load of aquaculture
   d. Government policy on shrimp culture
   e. Organic aquaculture
      i. Definition
      ii. Importance of organic aquaculture
      iii. Practice of organic aquaculture in Bangladesh

Forestry

Paper-I

Marks-100

1. Scope and importance of Forestry in Bangladesh. Principal forest types and silvicultural and Management Systems followed in Bangladesh.
2. silviculture of Teak, Sal, Garjan, Dhakijam, Gamar, Chapalish, Champa, Sundari, Keora, Bain, Gewa, Golpata and Bamboos.
3. Regeneration, Tree reproduction, Clonal propagation, seed technology, nursery practices, planting, tending nad cultural operations practiced in forest plantation in Bangladesh.
4. Importance and practices of Agro forestry, Social forestry and Forest Extension in Bangladesh.
5. Mangrove Silviculture and coastal afforestation in Bangladesh

Forestry

Paper-II

Marks-100

1. Forest Policy of 1979 and Forest (Amendment) Act 1927 of Bangladesh.
2. Influence of Forest on environment and of environment on Forests.
3. Diameter height and basal area measurement and volume estimation of trees. Formulae for measuring logs. Aerial photography, volume estimation of trees with the help of aerial photographs.
4. Outdoor recreation, wildlife management, national, Zoological and botanical parks management in Bangladesh.
5. Methods of felling, logging transportation in use in Bangladesh.
6. Objective, importance and common methods of wood seasoning and preservation.
7. Manufacturing process of Paper and fiver boards.
8. Distribution and uses of Bamboo, Cane, Golpata, Sungrass and Khoir.
9. Major diseases and pests in Forest nurseries and of important trees and of their control.

Civil Engineering

Paper-I

Marks-100

- Analysis of statically determinate and indeterminate structures by various methods.
- Space truss analysis. Deflection of beams, frames and trusses using different methods.
- Influence lines for statically determinate beams, truss, frames.
- Analysis of bridge truss, and frames.

Water Resources Enginnering-30

Importance of irrigations: sources and quality of irrigation water, soil-water relationship; consumptive use and estimation of irrigation water requirements; methods of irrigation;field-irrigation structures; irrigation canal system; irrgation pumps and wells; problems of irrigated lands; land drainage; flood and its mitigation; methods of river training and bank protection.

Water Supply:

Planning and design consideration of water treatment plant, various methods (Sedimentation, coagulation, filtration, dis-infection, chemical precipitation) of water treatment, distribution system, environment impact assessment(EIA). Design of water supply system.

Sewage:

Physical, chemical and biological treatment of sewage, planning and design of sewage treatment, industrial wastes and their treatment, solid waste management, microbiology of waste water, introducation to aerobic and anaerobic treatment of waste water, self-purification of stream BOD removal kinetics. Design of domestic and storm sewers.

Paper-II
marks-100

Structure-40

R.C.C. Part:

Introduction of high rise building structure, structural forms of tall building, analysis of multistoried building frames subjected to wind and earthquake forces.

Working stress and ultimate strength analysis and design of reinforced concrete beams, columns, footing, two ways slab, flat slab, flat plate structure .

Pre-stressed Part:

Pre stressed concrete materials and their properties; pre-stressing system; losses of pre-stress, shape, selection and tendon profile; analysis & design of section for flexure, shear, bond, and bearing.

Transportation Engineering-30

Highway:

Design, construction and maintenance of rigid and flexible pavements. characteristics, sub-grade, sub-base, base and asphaltic surface courses, soil stabilization, brick and block pavements, cement concrete pavements. highway maintenance, highway drainage, airways and air-ports, waterways and terminals.

Transportation engineering, modes of transport planning of transportation system.

Highway planning, geometric design, vehicle operating characteristics, traffic survey, traffic flow and control traffic management and administration, highway materials.

Railway:

Railway alignment, gradient and curves, permanent way track construction and maintenance, points and crossings, signaling and interlocking.

Foundation Engineering-30

Engineering properties of soils, shear strength, permeability, consolidation, settlement and compaction. Analysis and design of spread footings pile foundations, mat foundation, settlement analysis, large excavation underpinning etc.

Electrical Engineering

Paper-I
Marks-100

1. Electrical Circuits:

   Circuit variables and elements: Voltage, current, power, energy, independent and dependent sources, resistance. Basic laws: Ohm's law, Kirchoff's current and voltage laws. Simple resistive circuits: Series and parallel circuits, voltage and current division, wye-delta transformation. Techniques of circuit analysis: Nodal and mesh analysis including supernode and supermesh. Network theorems: Source transformation, Thevenin's Norton's and superpostion theorems with application in circuits having independent and dependent sources, maximum power transfer condition and reciprocity theorem. Energy storage elements: Inductors and capacitors, series parallel combination of inductors and capacitors. Responses of RL and RC circuits: Natural and step responses.

   Sinusoidal functions: Instantaneous current, voltage, power, effective current and voltage, average power, phasors and complex quantities, impedance, real and reactive power, power factor. Analysis of single phase ac circuits: Series and parallel RL, RL and RLC circuits, nodal and mesh analysis, application of network theorems in ac circuits, circuits with non-sinusoidal excitations, transients in ac circuits, passive filters. Resonance in ac circuits: Series and parallel resonance. Magnetically coupled circuits. Analysis of three phase circuits: Three phase supply, balanced and unbalanced circuits, power calculation.

2. Electrical Machines:

   Transformer: Ideal transformer-transformation ratio, no-load and load vector diagrams: actual transformer-equivalent circuit, regulation, short circuit and open circuit tests. Three phase induction motor: Rotating magnetic field, equivalent circuit, vector diagram, torque-speed characteristics, effect of changing rotor power, no-load test, blocked rotor test, starting and braking and speed control. Single phase induction motor: Theory of operation, equivalent circuit and starting.

   Synchronous Generator: Excitation systems, equivalent circuit, vector diagrams at different loads, factors affecting voltage regulation, synchronous impedance, synchronous impedance method of predicting voltage regulation and its limitation. Parallel operation: Necessary conditions, synchronizing, circulating current and vector diagram. Synchronous motor: Operation, effect of loading under different excitation condition, effect of changing excitation, V-curves and starting. DC generator: Types, no-load-voltage characteristic, effect of speed on no-load and load characteristics and voltage regulation. DC motor: Torque, counter emf, speed to-que-speed characteristics, starting and speed regulation. Introduction to wind turbine generators Construction and basic characteristics of solar cells.

3. Electronics:

   P-N junction as a circuit element: Intrinsic and extrinsic semiconductors, operational principle of p-n junction diode. Diode circuits: Half wave and full wave rectifiers, rectifiers with filter capacitor, characteristics of a zener diode, zener shunt regulator, clamping and clipping circuits. Bipolar junction transistor(BJT) as a circuit element: Bipolar junction transistor: current components. BJT characteristics and regions of operation, BJT as and amplifier, biasing the BJT for discrete circuits, small signal equivalent circuit modes, BJT as a switch. Single stage mid-band frequency BJT amplifier circuits. Metal-oxide-semiconductor field-effect-transistor(MOSFET) as circuit element:

structure and physical operation of an enhancement MOSFET, threshold voltage, current-voltage characteristics of an enhancement MOSFET, biasing discrete and integrated MOS amplifier circuits, single-stage MOS amplifiers, MOSFET as a switch, CMOS inverter.

Single-stage and cascode amplifiers, frequency response of differential amplifiers. Operational amplifiers (Op-Amp): non-inverting and inverting amplifiers, inverting integrators, differentiator, weighted summer and other applications of Op-Amp circuits. Negative feedback: properties, basic topologies, feedback amplifiers with different topologies, stability, frequency compensation.

Basic logic functions, Boolean algebra, combinational logic design, minimization of combinational logic. Sequential circuits: different types of latches, flip-flops and their design using ASM approach, timing analysis and power optimization of sequential circuits. Modular sequential logic circuit design: shift registers, counters and their applications.

BJT, MOSFET, SCR, IGBT, BTO, TRIAC, UJT and DIAC. Rectifiers: Uncontrolled and controlled single phase and three phase. Regulated power supplies: Linear-series and shunt, switching buck, buck boost, boost and Cuk regulators. AC voltage controllers : single and three phase, Choppers. CD motor control. single phase cycloconverter. Inverters: Single phase and three phase voltage and current source, AC motor control. Stepper motor control. Resonance inverters. Pulse width modulation control of static converters.

Electrical Engineering

Paper-II

Marks-100

1. **Power Systems:**

   Network representation: single line and reactance diagram of power system and per unit. Line representation: equivalent circuit of short, medium and long lines, Load flow: Gauss-Siedel and Newton Raphson Methods. Power flow control: Tap changing transformer, phase shifting, booster and regulation transformer and shunt capacitor. Fault analysis: Short circuit current and reactance of a synchronous machine. Symmetrical fault calculation methods: symmetrical components, sequence networks and unsymmetrical fault calculation. Protection: Introduction to relays, differential protection and distance protection Introduction to circuit breakers. Typical layout of a substation. Load curves: Demand factor, diversity factor, load duration curves, energy load curve, load factor, capacity factor and plant factor.

   Transmission lines cables: overhead and underground. Stability: swing equation, power angle equation, equal area criterion, multi-machine system, step by step solution of swing equation. Factors affecting stability. Reactive power compensation. Fleible ac transmission system (FACTS). High voltage de transmission system. Power quality: harmonics, sag and swell.

   Power plants: general layout and principles, steam turbine, gas turbine , gas turbine, combined sycle gas turbine, hydro and nuclear. Power plant instrumentation. Selection of location : Technical, economical and environmental factors. Load forecasting. Generation scheduling: deterministic and probabilistic. Electricity tariff: formulation and types.

2. Telecommunication Systems.

   Communication systems: Basic principles, fundamental elements, system limitations, message source, bandwidth requirements, transmission media types, bandwidth and transmission capacity. Noise: Source, characteristics of various types of noise and signal to noise ratio. Information theory: Measure of information, source encoding, error free communication over a noisy channel, channel capacity of a continuous system and channel capacity of a discrete memory less system. communication systems: Analog and digital. continuous

wave modulation: Transmission types,-base-band transmission, carrier transmission; amplitude modulation-introduction, double side band, single side band, vestigial side band, quadrature; spectral anslysis of each type, envelope and synchronous detection; angle modulation-instantaneous frequency, frequency modulation (FM) and phase modulation (PM), spectral analysis, demodulation of FM and PM. Pulse modulation: Sampling-sampling theorem, Nyquist criterion, aliasing, instantaneous and natural sampling; pulse amplitude modulation-principle, bandwidth requirements; pulse code modulation (PCM)-quantization principle , quantization noise, non-uniform quantization, signal to quantization error ratio, differential PCM, demodulation of PCM; delta modulation (DM)- principle, adaptive DM; line coding-formats and bandwidths. Digital modulation: Amplitude-shift keying-principle, ON-OFF keying, bandwidth requirements, detection, noise performance; phase-shift keying(PSK)-principle, bandwidth requirements, detection, differential PSK, quadrature PSK. noise performance; frequency-shift keying (FSK)- principle, continuous and discontinuous phase FSK, minimum0-shift keying, bandwidth requirements , detection of FSK. Multiplexing: time-Division multiplexing (TDM) principle, receiver synchronization, frame synchronization, TDM of multiple bit rate systems; frequency-division multiplexing-principle, de-multiplexing; wavelength-division multiplexing, multiple –access network-time-division multiple-access, frequency-division multiple access; code-division multiple-access (CDMA)- spread spectrum multiplexing, coding techniques and constraints of CDMA. Communication system design: design parameters, channel selection criteria and performance simulation.
Mobile Cellular Telephone: Concept , evolution and fundamentals. Analog and digital cellular systems. Cellular Radio System; Frequency reuse, co-channel interference, cell splitting and components. Mobile radio propagation: propagation characteristics, models for radio propagation antenna at cell site and mobile antenna. Frequency management and Channel Assignment; Fundamentals spectrum utilization, fundamentals of channel assignment, fixed channel assignment, non-fixed channel assignment, traffic and channel assignment. Handoffs and Dropped calls: Reasons and types, forced-handoffs, mobile assisted handoffs and dropped call rate. Diversity Techniques: Concept of diversity branch and signal paths, carrier to noise and carrier to interference ration performance. Digital cellular systems: Global system for mobile, time division multiple access and code division multiple access.

