SYLLABUS FOR PRELIMINARY EXAMINATION FOR RECRUITMENT TO THE POSTS OF ASSISTANT MASTER/MISTRESS IN <u>BENGALI</u>

Full Marks : 100   Time : 1 Hour 30 Minutes

১. পাঠ্য বস্তু :

ক) উপন্যাস : কৃষ্ণকান্তের উইল - বঙ্কিমচন্দ্র চট্টোপাধ্যায়;
আরণ্যক - বিভূতিভূষণ বন্দ্যোপাধ্যায়;
বনপলাশের - আশাপূর্ণা দেবী;

খ) কাব্য : * মেঘনাদ বধ কাব্য - মাইকেল মধুসূদন দত্ত:
চতুর্থ, ষষ্ঠ, নবম সর্গ।

* জীবনানন্দ দাশ : বনলতা সেন কাব্যগ্রন্থ:
— পুস্তকে পাঁচটি কবিতা;

* সুভাষ মুখোপাধ্যায় — পদাতিক কাব্যগ্রন্থ:
— পুস্তকে পাঁচটি কবিতা;

* কাজী নজরুল ইসলাম — বিদ্রোহী, আগমনী কবিতাসমূহ

গ) নাটক : * বিসর্জন : রবীন্দ্রনাথ ঠাকুর;
* নবক গুপ্তচর : অমলেশ মিত্র;

ঘ) প্রবন্ধ : * নির্বাচিত প্রবন্ধ : কাজী আবদুল ওদুদ :
পুস্তকে পাঁচটি প্রবন্ধ;

* ক্রমিক প্রবন্ধ : অন্নদাশঙ্কর রায় :
পুস্তকে পাঁচটি প্রবন্ধ

ঙ) ছোটোগল্প — রবীন্দ্রনাথ ঠাকুর → মেঘ ও রৌদ্র;
শরৎচন্দ্র চট্টোপাধ্যায় → মহেশ;
তারাশঙ্কর বন্দ্যোপাধ্যায় → বিচার;
বিভূতিভূষণ বন্দ্যোপাধ্যায় বিভূতি → পুঁইমাচা তেলেনাপোতা;
জ্যোতিরিন্দ্র নন্দী → চিরকিনি;

২. বাংলা সাহিত্যের ইতিহাস —
* মঙ্গলকাব্য — (মনসামঙ্গল, চণ্ডীমঙ্গল, ধর্মমঙ্গল)।
* বৈষ্ণব কাব্য — (বিদ্যাপতি, চণ্ডীদাস, জ্ঞানদাস,
গোবিন্দদাস)

* মেঘনাদবধ লিখিত করেন, বিদ্যাসাগর, দীনবন্ধু,
গিরিশ ঘোষ, দ্বিজেন্দ্রলাল রায়, প্রমথ চৌধুরী,
অতুলপ্রসাদ দত্ত;

৩. প্রত্যয় প্রকরণ :

 * অর্থ, অভ্যাস, প্রত্যয়, কারক ও বিভক্তি,
   পদ-পরিবর্তন, লিঙ্গ পরিবর্তন, অব্যক্তি-
   অনুতোষন, এক কথায় প্রকাশ;

SYLLABUS FOR PRELIMINARY EXAMINATION FOR RECRUITMENT TO THE POSTS OF ASSISTANT MASTER/MISTRESS IN ENGLISH

Full Marks : 100   **Time : 1 Hour 30 Minutes**

1. A knowledge of the history of English Literature from 1340 to 2000.

2. A close acquaintance with the following works which are prescribed for detailed study :-

a)	William Shakespeare	:	Macbeth, As you Like It
b)	Jane Austen	:	Pride and Prejudice
c)	John Milton	:	Paradise Lost (Book 1)
d)	Alexander Pope	:	The Rape of the Lock
e)	R. K. Narayan	:	The Guide
f)	Amitav Ghosh	:	The Shadow Lines
g)	P. B. Shelley	:	Ode to the West Wind
h)	John Keats	:	Ode to a Nightingale
i)	Alfred Tennyson	:	Ulysses
j)	Robert Browning	:	My Last Duchess
k)	T. S. Eliot	:	Preludes

3. Grammar

4. Vocabulary
   Antonym, Synonym, Idiomatic usage of
   Language, Figures of Speech etc.

5. Test of Comprehension

   (Candidates will be given a passage of 250 to 300 words. They should read it carefully and answer the questions. The answers may be contained in the passage or may be inferred from the reading of the passage).

ASSISTANT MASTER/ASSISTANT MISTRESS IN CHEMISTRY IN THE WEST BENGAL SUBORDINATE EDUCATIONAL SERVICE

S Y L L A B U S

Time : 3 Hours   **Full Marks : 100**

Group - A
Organic Chemistry

1.   **Bonding in organic molecules** :

σ and π bonds, bond distance, bond angle, and bond energy. Dipole moment of organic molecules. Inductive, resonance and hyperconjugative effect. Hydrogen bond. Tautomerism, Aromaticity, Huckel's rule, aromatic, non aromatic and anti aromatic compounds. Effects of structure, substituents and solvent on acid and base strength.