Mechanical Engineering

Paper-I

Marks-100

Properties of gases and various, Law of thermodynamics and their corollaries, Ideal gases and their cycles. Study of stream generators, their accessories and mountings, Steady state conduction of one dimensional heat in different geometrics and composite structures. Transient heat conduction in solids with negligible internal resistance and surface resistance. Laws of radiation heat transfer, Net radiation interchange between two infinite parallel plates. Concept of refrigeration and its application.

Continuity, momentum and energy equation and their applications . Pressure, velocity and flow measurement devices. Basic conception about pumps and turbines.

Stress analysis; axially loaded member, thermal and centrifugal stresses, stresses in thin and thick walled cylinder and spheres. Shear force and bending moment diagram of beams. Combined stress. Types of fits, Design for static and fatigue strength, Design of screws, fasteners and connections and columns.

Mechanical Engineering

Paper-II
Marks-100

Power transmission by belts, clutches & brake, gear and gear trains, static and dynamic balancing. Static and dynamic balancing. Undamped free vibration with one and two degrees of freedom. Velocity and acceleration of mechanisms. Damped free and forced vibration with single degree of freedom.

Basic engine types, their operation and testing. combustion in SI engines, CI engines and gas turbine. Compression process. Source of energy , production of power, steam power plants. The variable load problem of power plant.

Mechanism of Convective heat transfer, Free convection form exterior surfaces of common geometrics. Concept of air condition and its uses. Cooling load calculation.

Principle of measurements. Different types sensing elements, measurements of displacement, pressure, temperature, heat flux flow, force torque, and strain

Sampling theory estimation hypothesis testing. Control charts, X,P and C charts. Regression analysis, analysis of variance. Concept of quality circle.

Basic of casting, welding, metal removing processes such as turning, drilling, shaping and milling; Tool geometry.

Various type of organization and management information systems, concepts and scope of application. Ogranization structure, Personal management. Technology management.

CHEMICAL ENGINEERING
PAPER-I
Marks-100

Chemical Engineering and its application, Principles of chemical engineering Calculations; flow of fluids in closed conduits and measurement of different parameters, calculation power requirement for transport of different fluids; different modes of heat transfer and design of heat exchangers. Design of equipment for mass Transfer operator.

Principle of the design of chemical process equipments such as distillation, absorption and extraction towers, chemical reactors, procedures for control system design of chemical plants and equipments.

Principle of corrosion and material protection, selection of construction materials for industries.

CHEMICAL ENGINEERING

PAPER-II

Marks-100

Economics and management of chemical processes, cost estimation for process plants, profitability analysts, project management, safety and environmental analysis. Economic analysis projects, CPM and IRR.

Energy situation and sources in Bangladesh. Design of energy efficient process, energy crisis and its effect on Bangladesh economy.

Fertilizer, paper and other chemical industries in Bangladesh, Design operation and future of industries.

Sources of natural gas in Bangladesh and its production, selection of processing and equipments.

Water and air pollution : source and source control, municipal water treatemnt and waste water treatment.

Environment issues of Bangladesh.

Naval Architecture and Marine Engineering

Paper-I

Marks-100

Calculation of areas, volumes, weights and displacement related to ships. Centre of gravity, Centre of buoyancy, Moments, Conditions of equilibrium, Transverse metacentre, Moment of inertia, Transverse BM , Met centric height, Inclining experiment. Effects of loading, unloading and flooding on trim, Launching calculations, Statical stability, Dynamical stability.

The Trochoidal wave theory, Load curves, Shearing force and bending moment curves, Smith correction, Approximations for maximum bending moments and shearing forces, Modulus and stress calculations, Stresses in the inclined condition of a ship. Resistance of ship structures to bucking.

Natural vibration , Forced vibrations, Damping, Natural vibrations with viscous damping. Forced vibrations with viscous damping, Transverse vibration of beams, Schlick's formula , Todd's formula and Burrill's formula for the natural frequency of vibration of ship, Lockwood Taylor's formula for the frequencies of torsional vibration of a ship. hydrodynamic inertia coefficients and added virtual weight, Elastic mountings for marine engines.

Naval Architecture and Marine Engineering

Paper-II

Marks-100

The frictional resistance, wave-making resistance, eddy-making resistance, air resistance and appendage resistance of a ship, Prediction of the total resistance of a ship by testing a model in a towing tank, Froude's Law of Comparison.

Propeller types, Design of screw propellers, The momentum theory and the blade-element theory of screw propellers, Slip, Wake fraction, Thrust deduction fraction, Quasi propulsive coefficient, Cavitations.

Sinusoidal water waves, Velocity, length and period of waves, Addition of wave trains, Standing wave, Pressure in a wave, Energy in a wave, Group velocity, A ship in waves, Head sea, Following sea, Beam sea, Frequency of encounter, Uncoupled heaving, pitching and rolling motions of a ship, Motion stabilization.

Materials and Metallurgical Engineering

Paper-I

Marks-100

1. Classification of Engineering Materials and their main Characteristics;
   Metals, ceramics, glasses, polymers, composites and electronic materials. Atomic bonding, crystal structure and x-ray diffraction.
2. properties of Materials:
   Strength, ductility, hardness, toughness, creep and fatigue, etc. Corrosion and degradation characteristics.
3. Phase diagrams:
   Common binary equilibrium diagrams, isothermal reactions, Iron-iron carbide thermal equilibrium diagram.
4. Heat Treatment:
   Annealing, normalizing, quenching, I-T and CCT diagrams, tempering austempering martempering.
5. Surface hardening:
   Carburizing, nitriding, carbonitriding, flame hardening and induction hardening.

Materials and Metallurgical Engineering

Paper-II

Marks-100

1. Fabrication of Materials :
   Industrial fabrication techniques for metals, ceramics, glasses and polymers,
2. Non-metallic Materials.
   Conventional and engineering ceramics, thermoplastic and thermosetting plastics.
3. Steel making:
   Raw materials, basic oxygen and electric steel making processes.
4. Engineering Alloys:
   Ferrous alloys: Plain carbon steel, common alloy-steels, stainless steels, tool steels, HSLA steels, etc. Cast irons including malleable band ductile cast iron.

   Non-ferrous alloys: Copper base-, aluminum base-and nickel base alloys, bearing metals etc.

Architecture

Paper-I

Marks-100

1. Art & Architecture:
   A general survey of Art and Architecture. Art and Architecture of the sub-continent from ancient to modern times. Modern Architecture.

2. Planning & Urban Design:
   Basic Planning theories, Development of urban space through history : Principles and technique for urban design. Urban renewal, Urbanism in Bangladesh.

3. Housing:
   Housing and community: their influence of individuals, developer built and public housing, Housing finance, low cost housing, Housing problems in Bangladesh. Users response in high-rise apartments and its comfort and convenience conditions. Housing infrastructure, Rural housing.

4. Building & finish Materials:
   Preparation, manufacture, Properties, Use and application of brick, Cement, Concrete, Timber, Steel, Glass, Tile, Stone, Terrazzo and Paint.

Architecture

Paper-II

marks-100

1. Building type and functional facilities.
   Objectives, principles and technique for the design of commercial building, Industrial building, Recreational buildings, Institutional buildings, educational building, Health care and Hospitals, Sports centers and terminal buildings and airports.

   Structure & Form:
   Modular system of design, Construction methods, Space frame, Membrane structure, Folded Plates, Shell, High-rise Structure, Geodesic Dom and Cable Structure.

2. Environmental studies:
   Elements of climate, microand macroclimate. Climate conscious design, green architecture, day lighting, method of passive cooling in building, Ventilation and air movement in building, Building Acoustics.

3. Landscape Design:
   Elements of space organization, ecosystem, site development and environment design, Site analysis, Site Planning, Plants and planding design, history of garden design, Public Parks and Plaza, conservation, landscape as climate modifier.

4. professional Practice:
   Building construction rules, Bangladesh National Building Code (BNBC), Professionals ethics, Conditions of engagement and types of contacts.

Urban Development

Paper-I

Marks-100

1. Urbanization:
   Concepts of urbanization and urban growth. The nature of urbanization in Bangladesh and comparison with urbanization in the western world. The growth and development of towns and cities in Bangladesh. Effects of urbanization on economic and social development of a country.
2. Urban function:
   Causes of origin and evolution of towns and cities. The important functions for which the towns and cities, exist. The reasons in the variation of sizes of urban areas. The rural-urban relationship. The sphere of influence of urban areas. The meaning of land use. The major of land use components of urban areas; CBD, neighborhood unit, recreational space.
3. Urban Development:

Meaning of Development in urban planning. Necessity of development control in urban areas. Methods of development control: Enabling legislation; Police power; Zoning; building control regulation; Town Improvement Act. Paurashava ordinance. Urban planning institution.

4. Urban Transportation and Housing:
   Different pattern of urban road network system and their advantages and disadvantages. Hierarchy of urban roads and the functions of different hierarchies. Cross-sectional elements of roadways. National Housing Policy of Bangladesh and its objectives, strategies and salient features.

Urban Development

Paper-II

Marks-100

1. Urban Form and Structure:
   Theories on size, spacing and distribution of urban areas; Christaller Model. Spatial structure of urban areas; Concentric Zone theory, Sector theory; Multiple Nuclei theory; Utopian ideas of urban planning; Garden City of Sir Ebenezer Howard, Linear City of Soria-Y-Mata, Vertical City of Le Corbusier, Neighborhood idea of Clarence Perry, Radburn Layout of clarence Stein.
2. Methods and Techniques of Urban Planning and Management:
   Urban Development Plan. Structure Plan. Master Plan. Detail Area Plan. Sites and Services Program. Land Readjustment Technique. Upgrading of Low-income Settlements. Urban conservation. Strategies for managing the growth of cities.
3. Urban and regional Econoics:
   Economic base of cities; the basic and non-basic concepts: Export activities and Residentiary activities. Economic function of cities. Models of urban economic growth. Spatial organization of regional economic activities. Regional economic growth models; Place prosperity vs. people prosperity; economic development vs. regional growth; dispersal vs. concentration; balance vs. imbalance; growth vs. welfare; polarisation and trickle down effect.
4. Transportation and Site Planning:
   Traffic generation in urban area; land use and transport interaction. Urban transportation study; volume study, O-D survey, parking survey, inventory of physical infrastrucure. Characteristics and role of different transport modes.
   Principle of site planning. Different patterns of layout design. Principles of designing with cut-de-sacs. Principles of planning pedestrian pathway system.

Textile Technology

Paper-I

Marks-100

1. Definition of textile fibres, classification of fibres with examples.

2. Study of cellulosic fibres:

Cotton-cultivation and harvesting, growth, composition, physical and chemical structure and properties, geographical distribution, ginning, grading and classification. End uses.
Bast fibrs-Cultivation and harvesting of different types of bast fibres with special reference to jute, growth, composition, phyiscal and chemical structure and properties. Retting, study of fibre ultimates, sorting, grading and classification.

3. Study of protein fibres:
Wool- growth, composition, physical and chemical structure and properties. Geographical distribution of main wool producing countries.

Silk- Growth, composition, physical and chemical structure and properties. Sericulture and methods of production. Geographical distribution. End uses

4. Textile raw Materials:
Definition and classification of chemical fibres. Principles of different spinning systems. Different fire structures and their effects on fibre porperties.

Present trends of chemical fibres production and their economic and social aspects.

5. Textile Technology:
Characteristics of fibre considered by a spinner. FLow-Chart for the production of carded and combed yarns. Importance of mixing and blending.

Blow room-Principles of opening and Cleaning, Study of blow room machines for blending, opening, cleaning and control of regularity of mass per unit length. Extraction and control of waste, settings for waste, Blow room libes for different purposes, sue of suitable sequences.

Carding-principles and objects of carding; detailed study of the revolving flat card; types and care of wire, stripping and grinding, doffing mechanism. Extraction and control of waste and dust. can coiling . Speeds, productions, settings, cleaning efficiency, control of nep and fibre damage, vriation in sliver mass per unit length.

6. Fabric Manufacturing Technology:

Chronological development of looms. Loom drive and brakes. Different types of sheds. Features of automatic looms. Weft replenishment, methods of weft patterning, warp protector motion, Side & centre weft fork motion, Warp stop motions. Jacquard Weaving: Classification of Jacquards. L.L.S.C., D.L.S.C. & D.L.D.C, open shed, centre shed fine pitch and cros border jacquard shedding. Systems of harness mountion. Methods of increasing the figuring capacity of Jacquard costing out. Card cutting and lacing. Jacquard calculations.

7. Yarn Manufacturing Technology:
   Detailed study of projectile, Rapier, Jet and multiphase weaving machines.

8. Fabirc Manufacturing Technology:
   Weaving Preparation , winding, warping, sizing, weaving mechanism. knitting.

Textile Technology

Paper-II

Marks-100

1. Applied Chemistry:

Water and its importance in wet processing (hydrogen bonding, cluster formation, Heat of evaporation, Dissolving ability), general concepts of soaps, classification of detergents, Detergency (Mono molecular layer, micelle formation, Surface and interface tension, wetting and dispersing).

a. Pretreatment and Bleaching:

Flow-chart of wet processing, chemistry of various impurities in fibres and their removals; singing, desizing scouring of cotton, Jute, wool and silk fibres. Methods of bleaching of cotton, Jute, wool and silk fibres.

c. Technology of Printing:

Flow-chart of Printing , Thickeners(types of thickeners rheology). Methods and styles of printing; machineries used for printing; printing processes for different fibres with direct, acid, basic and vat dyes.

d. Technology of dyeing:

Structure and application of sulphur, azoic, reactive and Disperse dyestuffs on different fibres; stripping.(Assistants used in printing operations and their functions; Structure of pigments, Pigment printing.)

e. Technology of finishing :

Definition and classification of finishing . Physical and Mechanical Finishing of Cotton. Jute, wool and Silk fabrics. Shearing and Cropping different types of calendering, measuring and cutting, making up of different jute goods. Hoop-length and dead weight measurement calculations, raising, beetling, breaking, folding sanforising; chemical finishing; mercerisation and parchmentisation, resin finishing, water repellency, flame retardancy.

2. Applied Chemistry:

Water teatment (Estimation and Removal of Hardness). Different types of surface active agents (Synthesis, Effects, Degradability); Chemistry, properties and uses of various acids, alkalies salts, oxidizing agents and reducing Agents in Textile Wet Processing.

a. Dyeing:

Dye Aggregation; interaction of dyes and fibres. Mechanism of dyeing, dyeing kinetics,(Diffusion, Pre Model, Free volume model). Thermodynamics of dyeing (Dyeing Isotherms, Affinity/standard Chemical Potential difference).

b. Printing:

Special types of thickeners (Synthetic Polymers, Emulsion thickeners); Methods of screen and roler preparation; detailed study on screen printing technology.

c. Finishing:

Softening agents-different types, applications. Special finishing treatments (rot-proofing, mildew proofing, insect and bactericidal finishes, soil lease finishes).

3. Garment Technology:

Historical development of Garments Industry in Bangladesh and other countries of the world.
Garments terms and definitions.
Germs terms and definitions
Garments manufacturing sequence
General discussion on pattern making
Sample garments making
Sample garments making
Components of shirt, trouser & their types, Standard body measurement for Gents, Standard body measurement for ladies, Principle of pattern making for shirt & trouser, Pattern grading.

a. Sewing: Seam properties, types & usages; Stitch types, properties & usages; Principle of lock stitch & chain stitch formation; Sewing machine feed mechanism. needles Sewing thread, sewing problem and remedies, sewing machines, Work aids in sewing, simple automatic machines.

Alternative methods of joining fabrics – Welding, adhesives, Fusing, Moulding and their comparision.

b. Trimmings-Discussion on label and motifs, Chain, Buttons, lining, Hook & loop fastening, shoulder pad, lace braid & elastic, performance of trimmings.

c. Pressing and Finishing-Objects, types, methods, & International care labelling codes.

d. Folding & Packing – Types, methods, equipments, symbol and marking.

4. Textile:

Introduction to Textile Testing, Importance of Textile Testing. Sampling methods for fibre.

a. Yarn Testing- Sampling methods, Zoning, stratified samples, Measurement of tensile strength of yarn; single thread, skein or lea strength and ballistic test; comparison of results, CRT, CRE and CRL machines and methods of loading.

Silver, roving and yarn irregularity; measurement by cutting and weighing methods, thickness under compression, capacitance and other methods, length variance curves. Use of spectrogram for analysis of periodic , random and drafting wave variation, Measurement of imperfections. comparison of results with Uster statistics.

b. Measurement of yarn hairiness.

Fabric Testing- Fabric dimensions, measurement of length, width, thickness; ends and picks per unit length in woven fabric; courses and wales per unit length in knitted fabric. Crimp of yarn in woven and knitted fabric

Methods of measurement for tensile, tearing, ballistic and bursting tests. Relationship of fibre, yarn and fabric strength.

Measurement of tabric stiffness and its relation to handle and drape.

Measurement of air, water permeability/retention, water pressure; crease recovery. Serviceability, wear and abrasion tests, pilling of fabrics. Flame retardant/flame resistance tests.

Measurement of fastness to light, washing and rubbing. Estimation of damage to marerials caused by physical & chemical treatements. viz. Singeing scouring, bleaching, Determination of size and filling. Carpet testing: carpet thickness, compression and durability, Identification of fibres.

Leather Technology

Paper-I

Marks-100

Hides and Skins:

Histological structure and Chemical Composition, Marketing channel of hides and skins and constraints at different stages. Supply Position in Bangladesh ,Curing of Hides and Skins, evaluation of different methods of curing, antemortem, post mortem and industrical defects of Hides and Skins.

wet processing:

Soaking, liming, deliming , bating, degreasing, tanning, neutralization, re-tanning, dyeing, fat-liquoring.

Chrome Tanning:

Historical development, theories of Chrome tanning, Factors affecting Chrome tanning, chrome tanning and its impact on environment, recycling, reduce and reuse of chrome liqours, defects of chrome tanning, and their remedies, control in chrome tanning.

Other tanning Operation:

Aluminum and titanium tanning, Vegetable tanning, Synthetic Tanning, Aldehyde Tanning, Oil-tanning, Resin and Polymeric tanning,

Neutralization:

Neutralizing agents, degree of neutralization and their impact on dying, fat-liquoring and finish leather.

Dyeing:

History and development of dyes, Nomenclature and classification of dyes, structure of natural and synthetic dyes, Azo dyes: Preparation, azo coupling and diazotization, classification, stereoisomerism and tautomerism of azo dyes, reaction mechanism between azo dyes and protein fibre, banned a mines in azo dyes, commercial azo dyes, and their application. metal complex dyes-their chemistry mechanism, toxicity and application. Reactive dye-their chemistry and application, selection of leather dyes, leather dyes in colour index.

Fat liquoring:

Objective, Selection of Fat liquors and oils, influencing factors of the fat liquoring operation, Quality control during fat-liquor.

Mechanical Operations:

Fleshing, Samming, Setting out, Splitting, Shaving , Vacuum drying and Drumming.

Leather Drying:

Introduction, types of leather drying, theory of leather drying, principles of heat and mass transfer, equilibrium moisture content, rate of drying, constant drying and falling rate periods, factors affecting the drying of leather, defects of leather drying.

Environmental Impact and Pollution Control:

Pollution results during Pre-tanning, Tanning and Post-tanning stage, nature of effluent and solid wastes, treatment of effluent, central effluent treatment plan(CETP), chrome recovery plant. ISO 14000 and it's application for leather industry.

Health Hazards and Safety:

Safety measurements during leather productions, chemicals handling, Banned amines and their effect of health. Pentachlorophenol (PCP), Chromium(vi), and formaldehyde hazards, social and international trade barrier due to health and safety requirements.

Leather Technology
Paper-II
Marks-100

Leather Finishing:

Introduction, history of finishing, aim and purpose, Classification of Leather Finishing, requirements of Leather finishes, dimensions of the finish as a protecting layer and characteristics of the finish film, formulation of leather finishes, different layers in finish coat.

Mechanical Operation for Finishing:

Buffing, snuffing, de-dusting, flesh coating, staining/colour impression, ironing, glazing, plating selection.

Theory of Leather Finishing:

Basic concept of coating, ground coating, season coating, top coating, preparation of leather surface for finishing, coating, of leather , theory of adhesion, theory and mechanism of film formation, gloss and gloss retention, plasticization of finish film, techniques of leather coating, ironing and embossing during coating, evaluation and control of leather finishing.

Leather finishing materials:

Introduction, aqueous and non-aqueous finishing materials, different types of finishing materials-protein, shellac, resin binder, liquid dyestuffs, pigment, plasticizer, preservatives, wetting agents, dispersing agents, defoamers, plate release agents, penetrators, optical brighteners, polishing agents, flow improver, cross-linking agents and hardeners, leveling agents, filling agents, thickeners, matting agents, fluorescent agents, crackle lacquers, silicones, modifiers, slip and fixing agents.

Pigment:

Definition, objects of pigmentation, properties of pigments classification, organic and inorganic pigments, different forms of pigments power and pastes. Evaluation and control of their brilliance, opacity, particle

size, resistance to solvent heat and light and colour matching, application of colour circle for colour matching, pigment dyeing-their advantages and limitation.

Polymeric materials and their chemistry and application:

Chemistry and application of acrylics, polyurethane and Cellulose derivatives. Solvents and Diluents.

Formulation of Leather finishes:

Plain finishes, glazing finish, shellac finish , wax finish, pigment finishes, pigment finish of a simple type, side leather finish for corrected leather, finish for glazes lining leather, suede leather finishes, patent and wet look leather.

Physical tests:

Physical tests essential for leather, footwear and leather products manufacture, principles of different physical tests such as tensile strength, present elongation at break, bursting strength, tearing strength, flexing endurance test, vamp flexing, water vapour permeability test, air permeability of leather, dynamic water proofness test, apparent and real densities, scuffing and abrasive resistance, absorption of water, water penetration, resistance of cracking of grain and crack index, perspiration resistance of leather, leather softness, fogging tendency of leather.