2.   **Stereo Chemistry of carbon compounds** :

Elements of symmetry. Chirality, Eanantiomerism and diastereo isomerism. Optical purity, racemization, resolution. Projection structure of stereoisomers – Fischer, Sawhorse, Newman, Flying – wedge DL, RS and EZ notations. Examples of enantiotopic and diastereotopic ligands and faces. Conformations of alkanes (upto 4 carbon), Cyclohexane, dimethylcyclohexanes and 1, 2 – glycols. Stereoisomerism in allenes and biphenyls (excluding RS notation).

3.   **Reaction mechanism** :

General methods of study of mechanism of organic reactions illustrated by examples – use of isotopes, cross-over experiement, intermediate trapping, kinetic studies, stereochemistry. Energy profile diagrams of simple organic reactions, thermodynamic and kinetic control of reactions.

4.   **Reactive intermediates** :

Generation, geometry, stability and reactions of carbocations, carbanions, free radicals, carbenes and benzynes.

5.   **a)**   **Substitution reaction** – S_N1 , S_N2, S_Ni and NGP. Electrophilic and nuclephilic substitution of aromatic compounds.
        b)   **Elimination reaction** – E_1, E_2, E_1CB and Syn - elimination.
        c)   **Addition reaction** – electrophilic addition to $C=C$ and $C\equiv C$, nucleophilic addition to $C=O$, conjugated olefins and carbonyls.
        d)   **Rearrangement reaction :**
            Pinacol-pinacolone, Hofmann, Beckmann, Claisen, Baeyar-Villiger, Favorskii.

6.   **Chemistry and mechanism of** :

Aldol condensation, Claisen condensation, Perkin reaction, Knoevenagel reaction, Wittig reaction, Michael reaction Arndt Eistert reaction, Acyloin condensation, Friedel-Craft reaction and Von Richter reaction.

7.   **Synthetic uses of reagents** :

OsO_4, HIO_4, $Pb(OAc)_4$, SeO_2, $LiAlH_4$, $NaBH_4$, B_2H_6, NBS, PCC, Na or Li in liq-NH_3, Alkyl lithium, Lithium dialkylcuprate, Lithium diisopropylamide, Aluminium isopropoxide.

8.   IUPAC nomenclature. Synthesis and reactions of alkanes, alkenes, alkynes, alkyl halides, ethers, alkanols, alkanals, alkanones, alkanoic acids, esters, amides, nitriles and amines.

9.   **Pericyclic reaction** :

Definition and classification. FMO approach of electrocyclic, cycloaddition reactions and sigmatropic H-shifts.

10.   Basic principles and applications of UV, IR, and NMR spectroscopy of simple organic molecules. Road-map problems related to spectroscopy and organic reactions.

Group - B
Inorganic Chemistry

1. **Chemical bonding :**

a) **Ionic bonding ;**
polarizing power and polarizability, ionic potential, Fajan's rules.

b) **Covalent bonding :**
Lewis structures, VSEPR theory, Valence Bond theory (Heitler-London approach), Directional character of covalent bonds, hybridization, Bent's rule, concept of resonance. Molecular orbital theory (MO) elementary approach – sigma and pi bonds, multiple bonding, MO diagrams of simple homonuclear and heteronuclear diatomic molecule, simple triatomic molecules like BeH_2, CO_2, BF_3, bond order, bond energy.
Shapes of the molecules and ions containing lone pairs and bond pair.

c) **Weak Chemical forces :**
Vander Waals forces; Hydrogen bonding, Effects of chemical forces on physical properties.

d) **Metallic bonding :**
Qualitative ideas of band theory, Conducting, Semiconducting and insulating properties.

2. **Chemical periodicity :**
a) **Periodic Table :**
Classification of elements on the basis of electronic configuration, Modern periodic Table (current IUPAC version).
b) **Atomic and ionic properties :**
Effective nuclear charge, screening effect, Slater rules, atomic radii, ionic radii, covalent radii, ionization energies, electron affinity, electro-negativity, inert pair effect.

3. **Acid-Base Concepts :**
Bronsted and Lowry's concept, Lewis concept, HSAB principle.

4. **Non-aqueous solvents :**
Liquid ammonia and liquid sulphur dioxide.

5. **Coordination Compunds :**

Double and complex salts, Werner's theory, Chelate complexes, nomenclature of complex compound, stereo chemistry and coordination number, isomerism of coordination compounds – geometrical and optical isomers in respect of coordination numbers 4 and 6.

Bonding in coordination compounds : valence bond descriptions and its limitations, crystal field theory (elementary). Crystal field stabilization energies in weak and strong field cases mainly of octahedral and tetrahedral complexes.

6. **Magnetism and Colour :**

Origin of magnetic moments, paramagnetism, diamagnetism, ferro and antiferromagnetism, orbital and spin contributions, spin only moments of $3d^n$ ions.

Theoretical aspects of d-d spectra (elementary idea) selection rules for spectral transitions.

7. **Organo metallic compounds :**

Definition and classification, Metal-Carbon bonded complexes of transition metals – their preparation, properties and stability. Application of 18 electron rule to carbonyl, nitrosyl and cyanides of transition metals.

8. **The Chemical elements and its compounds :**

(a) (i) Group trends and periodic trends of effective nuclear charge, atomic and ionic radii, ionisation energies, electron affinity and electronegativity with respect to s-, p-, d- block elements.