Standards for leather testing:

International standards, national standards, testing of different leather chemicals, computer use for quality control in the leather industries, selection of tests, description of different test methods, quality requirement of upper leather, garment leathers, furniture leather, lining and book-binding leather.

Quality control for different stages of leather:

Sorting and selection of hides and skins, unit operation of leather processing, their objects and principles, techniques of controlling of chemical processes such as web-processing, tanning, neutralization, dyeing and finishing , control of mechanical operation.

Computer Science

Paper-I

Marks-100

(a) Computer Programming:

Introduction to computer programming. Assembling language programming. Problem solving techniques, algorithm specification and development. Programming style, testing and debugging. Program design techniques: Structured and modular program design. Programming languages and paradigms: classification. Programming in C: data type, statements, control structures, arrays, pointers, strings, functions, preprocessor directives, structures, unions and bit-fields, files. Introduction to object oriented programming: encapsulation, inheritance and polymorphism, Mechanic Language Programming, Template functions and classes multi-threads exceptions, Class and object. Introductory programming with C++/JAVA.

(b) Digital System:

Number system: binary, octal, hexadecimal and BCD. Data representation. Logic gates and Boolean algebra: combinational circuits. Circuit design using logic gates. Circuit and expression minimization:

Karnaugh map and Quine-McCluskey. Basic flip-flops(FF), Design of half and full adder. Basic counters and register. Basic decoders, encoders, multiplexers and demultiplexers. ADC and DAC circuits. PLA design, Pulse mode and fundamental mode logic, Pulse & switching units, Newtrivibrations , Digital LC: DTL, TTL, III, CMOS MOS gates, Memory system, LED, LCD applications of op-Amps. Cooparators.

1c) Discrete Mathematics:

Prepositional and predicate calculus: basic concept. Theory of sets: set operations, algebra of sets. Mathematical induction. Basic concept of relations and its representation. Functions and its classification and pictorial representation. Graph theory and its application. Elementray number system. Principles of counting. Reversion, generating, functions, recurrence relation.

(d) Numerical Analysis:

Solving linear systems with Gaussian elimination and Gauss-Jordan elimination method. Interpolation: Newton's formula, Lagrange's formula. Numerical differentiations and integrations: trapezoidal, Simpson's $1/3^{rd}$ and $3/8^{th}$ rule. Romberg integration. Solutions and Newton-Ralphson's method. Solution of ordering differential equation and least square approximation of functions.

(e) Data Structures:

Arrays: representation and operations. Sparse and dense matrices: concept and operation. Stacks and queues: concept, structures and basic operations. Quick-sort and Polish notation: applications of stack. Recursion: Concept and applications. Linked lists: representation and various operations. Trees: binary trees, traversing binary trees. Binary search trees: various opeations. Binary heaps: heap sort. Huffman's algorithm. Graphs: representations and operations. Spanning trees, shortest path and topological sorting. Internal sorting: insertion sort, selection sort, merge-sort, radix sort, Basic hashing techniques.

(f) Microprocessor and Interfacing:

Microprocessor and microcomputers. Evolution of microprocessor. Architecture of a general purpose microprocessor and its operation. Addressing modes. Common instruction types: basic assembly instruction set. Intel 8086 microprocessor: internal architecture, register structure, programming model, addressing modes and instruction sets. Interrupts, its classification and interrupt handling, Memory management in Intel 80_x86 family: real-mode memory management,segmentation and segmented to physical address translation. Protected mode memory management: segmentation and virtual addressing, segment selectors and descruptors and tables. Intel 80386 and 80486 register formats. Paged memory operation and TLB structure I/O port organization and accessing. Interfacing the keyboard, printer and monitor. Structure and operation of certain chips as 8255A, 8253, 8272, 8259A, 8237. Bus interfaces and micro controllers.

(g) Computer Organization and Architecture:

Fundamentals of computer design. Processor and ALU design. Control design: hardware control and micro-programmed control. Caches Memory organization. Exceptions System organization Bus and

hazards I/O subsystem and I/O processor. Parallel processing: concept, pipeline processors. Interrupts systolic arrays and fault-tolerant computers.

(h) Compiler and theory of computation. Introduction to compiliary. basic issues, logical analysis, hexical analysis, syntax analyses. semantic analysis, type cheeking, run-time environments, code generation, code optimization and language theory.

Computer Science

Paper-II

Marks-100

(a) Algorithm:

Algorithm and complexity: asymptotic notations. Basic algorithm techniques and analysis: divide and conquer, dynamic programming, greedy method, branch and bound, string matching, computational geometric problems, graph algorithms, spanning trees, shortest paths, max-flow problem, searching algorithms. Techniques for analysis of algorithms, approximation algorithms, parallel algorithms.

(b) Operating System:

Introduction, evolution, goals and components of OS. Types of OS Process management: process states PCB, job and process scheduling. CPU scheduling algorithms, critical section problems and solutions. Semaphores, Inter-process communication techniques. Deadlick handling methods. Memory management techniques: paging, segmentation and page replacement policies. Secondary storage management: disk scheduling algorithms. File management: file system structure, organization, FCB, space allocation, tree structured file system. Protection and security: classification and handling techniques.

(c) Database Management System:

Definition of DBMS, types of DBMS, its advantages and disadvantages, Data model: ER model and relational model. Integrity constraints. Functional dependencies. Assertions and triggers. File organization: definition of various file organization, classification and Representation. Indexing techniques: sparse and dense indexing. B+ tree indexing, hash indexing. Relational database design: normalization , 2NF, 3NF and BCNF. Query processing: various notations, cost estimation of selection operation and join operation. Transaction concept and concurrency control: Lock based protocol, deadlock handling. SQL and application using SQL.

(d) Software Engineering:

Introduction, Software process. Project management. Requirements engineering processes. System models: context, data, behavioral and object models . Object oriented design techniques. Real-time software design. System design with reuse. Critical system design dependability, software maintenance, critical system specification and development Verification and validation. Software testing. Software cost estimation: COCOMO model Halstead formula, Graph: cel analysis of complexity measures, software reliability and availability, Quality assurance.

(e) Data Communication:

Introduction to OSI and TCP/IP protocol. Data transmission basics: analog and digital data, spectrum and bandwidth. Transmission impairments. Data rate channel capacity. Transmission media: twisted pair, coaxial cable and optical fiber, wireless transmission. Data encoding: NRZ. NRZI, Manchester and differential Manchester modulation techniques-AM, FM, PM, Della modulation, compounding

Equations, ASK, PSK, FSK. QPSK. QAM sampling theorem, PCM. PPM. PAM. data transmission: Synchronous and asynchronous and asynchronous. NUll modem configuration. Data link control error and flow control CRC and HDLC. Multiplexing : FDM, TDM, statistical TDM. Basic circuit switching and packet switching techniques.

(f) Computer Network and the Internet:

Protocol, fundamentals of control protocol,

Introduction and network types, LAN, MAN, WAN. Topologies : star, switched, bus, ring. Ethernet LAN standards. Internetworking : network interconnection, bridges, routers. Network layer protocols: IP, ARJP, ICMP, IP addresses. Unicast and multicast routing protocols. IPV6 congestion control, Transport layer protocol: TCP and UDP. Introduction to wireless LAN, VSAT, analog and digital cellular system. Network security: types of attack, encryption techniques and digital signatures. ATM switches, ATM protocol; DNS, HTTP, Email.

(g) Artificial Intelligence :

Overview of AI. General concepts of knowledge. Introduction to PROLOG. Knowledge representation. Intelligent agents. First order logic. Knowledge organization and manipulation : search strategies, matching techniques and game planning. Natural language processing , Probabilities reasoning, expert systems and computer vision, Knowledge acquisition: Learning in symbolic and non-symbolic representation.

STATISTICS

Paper - I

Marks - 100

1. Introduction to Statistics : Definition and scope, Scope of Statistics, Classification, Variables.
2. Presentation of Data : Charts or Diagrams, Types of diagrams.
3. Grouping Data: Frequency Distribution, General rules for forming frequency, Graphical presentation of frequency distribution, Relative frequency distribution.
4. Measures of Central Tendency: The Arithmetic mean, the Median, The Mode, The Geometric Mean. The Harmonic Mean, Finding Measures of Central tendency from Grouped data, Graphical determination of Measures of Central tendency, Comparative discussion on measures of central tendency.
5. Measures of Dispersion : Dispersion or variation, Measures of dispersion from grouped data, Interpretation of Standard deviation, Chebyshev rule, Normal rule, Relative dispersion: Coefficient of Variation.
6. Skewness and Kurtosis : Skewness, Kurtosis, Skewness and kurtosis from graphical displays, Descriptive measures of skewness and kurtosis.
7. Regression and correlation : Simple regression and correlation. Least squares estimates of simple linear regression, regression coefficient and correlation coefficient. Rank correlation, correlation ratio and partial correlation. Multiple regression and Multiple correlation coefficient. Coefficient of determination.
8. Demography : Crude birth and death rates, Fertility rate, Age specific and total fertility rates, Population growth in Bangladesh, Migration, Nuptiality.
9. Index Number: Definition, Properties of index numbers, Significance of index numbers, Classification of index numbers, Simple Index Number, Un weighted indices, Simple average of price index, Simple Aggregate Index, Weighted Indices, Laspeyres index, Paasche method, Fisher's Ideal Index, Weighted average of relatives.
10. Time Series Analysis : Components of a time series. Measurement of secular trend, seasonal variations, cyclical variations and measurement of irregular variations.
11. Sampling : Statistical population and sample. Advantages and disadvantages of sampling over census. Sample design. Probability and non-probability sampling. Simple random sampling, stratified random sampling and systematic sampling. Cluster sampling, Sampling error and non-sampling error. Determination of sample size.

STATISTICS

Paper - II

Marks - 100

1. Concept of probability : Basic Definitions, Approaches of Defining probability, Basic properties of probabilities, Notation and Graphical displays for events.

2. Rules of Probability : Special Addition rule, The complementation Rule, General Addition rule, Bivariate data and Contingency table. Joint and marginal probabilities, Multiplication rules, Conditional probabilities, Concept of Bayes' Theorem.

3. Random Variables and probability Distributions : Random variable, Discrete Probability Distribution, Binomial Probability, Hypergeometric distribution, Poisson distribution, Normal distribution.

4. Sampling Distribution: Sampling distribution of the sample mean for a normally distributed variable, The Central Limit Theorem (CLT), Sampling Distribution of the Sample Mean, Sampling distribution of the sample proportion, Sampling distribution of function of mean and proportion. Confidence interval, Confidence interval of Population mean. Depermination of Sample size, Sampling for estimating mean, Sampling for estimating proportion.

5. Basic Concepts of Hypothesis Testing : Null and Alternative hypothesis, simple and composite hypotheses, Test statistic, acceptance and rejection regions, type I and type II errors, the significance level, one tailed and two tailed tests, general procedure for test of hypothesis. Tests based on normal, student's t,F, and X^2 distribution. The Z- test for two population means. The pooled t-test for two population means. The paired t-test for two population means.

6. Analysis of Variance : Concept of analysis of variance, treatment, response, extraneous variables, One-Way Anova Model, Estimate of The Model Parameters, Hypothesis Testing In Anova. Two-Way Anova, significance of Correlation and rank correlation coefficients. Multiple comparison test. Two-way analysis of variance with and without interaction.

7. Experimental Designs: Basic principles of Experimental Design. Randomization, Replication and Local control. The completely Randomized Design (CRD), Randomized Complete Block Design (RCBD) and Latin square Design.

Geology

Paper - I

Marks -100

1. Physical Geology and Geomorphology

Introduction to the science of Geology and historical development, the Earth and its position in space and solar system; its origin ; interior of the Earth; the Earth materials and crystal processes. Evolution of crystal features and fundamentals of plate tectonics. Theory of Isostasy, Diastrophism, Magmatism and volcanism.

Earth's surface processes-Natural agents of sculpturing the Earth's surface(Running water, Glaciers, wind) and their origin; alluvial processes and morphology; geo-morphological tools; methods of study of geomorphic features; morphometric units of Bangladesh.

2. History of Geology

Fundamental laws of historical geology; geological time and methods of measurements; geological column; geological time scale; evolution of the Earth and origin of life; fossils; major physical events and life forms and their evolution through geological time; glaciation; palaeomagnetism; polar wandering; brief geological history of the Indian subcontinent.

3. Petrology and Mineralogy :

Introductory crystallography and different crystal forms. Study of the physical properties, and classification of common rock forming minerals. Rocks and rock cycle, study of the mode of occurence, texture, structure, composition and classification of Igneous, Metamorphic & Sedimentary rock.

4. Structural Geology and Tectonics

Deformation of the earth crust: structural features(fold, joint, fault and unconformity). Concept of continental drift, Rise of theory of Plate tectonics, and Sea floor spreading. Tectonics and Structural framework of Bangladesh. Causes, types, distributions and effects of earthquake & tsunami and volcanoes.

5. Rock Mechanics & Engineering Geology

Stress analysis-theory, stress components, stress ellipsoid, relation of rupture to stress, Stain analysis-theory, geological significance of strains, mechanics of deformation. Surface and subsurface investigations, sampling and sampling methods. Engineering properties of soil geological criteria for site selection.

6. Oceanography

Distribution and origin of the ocean; ocean morphology-physical features of deep ocean floor including the ridges, rises and trenches. Sea-floor spreading, major tectonic features and tectonic history of the oceans. Bengal Deep Sea Fan and other bottom topographical features of the Bay of Bengal. Mineral resources of the oceans.

Geology

Paper-II

Mark-100

1. Stratigraphy :

Principles of Stratigraphy, Stratigraphic Correlation; Stratigraphic outline of Bangladesh and adjoining areas. Quaternary geology of the Bengal basin-physical framework and its landforms, distribution of the Quaternary deposits.

2. Exploration methods:

Widely used methods in exploration like: Seismic method-Importance of seismic work, geometry of seismic wave path, reflection and refraction field methods and equipment, elevation and weathering correction of seismic data, velocity, depth and dip determination by reflection and refraction data both for single layer and multi layer, interpretation of seismic sections. Gravity method-introduction, earth's gravity field and its variations, reduction of gravity data, gravity instruments, techniques and field survey, interpretation of gravity data. Electrical method-elementary theory, effect of inhomogeneous ground, electrode configuration, field procedure, interpretation of profiling and sounding data.

3. Petroleum Geology :
   Chemistry of petroleum, formation of oil and gas; generation of hydrocarbon, organic matter in sedimentary basins, diagenesis, catagenesis, kerogen composition and classification. Petroleum migration and accumulation, primary and secondary migrationas and their mechanism. The traps and their classification. The reservoir properties-porosity and permeability, diagenesis with emphasis on clay mineral diagenesis, reservoir continuity and reserve estimation. World's major oil provinces; a brief account of the petroleum geology of Bangladesh.
4. Hydrogeology:
   Origin and occurrence of ground water, rock properties affecting ground water, subsurface distribution of groundwater, geological formations as aquifers, types of aquifers. Ground water movement , Darey's law, permeability, transmissibility, tracing of ground water movement, ground water flow lines and contours. Ground water exploration, presentation and interpretation of results; determination of aquifer characteristics pumping test. Water wells, well design and well development. Ground water resources of Bangladesh : Problems and Prospects.

5. Mineral Resources:
   Classification of economic mineral deposits; mode of occurrence, controls of ore localisation, formation of ore mineral deposits by magmatic and metamorphic processes including magmatic concertration , hydrothermal processes, contact metamorphism, metamorphic minerals, submarine, exhalative and volcanogenic minerals; Mineral resources of Bangladesh -occurrence, distribution, stratigraphic relationship, reserve and uses of gas & oil, coal, peat, limestone, glass sand, white clay, placer deposits, hard rocks, building materials and metallic minerals.

Education

Paper -I

Marks-100

1. Concepts and Connotations of commonly used Educational Terms:
   - Education : Origin, meaning, concept. Continental and westerns definitions.
   - Literacy and Education : literacy and its conditions , literate and illiterate, education for all, mass education, compulsory education, work experience vocational and technical education, professional education.
   - Basic Education: concept, components-life skills, rights of Basic Education with regard to declaration of Human Rights, Rights of the Child, Constitutional Provision, EFA and DFA.
   - Informal, Non-formal and Formal Education: connotation, concept, nature, scope, significance of Non-formal Education, Continuing Education, Life-long Education.
2. Foundations of Education:
   - Philosophical: Theme-based major philosophies-idealism, naturalism, pragmatism, materialism, realism and existentialism.
   - Sociological : Child-society and Education, Social bases of Education and Social functions of Education.
   - Psychological: Human psychology and Education, individual needs and Education, human ability, personality and Education.

3. Organization and Management in Education:
   - Concepts and significance of Education Organization, Management, Administration, Monitoring, Inspection and Supervision.
   - Principles and functions of organization, management, monitoring and supervision
   - Roles and Functions of Heads as Leaders
   - Management of Curricular Activates
   - Mobilization and Management of Funds and Resources
4. Curriculum :
   - Concept, nature, scope and significance
   - Curriculum and syllabus
   - Aim, objective and competency, domains of objective
   - Principles of Curriculum
   - Major components of Curriculum
5. Roles of Education in Human Resource Development:
   - Roles of Basic Education - literacy and life skils
   - Roles of Secondary Education
   - Roles of Higher Education
   - Roles of Vocational/Technical Education
   - Roles of Women's Education
   - Roles of Professional Education
   - Roles of Environmental Education
   - Roles of Non-formal Education
   - Education as a means for Poverty Reeducation: PRSP and Education

Education

Paper -II

Marks-100

1. Learner and Learning :
   - Concepts of learner and learning
   - Child and adolescent phsiological and psychological needs and characteristics of child and adolescent
   - Piaget's and Bruner's theories of cognitive development
   - Insightful learning theories and their applications
   - Connectionism, classical conditioning, operant conditioning and Gestalt Theories and their application in learning.
2. Learning Experience:
   - Concepts effective learning experience
   - Changing roles of teacher as facilitator
   - Criteria of facilitating learning
   - Maxims of effective learning
   - Learning how to learn than what to learn
   - Child centric and joyful learning strategies
   - Activity based learning strategies

- Reinforcement for effective learning
- Effective communication in classroom
- Classroom methods and techniques
- Classroom management and learning environment

3. Assessment of Achievement :
   - Assessment, Measurement and Evaluation: concepts, nature, significance Test: classification, characteristics, standardization, administration, scoring
   - Analysis of test-results: use of descriptive statistics, interpretation.
4. Education in Bangladesh:
   - Historical background
   - Structure, organization and management
- Constitutional provision and legal framework
   - Primary Education: structure, statistics, curriculum, development programs, major issues and problems and their solutions
   - Secondary Education: structure, statistics, curriculum, development programs, major issues and problems and their solutions
   - Higher Education: structure, statistics, curriculum, development programs, major issues and problems and their solutions
   - Language Education: nature, scope, limitation and shortcomings, possible solutions
   - Social Science Education: nature, scope, limitation and shortcomings, possible solutions
   - Mathematics, Science and Technology Education : nature, scope, limitation and shortcomings, possible solutions
   - Technical, Vocational and Professional Education: programs, statistics , major issues and problems and their solution.

5. Teacher Education and Research in Education:
   - Primary Teacher Education : initial and in-service short programs, curriculum, modalities of delivery, shortcomings and problems, possible solution
   - Secondary Teacher-Education: initial and in-service short programs, curriculum, modalities of delivery, shortcomings and problems, possible solution
   - Provisions and Scope of Higher Degree in Education: Master's M.Phil and Ph.D
   - Research in Education: nature, scope, limitations and future directions.

Music and Theatre/Drama

Paper -I

(Drama/Theatre)

Marks - 100

Sl.No	Subject and Syllabus	Distribution of Marks
Part 1.	Dramatic Literature and History of Theatre:	30
a.	Theatre of Ancient Greece	
b.	Roman Theatre	
c.	Classical Sanskrit Theatre	

d. Elizabethan Theatre
e. French Neo-classic Theatre
f. Western Theatre of the Nineteenth and the Twentieth Century
g. Indigenous Theatre of Bengal/Bangladesh.
h. Colonial and post-colonial Theatre of Bengal/Bangladesh.

Sl.No	Subject and Syllabus	Distribution of Marks
	Part 2. Theory of Drama and Performance :	30
	a. The Poetics by Aristotle	
	b. The Natyashastra by Bharatmuni	
	c. Neo-classic criticism	
	d. Symbolism	
	e. Expressionism	
	f. Epic Theatre	
	g. Theatre of the Absurd	
	h. Postmodernism	
	i. Indigenous Theatre of Bangladesh.	
	Part 3. Theater as Practice :	30
a.	Theory of Acting (Konstantin Stanislavshy, Bertolt Brecht, Vsevolod Meyerhold and Jerzy Grotoeski)	
b.	Principles of Play Direction	
c.	The Elements and the Principles of Set Design	
d.	Basic Concepts of Light Design	
e.	The Elements and the Principles of Costume Design	
f.	Concepts of Makeup	
	Part 4. Applied Theatre :	10
	a. Theatre for Development	
	b. Theatre in Education	
	c. Television Drama.	

Music and Theatre/Drama
Paper - II (Music)
Marks - 100

	Part 1. History of Music (Theory):	25
	(Ancient, Medieval & Modern Age)	
	a. Classical Music	
	b. Bengali Music	

c. Folk Music

d. Eastern & Western Music-a comparative study.

Part 2. Practical Oriented Theory (Music): 25

a. Bengali Folk songs: characteristics and varieties.

b. Classical Music : Dhrupad, Dhamar, Khayal, Thumri.

c. Definition of Talas and Ragas (According to Eastern system)

d. Rabindranath Tagor's Songs : characteristics and varieties.

e. Kazi Nazrul Islam's songs: characteristics and varieties.

Part 3 . Life and Works of Musicians: 25

a. Ustad Alauddin Khan, Ustad Fayaz Khan, Ameer Khasru, Mian Tansen, Baiju Baora, Ustad Vismilla Khan, Ustad Amir Khan, Ustad Karamat Ullahi Khan, Ustad Enauet Khan, Pandit Omkarnath, Ustad Ali Akbar Khan, Pondit Ravi Sankar.

b. Beethoven, Mozart, Sebastion Bach, Hayen, Richard Wagner, Robert Schuman, Franz Liszt, Frederic Handel, Oscar Straus, Fraunz Schubert.

Part 4. Musicians of Bangladesh : 25

a. Ustad Munsi Raisuddin, Ustad Aeyet Ali Khan, Fuljhuri Khan, Ustad Fozlul Haque Pandit Barin Majumder.

b. Abbasuddin Ahmad, Folk Poet Jasimuddin, Sahid Altaf Mahmood, Samar Das. Abdul Ahad, Abdul Latif, Azad Rahman, Sekh Sadi Khan.

c. Baul Lalon, Radharamon, Hason Raja, Pagla Nanai, Pangu Shah, Jalaluddin, Ukil Musshi, Bioy Sarkar.

d. Mass Media & Stage Performance.

e. Modern Lyricist of Bengali Music; Abu Hena Mustafa Kamal, Dr. Maniruzzaman, Sabir Ahmed Choudhury, Nazrul Islam Babu, Abu Bakar, Rafiduzzaman, Fazal-E-Khoda.