(ii) General trends of variation of electronic structures, elemental forms, oxidation states, catenation and properties of important class of compounds such as oxides, oxyacids, halides and formation of complex compounds with respect to the following groups of **(i)** Li, Na, K **(ii)** Be, Mg, Ca, Sr and Ba **(iii)** B, Al, Ga, In, Tl **(iv)** C, Si, Ge, Sn, Pb **(v)** N, P, As, Sb, Bi **(vi)** O, S, Se, Te **(vii)** F, Cl, Br, I. and **(viii)** Chemistry of rare gases.

9. **Extraction/Preparation/Isolation of the following elements :**

(i) Extraction and purification of Li, Mg, Sn, Pb.
(ii) Extraction and purification of Ti, V, Cr, Mn, Pt, Ag, Au, U.

10. **Radioactivity and Atomic structure :**

(a) **Radioactivity** : Radioactive decay, half-life, Average life of radio elements, radioactive equilibrium Group displacement law, isotopes (uses of isotopes), isobars and isotones.

(b) **Atomic nucleus** : Fundamental particles of atomic nucleus, nuclear stability, neutron-proton ratio, nuclear binding energy. Nuclear forces.

Transmutation of elements, fission, fusion reactions.

(c) **Extra nuclear structure :** Bohr's theory and its limitations, Sommerfield's modification, spectrum of H-atom.

Group - C
Physical Chemistry

1. **Quantum Theory :**

Black-body radiation and Planck's Law, photo-electric effect and photon concept of light, wave particle duality, de Broglie hypothesis, Heisenberg uncertainty principle, Schrodinger's wave equation (time independent), Interpretation of wave function particle in one-dimensional box, quantum numbers, hydrogen atom wave functions separation of radial and angular part, shapes of s, p and d orbitals.

2. **The Gaseous State :**

Kinetic theory of gases, equation of state of real gases, intermolecular interactions, liquefaction of gases and critical phenomena, Maxwell's distribution of speeds, features of kinetic energy distribution, mean speed, root mean square speed, most probable speed, principle of equipartition of energy, specific heats of gases, intermolecular collisions, collision number and mean free-path, viscosity of gases and mean free-path.

3. **The Liquid State :**

Nature of liquid state, surface tension, capillary rise, spreading of liquid over other surface, temperature dependence of surface tension. Measurement of surface tension, viscosity of liquids, origin of viscosity of gases and liquids, determination of viscosity coefficient, Poiseuille's equation, temperature dependence of viscosity coefficients of gases and liquids.

4. **Solid State :**

Forms of solids, laws of crystallography, crystal lattices, crystal systems and crystal classes, Bragg's Law, X-ray diffraction by crystals, crystal structure of $NaCl$, KCl, structure of diamond and graphite, Lattice energy, Born-Haber Cycle, Einstein's equation for heat capacity of solids, Debye equation (elementary concept).

5. **Thermodynamics :**

a) Thermodynamic systems, states, processes, work, heat and internal energy, first law of thermodynamics, work done and heat absorbed in different types of processes. Reversible and irreversible process, energy and enthalpy changes in various processes and their temperature dependence.

b) Second law of thermodynamics, Carnot's cycle and Carnot's theorem, absolute scale of temperature, entropy as a state function, entropy change in various processes, entropy – reversibility and irreversibility, Free-energy functions, criteria for spontaneity and equilibrium, physical concept of entropy, entropy and probability.

c) Application thermochemistry, laws and their applications, Kirchoff's relation, Maxwell relation, $C_p - C_v$ relation Joule-Thomson expansion, thermodynamic equation of state, Gibbs-Helmholtz equation, Clausius-Clapeyron relation and phase transition, colligative properties of dilute solutions.

6. **Reaction equilibrium :**

a) Homogeneous equilibrium, relationship K_p ,K_c ,K_x . Van't Hoff's reaction isotherm (deduction using chemical potential). Temperature dependence of equilibrium constant, La-Chateleer's principle, response of equilibria to different conditions.

b) Ionic equilibrium, solubility product, dissociation constant of weak acids, ionic product of water, pH, buffer, indicators, hydrolysis of salt solutions.

7. **Electrochemistry :**

a) Electrical conductance, weak and strong electrolytes, variation of equivalent conductance with dilution, Kohlrausch's law, transport number, determination of transport number by moving boundary method, theory of strong electrolytes, applications of conductance measurements.

b) Galvanic cells, thermodynamic derivation of E.M.F. of chemical cells with examples, Transference cell, liquid junction potential and salt bridge, measurement of e.m.f. of cells and its applications, fuel cells and batteries.

8. **Chemical Kinetics :**

Concentration dependence of rate of reaction, differential and integral rate equations for zeroth, first, second order reactions, rate equations involving reverse, parallel, consecutive and chain reactions, effect of temperature and pressure on rate constant, collision and transition state theories of reaction rates.

9. **Photo Chemistry :**

Absorption of light, Lambert-Beer's law, laws of photochemistry, quantum yield, some typical photochemical reactions, HI-decomposition, CH_3CHO-decomposition, $H_2 - Br_2$ reaction, photosensitized reaction, Fluorescence and phosphorescence.