Archaeology

Paper - I

Marks - 100

1. Definition of Archaeology as an Interdisciplinary Approach.
2. Nature of Archaeological Data.
3. Relation of Archaeology with other Disciplines; Multidisciplinary vs. Interdisciplinary.
4. Dating Methods in Archaeology.

5. Some Basic concepts (i) Artifacts; (ii) Typology,(iii) Industry; (iv) Ecology; (v) Society; (vi) Culture.
6. The Origin and Growth of Archaeology in World Context.
7. Indigenous (Sub-continent) Conceptions of the Study of the Past.
8. Early (Pre-1981) Western Perceptions of the India's Past.
9. The Establishment of Asiatic Society of Bengal and Archaeology.
10. Alexander Cunningham's Surveys and the work of his contemporaries and successors.
11. John Marshal and His Successor's Period (1902-1944).
12. Sir Mortimer Wheefer and the Scientific Archaeology in the Sub-continent.
13. Present Structure of Archaeology in India, Pakistan and Sri Lanka.

14. Archaeology of Bangladesh from the Beginning till Date:-
    (I) Differential levels of culture/development in space and time and the persistence of ancient modes of life into the present.
    (II) Roots and migration of ancient peoples of Bengal.
    (III) Origin and migration of Society and Religion in the Sub-continent.
    (IV) Important social institutions:- Family, Kinship, Caste, Tribe, Totem, Magic, Religion.
    (V) Early important archaeological sites of Bangladesh:-
        (i) Mahasthangarh;
        (ii) Mainamoti;
        (iii) Paharpur.

Archaeology

Paper - II

Marks - 100

1. Archaeology and Fieldwork and the Basic Units Archaeology.

   The Goals and the Framework of Archaeological Inquiry . What is field archaeology? Theoretical Archaeology vs. Field Archaeology: Meaningless Opposition. Theoretical basis of archaeological Fieldworks; Culture, Historical, Processual and Post-processual theoretical paradigms in Archaeological Fieldwork. Archaeological Fieldwork Management in the sociocultural context of Bangladesh.

   Basic Units: Artifacts and Ecofacts: Definition, Classification and interpretation. Importance of Artifacts and Ecofacts in archaeological interpretation.

Stratigraphy: Law of Superposition. Law of Uniformatarianism. Law of sequence. Strata and **Stratification:** Identification, Stratigraphy, Interpretation. Significance of Stratigraphy in the reconstruction of chronology and culture.

Archaeological sites : Kinds of archaeological sites and their formation process.

Settlement Pattern : Definition, Determining factors of a settlement pattern.

Context : Definition, Space, Time, Form, Function, Structure and Content as dimensions of context.

Culture : Culture Historical view, Functional view and Interpretive view of Archaeology Culture.

2. Surface Exploration and Discovery: Methods, Equipment and Record. Objectives. Importance of having objectives in exploration. Survey of Pre-historic, Proto-historic and Historical Sites. A General Survey. Survey for a Specific Problem.
3. Methods of Sites Survey. Library and other types of pre-survey research. Ground Survey. Aerial Survey. Map Reading, Geophysical Prospecting. Chemical Survey, Physical Features Rocks and Minerals. Soil Sampling, Ethnological Data Collection. Legends and Folktales. Methods of Data Retrieval. Methods of Recording. Site Survey Data. Staff. Exploration Kit.
4. Excavation: Principles and Methods. Problems and Strategy. Permission, Funding and Law with special reference to Bangladesh. Mapping. The Processes, Methods and Types of Excavation. Recurrent Types of Context and their excavation. Excavation of Structures. Excavation of Sites without Features. Excavation Staff, Equipments and Logistics. Planning and Management of Excavation. Field Preservation. Responsibility and Qualifications of an Excavation Team.

   Importance and Methods of Recording in Excavation. Recording of pottery and Small Finds. Artifacts and Ecofacts: Their Recovery and Treatment.
5. Post Fieldwork Planning, Processing and Finds Analysis and Dating.
   Post-Fieldwork Planning. Finds Analysis. Pottery Analysis, Stone, Metal and Organic Artifacts Analysis, Bones, Seeds and Other Plants Remains Analysis. Soil and Sediments Analysis. Pollen, Land Snail and other Environmental Sample Analysis.
   Dating, Absolute and Relative Dating Techniques. Radio Carbon Dating. Thermoluminiscence Dating, Archaeomagnetism. Dendrochronology, Stratigraphic Dating, Cross Dating. Flourine-Uranium-Nitrogen Dating.
6. Interpreting the Evidence. What is Interpretation? Levels of Interpretation. Interpreting Site's Environment. Interpreting the Household Activity Areas, Community Activity Areas. Interpretation of How People Lived.
7. Prehistoric tools, techniques and uses.
8. Human achievements during Paleolithic and Neolithic periods.

9. Urban Revolution and Criteria of Civilization.
10. Egyption Civilization, Mesopotamian Civilization and Indus-Civilization.
11. Second Urbanization: Various Resource and sequences.
12. Paleontology: Its history and development from classical stage to the present.
13. Meaning of Epigraphy, types, nature and importance of Epigraphy and Numismatics in the Context of Archaeology of South Asia, especially Bengal.
14. Social, economic, religious and cultural aspects as reflected in ancient and early medieval Indian Coins.
15. Geographical Information System (GIS) and its implications in archaeology.
16. Archaeology and Fieldwork and the Basic Units Archaeology.
    The Goals and the Framework of Archaeological Inquiry . What is field archaeology? Theoretical Archaeology vs. Field Archaeology: Meaningless Opposition. Theoretical basis of archaeological Fieldworks; Culture, Historical, Processual and Post-processual theoretical paradigms in Archaeological Fieldwork. Archaeological Fieldwork Management in the sociocultural context of Bangladesh.
17. Definition of terms: Preservation, Conservation, Restoration, Artifacts, Cultural Property, Archaeology and archaeonetry.

(a) Ethics and principle of conservation purpose of conservation.
(b) Conservation of organic objects, building materials and other archaeological materials.

18. Definition, scope and limitation of Ethnoarchaelogical research. Role of Ethnographic evidence in the interpretation of archaeologica record and reconstruction of past societies and culture.

Water Resources Engineering

Paper-1

Total Marks-100

Marks

Fluid properties, fluid flow concepts and basic equations, similitude and dimensional analysis, laminar and turbulent flow, pipe flow and problem. 50

Open channel flow and classification, energy equations, critical flow concepts, uniform flow, hydraulic jump. 50

Flood management, its causes and economic aspects of floods, Principles and design of river training and hydraulic structures such as dams, barrages, cross-drainage works, revetments and guide banks, coasts and coastal features, ports and harbours, coastal sedimentation process, shore protection works and dredging.

Structure 50

Analysis of beams, truss, Influence lines for beams, truss, Deflection of beams. Statically indeterminate structure, beams, trusses.

Geotechnical 50

Soil exploration, properties of soil, bearing pressure, settlement of structure.

Environment 50

Water supply. Theory of water treatment, sewage treatment and disposal.

Water Resources Engineering

Paper-II
Total Marks-100

Hydrologic cycle, precipitation, stream flow. runoff relations, hydrographs, routing and statistical methods. 50

Integrated water resources management. O&M of water resources projects, principles of project management, contracts and pacifications, quality control cost accounting system, report preparation and project evaluation; Groundwater and well hydraulics, environmental aspects in water resources; waterways systems, measures of improving waterways, navigational aids, waterways of Bangladesh.

Structure 50

Design and analysis of RCC beams, one way to way slab, column design, introduction to Pestered Concrete.

Geotechnical 50

Design of foundation, retaining wall, sea wall. Deep excavation. Introduction of transportation Engg.

Mining Engineering

Paper-I

Marks-100

Course Outline:

Introduction to mining: Elements of mining, development of mining technology, stages in the Life of a Mine, Unit operation of mining, consequences of mining, governments influence and regulation; Stages of mining: prospecting, development, exploration etc, calculation of ore reserve estimate; Unit Operation of mining: fundamental operation and cycles, drilling, blasting, loading and excavation, explosives: different mining methods and their scope: surface mining, underground mining, other methods; Selection of mining method.

Mining Engineering

Paper-II

Marks-100

Course Outline:

Fundamentals of Mineral Processing; characterization of Particles; Analysis of Separation processes; fluid Dynamics; Mechanisms and Processes of Particulate Separations; Mechanisms of Fracture; Crushing and Grinding; Surfaces and Interfaces; Flotation and other Surface Separations; Ore Sorting; Magnetic Separation; Electrostatic Separation; Screening and Sieving; Classification, Gravity & Dense Medium Separation , Sedimentation, Filtration.

Electronics Engineering

Paper-I

Marks-100

Electrical Circuits :

Circuit variables and elements : Voltage, current, power, energy, independent and dependent sources, resistance. Basic laws: Ohm's law, Kirchoff's current and voltage laws. Simple resistive circuits: Series and parallel circuits, voltage and current division, way-delta transformation. Techniques of circuit

analysis. Nodal and mesh analysis, Network theorems : Sources transformation. Thevenin's Norton's and superposition theorems. Energy storage elements: Inductors and capacitors, series parallel combination of inductors and capacitors. Responses of RL and RC circuits: Natural and step responses. Instantaneous current, voltage, power, effective current and voltage, average power, phasors and complex quantities, impedance, real and reactive power, power factor. Analysis of single phase a c circuits : Series and parallel RL, RC and RLC Circuits, nodal and mesh analysis, application of network theorems in a c circuits, circuits with non-sinusoidal excitations. Passive filter. Resonance in a c circuits: Series and parallel resonance. Magnetically coupled circuits. Power calculation.

Electronic Circuits :

P-N junction as a circuit element : Intrinsic and extrinsic semiconductors, operational principle of p-n junction diode, contact potential, current-voltage characteristics of a diode, simplified dc and ac diode models, dynamic resistance and capacitance. Diode circuits: half wave and full wave rectifiers, rectifiers with filter capacitor, characteristics of a zener diode, zener shunt regulator, clamping and clipping circuits. Bipolar junction transistor (BJT) as a circuit element; Bipolar junction transistor; current components. BJT characteristics and regions of operation, BJT as a switch. Single stage mid-band frequency BJT amplifier circuits; Voltage and current gain, input and output impedance of a common base, common emitter and common collector amplifier circuits. Metal-oxide-semiconductor field-effect-transistor (MOSFET) as circuit element; structure and physical operation of an enhancement MOSFET, threshold voltage, Body effect, current voltage characteristics of and enhancement MOSFET, biasing discrete and integrated MOS amplifier circuit, single-stage MOS amplifier, MOSFET as a switch, CMOS inverter. Junction field-effect transistor (JEFT): Structure and physical operation of JEFT, transistor characteristics, pinch-off voltage. Differential and multistage amplifiers; Description of differential amplifiers, small-signal operation, differential and common mode gains, RC coupled mid-band frequency amplifier.

Frequency response of amplifiers: Poles, zeros and Bode plots, amplifier transfer function, techniques of determining 3 dB frequencies of amplifier circuits, frequency response of single-stage and cascode amplifiers, frequency response of differential amplifiers. Operatinal amplifers (Op-Amp): Properties of ideal Op-Amps, non-inverting and inverting amplifiers, inverting intergrators, differentiator, weighted summer and other applications of Op-Amp circuits, effects of finite open loop gain and bandwidth on circuit perfomance logic signal operation of Op-Amp, de imperfections. General purpose Op-Amp; DC analysis, small-signal analysis of different stages, gain and frequency response of 741 Op-Amp. Negative feedback: properties, basic topologies, feedback amplifiers with different topologies, stabitlity, frequency compersation. Active filters; Differnet types of filters and specifications, transfer functions, realization of first and second order low, high and band pass filters using Op-Amp. Signal generators: Basic principle of sinusoidal oscillation, Op-Amp RC oscillators, LC and crystal oscillators. Power Amplifiers; Classification of output stages, class A.B. and AB output stages.

Electromagnetic :

Static electric field : Postulates of electrostatic, Coulomb's law for discrete and continuously distributed charges, Gauss's law and its application , electric potential due to charge distribution, conductors and dielectrics inn static electric field density-boundary conditions; capacitance electrostatic energy and forces, energy in terms of field equations, capacitance calculation of different geometries, boundary value problems Poisson's and Laplace's equations in different co-ordinate systems. Steady electric current, Ohm's law, continuity equation. Joule's law, resistance calculation. Static magnetic field, Postulates of magnetostatics, Biot-Savart's law, Ampere's law and application, Vector magnetic potential, magnetic dipole, magnetization, magnetic field intensity and relative permeability, boundary conditions for magnetic field, magnetic energy, magnetic forces, torque and inductance of different geometries. Time varying field and Max well's equations; Faraday's law of electromagnetic induction, Maxwell's equations differntial and integral forms, boundary conditions, potential functions; time harmonic fields and Poyntng theorm. Plane electromagnetic wave; place wave in loss less media - Doppler effect, transverse electromagnetic wave, polarization of plane wave, plane wave in losssy media-low-loss dielectrics, good conductors, group velocity, instantaneous and average power densities, normal and oblique incidence of plane waves at plane boundaries for different polarization.

Electronics Engineering

Paper-II

Marks-100

Digital Electronics :

Introduction to number systems and codes. Analysis and synthesis of digital logic circuits: Basic logic functions, Boolean algebra, combinational logic design, minimization of combinational logic. Implementation of basic static logic gets in CMOS and BICMOS: DC characteristics, noise margin and power dissipation, Power optimization of basic gates and combinational logic circuits. Modular combinational circuit design: pass transistor, pass gates, multiplexer and their implementation in CMOS, decoder, encoder, comparators, binary arithmetic elements and ALU design. Programmable logic devices; logic arrays, field programmable logic arrays and programmable read only memory. Sequential circuits: different types of latches, flip-flops and their design using ASM approach timing analysis and power optimization of sequential circuits. Modular sequential logic circuit design: shift registers, counters and their applications.

Electrical Properties of Materials :

Crystal structures: Types of crystals, lattice and basic, Bravais lattice and Miller indices. Classical theory of electrical and thermal condition: Seattcring, mobility and resistively, temperature dependence of metal resistively, Mathiessen's rule, Hall effect and thermal conductivity. Introduction to quantum mechanics; Wave nature of electrons, Schrodinger's equation, one dimensional quantum problems infinite quantum well, potential step and potential barrier, Heisenbergs's uncertainty principle and quantum box. Band theory of solids; Band theory from molecular orbital, Bloch theorem, kronig-Penny model, effective mass, density-of-states. Carrier statistics, Maxwell-Bolzmannand Fermi-Dirac distributions, Fermi energy. Modern theory of metals: Determination of Fermi energy and average energy of electrons, classical and quantum mechanical calculation of specific heat. Dielectric properties of materials, Dielectric constant, polarization electronic, ionic and orientational, internal field, Clausius-Mosotti equation, spontaneous polarization, frequency dependence of dielectric constant, dielectric loss and piezoelectricity. Magnetic properties of materials; Magnetic moment, magnetization and relative permitivity, different types of materials, origin of ferromagnetism and magnetic domains. Introduction to superconductivity; Zero resistance and Meissner effect, Type I and Type II superconductors and critical current density.

Communication Theory :

Overview of communication systems: Basic principles, fundamental elements, system limitations, message source, bandwidth requirements, transmission media types, bandwidth and transmission capacity. Noise: characteristics of various types of noise and signal to noise ratio. Information theory: Measure of information, source encoding, error free communication over a noisy channel, channel capacity of a continuous system and channel capacity of discrete memory less system. Communication systems, Analog and digital, Continuous wave modulation, Transmission types-base band transmission, carrier transmission, amplitude modulation introduction, double side band, single side

band, vestigial side band, quadrature: spectral analysis of each type, envelope and synchronous detection, angle modulation instantaneous frequency, frequency modulation (FM) and phase modulation (PM). spectral analysis, demodulation of FM and PM. Pulse modulation: Sampling _sampling theorem, Nyquist cirterion, aliasing, instantaneous and natural sampling, pulse amplitude modulation _ principle, bandwidth reuirements; pulse code modulation (PCM)_ quantization principle, quantization noise, non-uniform quantization, signal to quantization error ratio, differential PCM, demodulation of PCM; delta modulation (DM) _ principle, adaptive DM, line coding_ formats and bandwidths, digital modulation.

Amplitude=shift keying, principle, on-off keying, bandwidth requirements, detection, noise performance, phase-shift keying (PSK)- principle, bandwidth requirements, detection, differential PSK. quadrature PSK, noise performance, frequency shift Keying (FSK)- principle, continuous and discontinuous phase, FSK, minimum-shift keying, bandwidth requirements, detection of FSK. Multiplexing: Time-division multiplexing (TDM)- principle, receiver synchronization, frame synchronization, TDM of multiple bit rate systems; frequency division multiplexing principle, de-multiplexing; wavelength-division multiplexing, multiple-access network-time-division multiple-access, frequency-division multiple-access; code-division multiple-access (CDMA)- spread spectrum multiplexing, coding techniques and constraints of CDMA. Communication system design : design parameters, channel selection criteria and performance simulation.

Microprocessor and Interfacing

Introduction to microprocessors. Intel 8086 microprocessor, Architecture, addressing modes, instruction sets, assembly language programming, system design and interrupt. Interfacing : programmable peripheral interface, programmable timer, serial communication interface; programmable interrupt controller, direct memory access, keyboard and display interface, introduction to micro-controllers.

Law

Paper-I

Part - I

(a) Concept and different theories of law : Imperative theory; Law according to Historical School; Law According to Sociological School - Functional theory of law.

(b) Sources of Law :

- (i) Sources according to modern jurisprudence, Legislation, precedent and custom.
- (ii) Sources according to Islamic Legal System_ Quran, Sunnah Ijma, Qiyas and Ijtehad.
- (iii) Sources according to Hindu Legal System-Smriti, Stuti, Custom and Legislation.

(c) Kinds of Law :

- (i) International law or law Nations-Concept, sources, nature, relationship with Municipal law.
- (ii) Civil law or of the state nature and definition of law, law and equity, General Law and Special Law, Common law and Constitutional Law.

(d) Rights, Ownership and Possession.

Part - II

(a) Constitution and state organs under the Constitution - Supremacy and other features of the Constitution, Principles of state policy. Fundamental rights and their enforcement, Amendment of the Constitution.
(b) The Executive : The president, Council of Ministers; Legislative powers of the President.
(c) The Legislature : Jatiya Sangsad, Composition, powers and functions- Powers to control the executive.
(d) The Judiciary :
  (i) The Supreme Court - High Court and Appellate Division, Composition, original, Appellate, Revisional, Advisory and with Jurisdictions.
  (ii) Sub-ordinate Courts Structure and jurisdiction of Civil and Criminal Courts. Inherent powers of the Courts Injunction.

Law
Paper-II
Civil Procedure Code

Preliminary

1. Introduction : Procedural law-Substantive law-History of Code-Commencement of Code-Extent and applicability of Code-Object & Scope.
2. Definition : 1. General
   2. Important Definitions
      Decree : meaning Essential elements-Classes of decrees-Rejection of Plant, Decree and Order-Decree and Judgment.
   3. Judge
   4. Judgment : Meaning, Decree and Judgment, Distinctions.
   5. Order : Meaning Decree and order distinction.
   6. Decree-holder
   7. Judgment debtor
   8. Legal Representative
   9. Mesne profit
   10. Affidavit
   11. Appeal
   12. Cause of Action
   13. Defendant
   14. Plaintiff
   15. Issue
   16. Jurisdiction
   17. Plaint

18. Set off
19. Summons
20. Written Shelter

Suits :

1. Suits of Civil nature
2. Jurisdiction of Civil :
    1. General
    2. Meaning of jurisdiction
    3. Kinds of jurisdiction
    4. Lack of jurisdiction, objection as to jurisdiction
3. Res Sub- judice :
    1. Res sub-judice : Stay of suits
    2. Section 10
    3. Object
    4. Conditions
    5. Res sub-judice and res-judicata.
4. Res-judicata :
    1. Section II
    2. Object
    3. Conditions
    4. Res-judicata between co-plaintiff and res-jucicata between co-defendant
    5. Matter directly and substantially in issue
    6. Matter collaterally or incidentally in issue
    7. Constructive res-jidicata
    8. Res-judicata Estoppel
5. Place of Suing :
    1. Rules as to forum
    2. Rules as to pecuniary jurisdiction
    3. Objection as to jurisdiction
6. Institution of suit :
    1. Presentation of plaint
    2. Time and place of presentation
    3. Parties to suit joinder of parties-joinder of plaintiff and defendants necessary and proper parties non-joinder or mis-joinder of parties and its effect.
7. Pleading :
    1. General rules of pleading
    2. Plaint general rules of plaint. Particulars Return of plant rejection of plaint. Effect of rejection of plant.
    3. Written statement general meaning of written statement, in particulars.
    4. Set-off meaning conditions-legal and equitable set-off counter claim,
    5. Issue and service of summon-general rules, modes of service summon, contents of summon. Exception from appearance.
8. Discovery Inspection and Production of documents

1. Discovery and Inspection-Discovery by interrogatories-Discovery of documents. General rules of Discovery and inspection.
2. Admission-kinds of admission, judgment of admission
3. Affidavit, Evidence of Affidavit.

9. Appearance and Non-Appearance of Parties :
    1. Appearance of Parties.
    2. Whether neither party appears
    3. Where only plaintiff appears
    4. where duly defendants appears
    5. Remedies in case of ex-parte decree
        Appeeal
        Review
        Suit

10.First Hearing
    1. Framing of Issues
    2. Kind of Issues
    3. Importance of Issues
    4. Country power of duty as to issues
    5. Materials for framing issues
    6. Disposal of suits.

11. Inter in Order
    a. Commissions
        1. Power of commit to issue commission
        2. Purpose
        3. Power
        4. Expenses
    b. Arrest before judgment
        1. Object
        2. Grounds
        3. Principles
        4. Security
        5. Arrest before judgment under allowed
        6. Arrest on insufficient grounds
    c. Attachment before judgment
        1. Object
        2. Grounds
        3. Mode of attachment
        4. Exception
    d. Temporary Injunction

1. Definition
2. Object
3. Types
4. Grounds
5. Principles
6. Description
7. Interlocutory order
    1. Receiver-Definition-Appoint-Power duties-liabilities
    2. Security for costs-applicability-object-failure to furnish security.