10. **Surface phenomenon and Catalysis :**

Adsorption from gases and solutions on solid adsorbents, adsorption isotherms – Langmuir and B.E.T. isotherms, determination of surface area. Gibbs adorption isotherms, surfactants, micelle formation. Characteristics and mechanism of homogeneous and heterogeneous catalytic reactions Enzyme catalysis.

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SYLLABUS FOR SCREENING TEST FOR RECRUITMENT TO THE POSTS OF ASSISTANT MASTER/MISTRESS IN <u>ECONOMICS</u> IN THE WEST BENGAL SUBORDINATE EDUCATIONAL SERVICE

Full Marks : 100   **Time : 1 Hour 30 Minutes**

G R O U P - A

MICROECONOMIC THEORY

Theory of Consumer Behaviour (Indiffernce Curve Analysis only) :
Demand Function and Concepts of Elasticity of Demand -   classification of Goods into Normal, Inferior and Giffen Good.

Theory of Production and Cost

Market Organisation : Perfect competition and Monopoly.

MACROECONOMICS

National Income Accounting; Classical Model of Income Determination; Say's Law; Simple Keynesian Model of Income Determination; IS-LM Model; Complete Keynesian Model; Comparison between Classical and Keynesian Models, Inflation – Demand Pull & Cost Push – Phillips Curve.

PUBLIC FINANCE

Analysis of Public goods; Externalities and the Role of the Government; Principles of Tax Equity; Tax Efficiency (Analysis of Excess Burden); Analysis of Tax Incidence; Burden of Public Debt.

THEORY OF INTERNATIONAL TRADE

Theory of Comparative Advantage (Heckseher-Ohlin Theory, Ricardian Theory); Gains from Trade; Factor Reversal and Factor Prices : The Leontieff Paradox; Effects of Tariff and Quota - Optimum tariff, Stolper-Samuelson Theorem; Balance of Trade & Balance of Payments - Effects of Devaluation (Elasticity Approach & Absorption Approach).

GROWTH AND DEVELOPMENT ECONOMICS

Distinction between Economic Growth and Economic Development; Lewis Model of Economic Development with Unlimited Supplies of Labour; Harris - todaro Migration Model, choice of Techniques; Investment Criteria; Rostow's Stages of Economic Growth; Dual Gap Analysis; Fiscal Policy and Economic Development; Balanced Versus Unbalanced Growth;

Critical Minimum Effort and Big Push Theories.

G R O U P - B

(INDIAN ECONOMY)

PRE-INDEPENDENCE PERIOD

Dadabhai NAOROJI AND THE Drain Theory; Managing Agency System; History of Indian Industries (Cotton, Jute and Iron & Steel); History of Indian Railways.

POST-INDEPENDENCE PERIOD

Five Year Plans; Indian Agriculture : Land Reforms - Farm Size - Productivity - Green Revolution; Indian Industry : Industrial Policy Resolutions; Changes in the Development Strategy in the early 1990s - Comparison between Nehru-Mahalanobis Strategy and Structural Adjustment Programme.

Full Marks : 100   **Time : 1 Hour 30 Minutes**

S E C T I O N - I

A.   PHYSICAL GEOGRAPHY

1.   Origin of Continents and Ocean Basins; Continental Drifts and Plate Tectonics; Epirogenic and Orogenic movements; Different kinds of Landforms and their origin; Volcanoes and Volcanic features; Earthquakes.

2.   Earth's Crust - general properties; Modes and origin of igneous, sedimentary and metamorphic rocks.

3.   Weathering and Mass wasting.

4.   Evolution of Landforms under different Cycles of Erosion - fluvial, glacial, Aeolian, marine and karst; Evolution of drainage system and its adjustment to structure.

5.   Elements and factors of climate; Distribution of temperature and pressure belts over the Earth.

6.   Airmass, Planetary Winds and Local Winds.

7.   Precipitation - origin and types; Cyclones and Anti-Cyclones.

8.   Classification of World Climates.

B.   ENVIRONMENTAL GEOGRAPHY

9.   Concepts of Environment, Ecology and Ecosystem; Natural and Man-made Ecosystems; Concepts of Bio-Diversity; Environmental Pollution, Degradation and Conservation; greenhouse effects and global Warming; Man-Environment relationships.

S E C T I O N - II

C.   ECONOMIC GEOGRAPHY

10.   Geographical factors favourable for the localization of the following major economic activities :

   a)   Lumbering,

   b)   Agriculture (Intensive Subsistence farming, Extensive Commercial farming and Plantation agriculture),

   c)   Fishing,

   d)   Mining (Coal, Petroleum and Iron ore - their distribution and utilization),

   e)   Power resources (conventional and Non-conventional),

   f)   Manufacturing (Iron & Steel, Aluminium, Cotton Textile and Jute industries).

D.   HUMAN GEOGRAPHY

11.   Concepts of Geographical Environment, Natural Regions of the Earth; - their characteristics; Role of Climate, Drainage and Relief in localizing human activities with particular reference to food gathering, pastoralism and subsistence agriculture.

12.   Settlement Patters - Rural and Urban; Hierarchy of Urban Settlements; Growth and distribution of World Population.

E.   GEOGRAPHY OF INDIA

13.   Structure, Relief, Drainage, Climate, Soils and Natural Vegetation.

14.   Irrigation and River Valley Projects; Agriculture and Green Revolution.

15.   Mineral Resources and industrial Regions.

16.   Population - growth and distribution, age-sex composition, migration, urbanization and regional disparities.

SYLLABUS FOR SCREENING TEST FOR RECRUITMENT TO THE POSTS OF ASSISTANT MASTER/MISTRESS IN HISTORY

Full Marks : 100   **Time : 1 Hour 30 Minutes**

G R O U P - A

ANCIENT HISTORY

1.   Ancient India (From rise of Magadhan imperialism to Harshavardhan).

2.   Ancient China (Economic, Social and Cultural achievements under Tang & Sung Emperors).

3.   Ancient Egypt (An outline of ancient Egypt with special reference to Pyramids, Mummies, Scripts, Trade & Commerce).

4.   Ancient Greece (Cultural achievement under the Athenian Empire & Spartan constitution).

5.   Ancient Rome (A general survey of ancient roman empire-building, Roman Law & System of Government).

G R O U P - B

MEDIEVAL HISTORY

1.   Medieval Europe (Feudalism, Charlemagne, Empire vs Papacy & Crusades).

2.   Medieval India (1206-1707 AD).

G R O U P - C

MODERN INDIA (1757-1947)

G R O U P - D

MODERN EUROPE & WORLD (1789-1945)

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**SYLLABUS FOR SCREENING TEST FOR RECRUITMENT TO THE POSTS OF
ASSISTANT MASTER/MISTRESS IN LIFE SCIENCE**

S U B J E C T : B O T A N Y

Full Marks : 100   **Time : 1 Hour 30 Minutes**

Module – 1 : The Gateway of Life Sciences :

1. The science of Life - Definition of Life; Origin and Evolution of Life on the Earth (overview).

2. Basic Technology associated with the study of Botany - Concept of simple, compound and electron microscopy; cell fractionation and centrifugation; colorimetry; tracer techniques.

3. Cell Structure and Function - Differences between prokaryotic and eukaryotic cells; ultra structural components and functions of the cell wall, plasma membrane, nucleus, mitochondria, plastids, endoplasmic reticulum, Golgi bodies, ribosomes, lysosomes and peroxisomes.

Module – 2 : Cell Biology and Genetics :

1. Morphology of chromosome; autosomes and sex chromosomes; differences between euchromatin and heterochromatin; basic methods of chromosome study; concept of gene; physical structure and chemical properties of nucleic acids (DNA and RNA).

2. Cell cycle; cell division (mitosis and meiosis) in plants.

3. Mendel's laws and experiments of heredity; linkage and crossing over; concept of mutation and mutagens; polyploidy.

Module – 3 : pH, Buffer, Water and Biomolecules :

1. Concept of pH; pH scale; Justification for pH value (7.0) of pure water; concept of buffer.

2. Diversification in structures of different carbohydrates (monosaccharides, disaccharides and polysaccharides); differences between reducing and non-reducing sugars.

3. Concept of structural, functional aspects and basic classification of proteins and lipids; types and classification of vitamins.

Module – 4 : Plant Physiology :

1. Concept of cell physiology - imbibition, diffusion, osmosis and plasmolysis; ascent of sap; translocation of solutes; types of transpiration and mechanism of stomatal transpiration; types of micro and macro elements required by plants.

2. Phases and factors of plant growth; precursor(s), structure and physiological roles of auxins, gibberellins, cytokinins, ethylene and abscissic acid.

3. Concept of photoperiodism and vernalization; physical and chemical nature of phytochrome; mechanism of seed dormancy and germination.

Module – 5 : Biochemistry :

1. Enzymes – Definition; basic architecture (holoenzyme, apoenzyme, coenzyme, cofactor); properties; nomenclature and classification (6 major classes with examples indicating name and reaction at least one for each class) according to IUBMB; concept of enzyme action.

2. Respiration - Definition; differences between aerobic & anaerobic respiration; metabolic pathways (by means of schematic presentation only) of glycolysis, oxidative decarboxylation of pyruvic acid, TCA cycle; concept of electron Transport System & Oxidative Phosphorylation; concept of RQ.

3. Photosynthesis - Definition; major photosynthetic pigments; concept of the spectrum of visible light; Hill reaction; concept of light-dependent & light-independent phases; Z-scheme of light reaction; biosynthetic reactions (by means of schematic presentation only) of CO_2 - fixation in C_2, C_3 and C_4 cycles/pathways.

S U B J E C T : B O T A N Y

Module – 6 : Molecular Biology and Plant Biochnology :

1. Gene structure and function; genetic code; concept of DNA replication; concept of protein synthesis (outlines only).

2. Outlines of recombinant DNA technology (preliminary concept of vectors, plasmid, restriction enzymes, DNA and CDNA libraries, nucleic acid sequencing and PCR).

3. Definition and agricultural application of Plant Biotechnology; outlines of Plant tissue culture and its applicationsl concept of totipotency; basic concept and objectives of cloning and transgenic plants.