12. Withdrawal and Compromise of Suits :
1. Withdrawal without leave of court
2. Withdrawal with leave of court
3. Compromise of suits
4. Compromise by minor's Decree
5. Compromise by pleader
6. Representative suit
7. Compromise Decree and res-judicata
8. Execution of Compromise Decree

13. Death, Marriage and Insolvency of Parties
1. Death of Party Consequences
2. Marriage of party Consequences
3. Insolvency Consequences
4. Insolvency of Plaintiff
5. Insolvency of defendant
14. Trial
1. Summons and attendance of witnesses
2. Adjournment
3. Heavy of suit-Right to being recording of evidence

15. Judgment and Decree
1. Judgment-definition-Essentials
2. pronouncement-contents-attention
16.Suits in Particular Cases
(a) Suits by or against government or Public officer
(b) Suits by or against aliens and foreign rulers
(c) Suits by or against soldiers, sailors, airmen
(d) Suits by or against Corporation
(e) Suits by or against firms
(f) Suits by or against trustees, executors & administrators

(g) Suits by or against minors and lunacies
(h) Suits by or against indigent persons
(i) Suits relation to mortgages
(j) Inter-pleader suit
(k) Suits relating to public nuisance
(l) Suits relating to public characters

17. Appeal, Reference, Review and Revision
18.Execution
1. Modes of Execution
2. Stay of Execution
3. Arrest and Detection
4. Attachment of Property
5. Sale and Delivery of Property
6. Distribution of Assets
19. Miscellaneous
1. Transfer of Causes
2. Restitution
3. Caveat
4. Inherent Powers of Court

Limitation Act

Objects, Interpretation and application of statutes of Limitation -Limitation of suits, Appeals and Application - Computation of period of Limitation - Extension and Exemption of period of Limitation Suspension of Limitation Waiver of Limitation -Effect of Fraud and Acknowledgement of Limitation Adverse possession Acquisition of easement rights Limitation in suit for recovery of Land.

The Code of Criminal Procedure

- Definitions
- Evolution of Criminal judicial System in Bangladesh.
- Constitution, Jurisdiction & Powers of Criminal Courts
- Summons and Warrants
- Arrest Bail & Bail Bonds
- Prevention offences Security for keeping good behaviours & peace
- Unlawful Assembly
- Public Nuisances & Temporary orders in urgent cases of Nuisance or apprehended dangers
- Disputes as to Immovable Property
- Preventive Action of the Police
- Police Investigation and Inquiry
- The mode of taking evidence in trials

- Complaints to Magistrates, Charge, Summary Trials, Trial of Summons and Sessions Cases, Judgment, Acquittal, Conviction, Appeal, Reference & Revision.
- Submission of sentences for confirmation.
- Provision as to Execution
- Provision as Lunatics.
- Disposal of Property
- Proceedings in cases of certain offences affecting the Administration of Justice.
- Transfer of Criminal Cases
- Suspensions, Remissions & Commutations of Sentences.
- Irregular Proceedings.
- Public Prosecutor.
- Inherent Power of the Court.
- Miscellaneous.

Penal Code

- Definition of Crime.
- Essential elements of Crimes.
- General exceptions from Cr.liabilities.
- Right of Private Defense.
- Punishments.
- Abetment.
- Offence against public tranquility.
- Criminal conspiracy and Sedition.

Offences by or relating to Election

- False evidence.
- Offences relating to coin & Govt. Stamps.
- Offences by public Servants.
- Contempt's of Courts.
- Public Nuisance.
- Offences relating to religion.
- Offences relating to human body.

Culpable Homicide, Murder, Hurts, Wrongful Confinement, Wrongful Restraint, Criminal Force. Assault. Kidnapping, Abduction, Rape Unnatural lust.

- Offences against property.

Theft. Extortion, Robbery, Dacoity, Cheating, Criminal Misappropriation of Property, Criminal Breach of Trust.

- Mischief
- Trespass: Criminal trespass, House-trespass, House breaking.
- Forgery & Falsification Accounts.
- Offences Relating to Marriage.
- Defamation.
- Criminal Intimidation, Insult and Annoyance.
- Attempts of offences.

Law of Evidence

Evidence Act

A. Law of Evidence

1. Function of the Law of Evidence.
2. Preliminary : Short Title-extent and commencement of the Act. Definitions.
3. Scheme of Evidence Act.

Relevancy of facts-Mode of proof-Production and effect of Evidence.

Improper Admission or Rejection of evidence.

Relevancy of facts

Facts in issue and Relevant facts. Facts connected with the facts to be provided. Statement about the facts to be proved. Decision about the facts to be proved. Opinions of the facts to be proved. Character of the persons who are concerned with the facts to be proved.

Mode of Proof

Judicial notice. Facts admitted. Proof of facts other than contents of documents. Proof of documents including proof of execution of documents and proof of existence.

Production and effect of evidence

Burden of Proof. Presumptions, competence of the witness. Privilege, Examination of witnesses. Impeachment or confirmation of the credit of the witness. Power of the court in relation to examination witnesses.

Improper Admission or rejection of evidence

Specific Relief Act

Equitable remedies, Rules regarding Possession of Immovable and Movable Properties, Specific performance, Declaratory suit, Receiver, Injunction.

Company Law

Company : Definition and Nature
Nature of Company Law
company Law as applied in Bangladesh
Types of Companies
Formation of Company
Memorandum and Articles of Association
Promoters
Prospectus

Management of Company: Directors, Managing Director, Manager and Managing Agent Raising and Maintenance of Capital; Share, Debenture and Dividends.

- Members and Shareholders
- Meetings and Resolutions
- Accounts and Audits
- Winding up

Commercial Law

The Sale of Goods : Formation of the Contract Subject-matter of the Contract Condition and Warranties Transfer of Property between Seller and Buyer-Islamic Principle in this matter Performance of the Contract Rights of Unpaid Seller -Suit for Breach of the Contract.

Partnership : Definition and Nature-Distinction between Partnership Firm and Company- Islamic Principle in these maters-History of Partnership Law in Bangladesh.

Partnership Relations : Relations between the Partners-Relation between the Partners and Third Parties-Inclusion and Exclusion of Partners, Registration of a Firm - Dissolution of a Firm-Consequence of Dissolution of a Firm Islamic Regulations.

Carriage of Goods : Contract of Carriage -Classification of Carriers-Railways as Carriers- Carriage of Goods by Sea-Charter-Party-Bill of Lading-Carriage by Air.

Insurance : Nature of the Contract of Insurance-Fundamental Principles Premium Policy Reinsurance Double Insurance-Marine Insurance: The Policy-Warranties-the Voyage-Perils Losses-Particular average, General average-Termination of-Risk-Fire Insurance-Life Insurance. Islamic Principle in the matter.

Law of Insolvency : Principles and objects of Insolvency legislation. Insolvency Court: Functions and jurisdiction.

Negotiable Instruments : Promissory Notes - Bill of Exchange-Cheques Holder in due Course Negotiation Endorsements Defective Title-Liability of Parties-Discharge.

Law of Arbitration : Defining Arbitration-Submission and modes of submission. Appointment and removal of arbitrators. The Award, Power of the Court in respect of the award.

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State Acquisition Act. 1950
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Special provisions for the acquisition of the interests of certain rent-receivers.
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Application of Parts V and class of agricultural tenants Incidents of holdings of raiyats and transfer, purchase and acquisition of lands.
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Jurisdiction, Appeal, Revision, Review.
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Non-Agricultural Tenancy Act, 1949

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International Law

Paper-I

(i) Concept and Nature of International Law. History. Development and Schools of International Law. Sources of International Law. Relation between International Law and Municipal Law.
(ii) State Territorial Sovereignty, different modes of Acquisition of State Territorial Sovereignty. Jurisdiction of a State in International Law. Territorial Jurisdiction. Personal Jurisdiction. Jurisdiction according to the protective Principle. Jurisdiction according to the University Principle. Jurisdiction of High seas. Exemptions from and Restrictions upon the Territorial Jurisdiction.
(iii) Recognition : Definition and forms of Recognition. Recognition of Government and State. Methods. Withdrawal and Consequences of Recognition. Retroactivity of Recognition. Recognition of Insurgency and Belligerency.

(iv) Place of the Individuals in International Law & human Rights. State and Individuals as subjects of International Law-The U.N. Charter and Human Rights Universal Declaration of Human Rights-International Covenant of Economic, Social and Cultural Rights-European Convention for the Protection of Human Right-American Convention on Human Rights-Principles of Self-determination of Peoples.

(v) Law of the Sea. Internal Waters. Territorial sea and contiguous Zone. Legal Regime of the Territorial Sea. Exclusive Economic Zone and Continental Shelf. Legal Regime of the Exclusive Economic Zone and Continental Shelf. High Seas. Deep Seabed and Ocean Floor.

(vi) State Succession Passing of Rights and Obligation upon External Changes of Sovereignty over Territory. Passing of Rights and Obligations upon Internal Changes of Sovereignty.

International Law

Paper-II

(a) Intervention, Kinds and Grounds of Intervention. Various Doctrines concerning Intervention. Intervention and the charter of the U.N.

(b) Law of Practice as to Treaties, Vienna Convention on the Law of Treaties of 1969. Different stages involved in Conclusion of the Text. Means of expressing consent to be bound by a Treaty. Reservations to treaty. Legal effects of Reservation. Treaties third States. Invalidity. Termination and suspension of the operation of treaties.

(c) Diplomatic Protection and Immunity. Vienna Convention on Diplomatic Relations, 1961 Diplomatic Missions Categories of personnel of Diplomatic Mission. Diplomatic Privileges and Immunities. Inviolability of Missions. Inviolability of Diplomatic Agents. The Prevention and Punishment of Crimes against Internationally Protected Persons.

(d) Neutralization and Neutrality. Neutralised States. Object and essence of Neutralisation. Obligations of Neutralized states and States guaranteeing Neutralisation. Declaration of Neutrality, Rights and Duties of Belligerent and Neutral States.

(e) Settlement of International Disputes. Peaceful or Amicable means of Settlement. Forcible or coercive means of Settlement. Judicial Settlement of International Disputes. The International Court of Justice. Settlement under the auspices of the United Nations Organisation.

(f) Disarmament Imperative. Urgency for Disarmament. US-USSR talks at Geneva, 1985. US-USSR Treaty on Arms Limitation The SALT-I Agreement. The SALT_II Agreement, Convention on Prohibition or Restriction on the use of certain Conventional Weapons.

(g) International Rivers. Rights and Obligations of riparian States over International Rivers. Ganges Water Dispute and Farakka Issue.

International Organisations :

(h) Concept of International Organisation-Structure-Classification Emergence of International Organisations

League of Nations-Background-League Covenant-Failures-Termination.

(i) The United Nations-Historical Background-The United Nations-Charter-Objectives- Purpose-Principle-Organs-General Assembly-Security Council-Economic and Social Council-Trusteeship Council-International Court of Justice-The Secretariat.

International Criminal Court(ICC):

(j) Specialised Agencies of the United Nations - Provisions in the UN Charter-Compositions, Power and Function of all the 18 (eighteen) Specialised Agencies so far being contracted with the United Nations-World Trade Organisation (WTO)- International Atomic Energy Agency.

(k) Regional Organisations - Its provisions in the United Nations Charter. The Arab League-Organisation of American States (OAS), African Union (AU). European Union (EU), North Atlantio Treaty Organisation (NARO) South Asian Association of regional Co-operations (SAARC). Association of South East-Nation (ASEAN), The Organisation of Islamic Conference (OIC), The Organisation of the Peteroleum Exporting Countries (OPEC), The Non-Aligned Movement (NAM), The Commonwealth.