Module – 7 : Microbiology :

1. Concept of microbial world; structure of a typical phage virus; structure of a bacterial cell.

2. Basic types of bacterial on the basis of morphological features; concept and difference between Gram-positive and Gram-negative bacteria; reproduction of bacteria.

3. Concept of nitrogen-fixing bacteria; concept of pathogenic bacteria; concept of antibiotics.

Module – 8 : Plant morphology and Anatomy :

1. Root-Morphology and functions of tap and adventitious roots; different modified roots; Stems-Morphology and functions of stem different modified stems; Leaf-morphology and functions of leave phyllotaxy, stipule, modified leaves.

2. Flower – Different parts of a typical flower, flower as a modified shoot, principal types of inflorescences, types of lower (regular irregular, actinomorphic and zygomorphic), morphology and androcium and gynocium; Fruit – definitions and types; basic morphology of seed.

3. Plant Anatomy - Concept and types of meristematic and permanent tissues; epidermal, ground and vascular tissue systems; types of stele; primary anatomical structures of root (monocot and dicot), stem (monocot and dicot) and leaf (dorsiventral and isobilateral).

Module – 9 : Plant Taxonomy :

1. Taxonomy - Definition, importance, relations of taxonomy with classification of plant groups.

2. Rules of Binomial nomenclature; basic types of classification (artificial, natural and phylogenetic).

3. Classification of plant kingdom; salient features of different plant groups (algae, fungi, bryophyte, pteridophyta, gymnosperms and angiosperms).

Module – 10 : Plant groups :

1. Life cycle pattern with special reference to alteration of generations in thallophyta (algae and fungi) and Bryophyta.

2. Life cycle pattern with special reference to alternation of generations in Pteridophyta and Gymnosperms.

3. Morphological description pattern of any angiospermic plant for its taxonomic identification; economically important angiosperms - bamboo, jute, lemon and tea.

S U B J E C T : Z O O L O G Y

Full Marks : 100   **Time : 1 Hour 30 Minutes**

Section – I :

1.   Classification of Protozoa up to Phyla.

2.   Structural organization and reproduction in Paramoecium.

3.   Classification upto subclass ; Porifera to Echinoderm.

4.   Coral reef : Types and formation.

5.   Locomotion in Protozoa.

6.   Canal system in Porifera.

7.   Nervous system in Mollusca

8.   Respiration in Arthropoda.

9.   Affinities in Onycophora, Balanoglossus.

10.   Classification of Chordata upto order.

11.   Structural organization of Lates.

12.   Axolotl Larva and its importance.

13.   Difference between poisonous and non-poisonous snakes.

14.   Migration of birds.

15.   Dentititon in mammals.

16.   Comparative anatomy of Heart, Aortic arches, and Kidney in Vertebrates.

Section – II :

1.   Principles of optical and electron microscopes.

2.   Ultra structure and functions of Plasma memberane, Mitrochondria, golgi complex, Endoplasmic reticulum and Lysosome.

3.   Physico-chemical properties of DNA and RNA, Nucleosome concept.

4.   Sex determination in Drosophila and Man.

5.   Replication, Transcription and Translation.

6.   3-point gene mapping in diploid.

7.   Inborn metabolic errors : Albinism, Haemophilla, thalassaemia.

8.   Gametogenesis.

9.   Fertilization.

10.   Histological organization of Pituitary, Thyroid, Pancreas and Liver.

S U B J E C T : Z O O L O G Y

Section – III :

1.   Geological time scale.

2.   Origin of life.

3.   Origin and Evolution of Horse.

4.   Theories of Evolution : Darwinism & Neo Darwinism.

5.   Hardy-Weinberg principles (application in autosomomal alleles).

Section – IV :

1.   Taxonomy, Systematics and classification.

2.   Mode of speciation.

3.   Biological species concept.

4.   Concept of Energy flow, Food chain and food Web.

5.   Ecological succession.

6.   Concept of biodiversity : Types of biodiversity, biodiversity and human welfare.

7.   Life cycle, Pathogenecity, clinical features and control of : Taenia, Ascaris, Plasmodium, Leishmania and Wuchereria bancrofti.

Section –V :

1.   Structure of mammalian nephron and mechanism of Urine formation.

2.   Propagation of nerve impulse.

3.   Transport of CO_2 and O_2 in mammals.

4.   Structure of eye and mechanism of vision in mammals. Structure of ear and mechanism of hearing in mammals.

5.   Aquaculture : Induced breeding in carp culture. Fresh water and brakish water prawn culture, Pearl culture.

6.   Sericulture : Mulbery silk wom culture; diseases of silk worm and their control.

7.   Apiculture : Apiculture technique; diseases of honey bees and their control.

S U B J E C T : P H Y S I O L O G Y

Full Marks : 100   **Time : 1 Hour 30 Minutes**

1.   Units of Hyman Systems : Structure – function relationship of cell and tissues.

2.   Basic Biophysical Principles : pH, Osmosis, buffers, Gibb's Donnan equilibrium, eloectrophoresis.

3.   Conservation of matter and erergy in human systems : Digestion, Elementary Biochemistry and metabolism, vitamins and minerals principles of nutrition, nutritional deficiencies, nutrition and health, enzymes and isozymes, inborn errors of metabolism.

4.   Blood and Body fluids : Functions of blood, Hemoglobin, Plasma proteins, Erythropoisis, Coagulation of blood, Blood-groups, Blood transfusion - rational use and transfusion related diseases. Basic principles of immunology - auto immune diseases.

5.   Heart & Circulation : Structure & functions of heart, properties of cardiac muscle, origin & spread of cardiac impulse, Cardiac cycle, Cardiac output - regulation & determination, innervation of heart, reflexes, regulation of circulation, Electrocardiography, Non invasive cardiac assessments.

6.   Respiratory System : Basic physiology, carriage of oxygen & carbon dioxide, Lung volumes & capacities, regulation of respiration, High altitude and under water physiology.

7.   Renal Physiology : Structure & functions of nephron, formation of urine, micturition, non excretory functions of Kidney, dialysis, artificial Kideney.

8.   Nerve-Muscle Physiology : Structure & functions of muscles & nerve, classification of nerve fibres, different types of muscles, neuromuscular junction, N-M transmission, synaptic transmission, origin and propagation of nerve impulse, degeneration and regeneration in nerve fibres.

9.   Nervous System : Gross organization, tracts - ascending and descending, reflex arc, classification of reflex - properties, autonomic nervous system, functions of sympathetic & para-sympathetic system, Higher funcitions of CNS – sleep, memory, learning.

10.   Sensory physiology : vision - structure and functions - specially of retina, colour vision, accommodation, defects of vision. Olfaction, gestation and audition - noise and its effects.

11.   Skin and Body temperature regulation : Basic physiology.

12.   The Endocrine System : Structure of endocrine glands, Hormone classification, different hormones - their functions : hypothalamus, pituitary, thyroid, parathyroids, pancreas, adrenal cortex and medulla Diseases associated with hypo and hyper secretion of hormones.

13.   Reproductive physiology : Histology of male and female reproductive system, menstrual cycle - hormonal regulation, ovarian and testicular hormones, Pregnancy, Placenta - formation and function, lactation, contraceptives.

14.   Basic principles of Work Physiology & Ergonomics : Static and dynamic work, PFI, doping, role of anthropometry, somatotyping, Role of ergonomics in industry and agriculture. Exercise and Health.

15.   Environmental Physiology : Pollutants and pollution, classification of pollutant according to physiological mechanism of action, Bio-transformation, dose-response curves/relationship, teratogens, mutagens, neurotoxins, corrosive agents, Heavy metal toxicity, Pesticidal Hazards.

16.   Social Physiology : Basic principles, mass immunizations, ORS, Safe drinking water, communicable and non-communicable diseases.

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SYLLABUS FOR SCREENING TEST FOR RECRUITMENT TO THE POSTS OF ASSISTANT MASTER/MISTRESS IN MATHEMATICS

Full Marks : 100   Time : 1 Hour 30 Minutes

Algebra :

Complex Number : Demoiver's theorem, its applications.
Exponential, Sine, Cosine, Logarithm of a Complex Number.

Theory of Equations : Relation between roots and co-efficients, symmetric function of roots, transformation of equation, multiple root.

Determinant and matrix : Properties and applications.

Inequality : AM >= GM >= HM and its applications.

Set Theory :

Basic concepts, mapping, group, ring, field.

Boolean Algebra :

Basic concepts. Boolean variables and functions and their truth tables. NOT, OR and AND gates. Binary systems.

Vector :

Vector addition, Scalar and vector product. Application of vector algebra in geometrical and trigonometrical problems.

Calculus :

Differential Calculus - Sequence, series, Limit, continuity, differentiability, Successive derivatives. Rolle's theorem, Mean value theorem.

Integral Calculus - Indefinite integral, definite integral and its properties, definite integral as limit of sum. Beta and Gama functions.

Application of Calculus :

Tangent & normal, curvature, pedal equation, curve-tracing, area, rectification.

Differential Equation :

Linear equation, Clairaut's equation, Complementary function, particular integral of higher order. Linear equations with constant Co-efficient.

Geometry :

Translation and rotation of axes. Reduction into Canonical form. Pair of straight lines. Circle, Parabola, ellipse, hyperbola – simple properties.

Equation of straight lines in space, equation of plane.

Numerical Analysis :

Errors in numerical computation – gross error, round off, truncation error, significant figure, absolute, relative, percentage error. Operators - $\Delta \quad \nabla \quad E$

Difference table, Newton's forward and backward interpolation formula.

Probability :

Basic concepts, addition and multiplication rule of probabilities. Conditional probability, Bay's theorem.

Dynamics :

Motion in a straight line under variable acceleration, motion under inverse square law, motion in resisting medium. Impact of elastic bodies, loss of KE in direct and oblique impact.

SYLLABUS FOR SCREENING TEST FOR RECRUITMENT TO THE POST OF ASSISTANT MASTER /MISTRESS IN PHILOSOPHY

S Y L L A B U S

Full Marks : 100   **Time : 1 hour 30 minutes**

Group – A

Indian Philosopy

1. **Cārvāka Philosophy**

    Perception is the only pramāna : Anumāna is not a pramāna.

2. **Buddhist Philosophy**

    Fourfold noble truths. Theory of momentariness.

3. **Nyāya Philosophy**

    Distinction of nirvikalpa, savikalpa pratyaksa.
    Inference : Vyāpti.

4. **Vaiśesika Philosophy**

    Categories. Atomism.

5. **Sāmkhya Philosophy**

    Satkaryavada. Refutation of asatikaryavada.
    Purusa. Prakriti.

6. **Vedānta Philosophy**

    (A) Sankara : Brahman, Ātman, Jagat, Māyāvāda

    (B) Rāmānuja Brahman, Ciṭ & aciṭ, Sat Khyātivāda.

Group B

1. Western Logic

    What is Logic : Basic Terms.
    Deduction and Induction.
    Truth and validity.
    What is a Fallacy?

2. Deduction

    Categorical propositions and classes
    Square of opposition
    Immediate Inference
    Categorial Syllogisms
    The formal nature of syllogistic argument.
    Venn diagram.

3. Symbolic Logic

    De Morgan's Theorems
    The paradox of material implication
    The three "Laws of Thought"
    Formal Proof of Validity
    Proof of Invalidity.

4.   <u>Induction</u>

Analogy and Probable Inference
Casual connections
Mill's method of Experimental Inquiry.
Criticism of Mill's methods.
Explanation : Scientific and unscientific
Probability : Alternative concepts of probability.
Preliminary Hypotheses.

Group C

<u>Western Philosophy : Epistemology, Metaphysics</u>

Plato's theory of Idas.
Aristotle'sdoctrine of causation
Kant's Copernican Revolution
The distinction between
analytic and synthetic judgments (Kant)

Knowledge, origin of. The empiricist and
rationalist views. Necessary and sufficient
conditions of knowledge. Kant's views.
Idea, Image, Concept.

Substance, the different views,
casual Relation, The Empiricist view of causation
Realism, distinction between Realism and Idealism.
Berkeley's Idealism.

Group D

<u>Ethics and Social Philosophy</u>

What is ethics/moral Philosopy : Its scope.
Hedonism. Utilitarianism (Mill).
Kant's Theory (The Categorical Imperative)
Theories of Punishment.

Society, Community, Association,
State, society and the Individual
Social class and caste.
The family. Marriage and the associated

Problems in modern life.

Group E

<u>Psychology and Philosophy of Religion</u>

What is Psychology ? Its scope. Perception,
Ductless glands. Gestalt Theory,
Freud's Theory of Dreams.

The arguments for the existence of God,
Importance of Religion in the context
of modern society.

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SYLLABUS FOR SCREENING TEST FOR RECRUITMENT TO THE POST OF ASSISTANT MASTER/MISTRESS IN PHYSICS

Full Marks : 100   **Time : 1 hour 30 minutes**

1.   **Classical Mechanics   :**

Newton's laws of motion; Mechanics of a single particle; Rotational Motion; Gravitation.

2.   **General Properties of matter   :**

Elasticity; Surface Tension; Viscosity.

3.   **Vibrations and Waves   :**

Simple Harmonic Motion; General Wave Equations; Vibrations of Strings.

4.   **Heat   :**

Kinetic theory of gases; Equations of state; Brownian Motion.

5.   **Thermodynamics   :**

First and second Laws Entropy, Thermodynamic Functions.

6.   **Optics   :**

Geometrical Optics; eye pieces; physical optics; Interference; Diffraction, resolving power, polarisation.

7.   **Electricity and Magnetism   :**

Magnetic effects of currents
Varying currents
Alternating currents.

8.   **Electronics   :**

P – n Junctions, transistors and uses.

9.   **Modern Physics   :**

Bohr's theory
Millikan's experiment
X-rays, Moseleys Laws, Bragg reflection
Radio-activity, alpha, beta, gamma rays.

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SCREENING TEST FOR RECRUITMENT TO THE POST OF ASSISTANT MASTER/MISTRESS IN POLITICAL SCIENCE IN THE WEST BENGAL SUBORDINATE EDUCATIONAL SERVICE

SYLLABUS

Full Marks : 100   **Time : 1 hour 30 minutes**

POLITICAL SCIENCE

I.   Definition and scope of Political Science – Approaches to the study of Pol. Sc. : Normative, Behavioural and post Behavioural, Marxist- Theories of the Origin, Nature and function of the state: Contract theory, Idealist theory, Liberal and Neo – Liberal theory, Marxist theory- Concept of State Sovereignty : Monistic and Pluralistic theories – Liberty, Equality, Rights and Law- Nationality, Nation and Nationalism, Right of Self – determination, Nationalism and Internationalism – Democracy and Dictatorship : Meaning and Forms- Emergence of Marxism : Dialectical Materialism, Theory of Class and class struggle, theory of Revolution – Gandhian Ideas.

II.   Salient Features of the Indian Constitution – Nature of the Indian Federalism – The Preamble – Fundamental Rights and Duties – Directive Principles of State Policy – President of India : Powers Functions and Positions- Prime Minister : Powers and Functions – Parliament ; Composition and Function – The Judicial System of India. Governor : Powers, Functions and Positions – Chief Ministers- Procedure of Amendments – Centre – State Relations – The Civil Services – Local Self Government in West Bengal.

III.   International Relations : A Brief Outline of its Evolution as an Academic Discipline- Some Basic Concepts : i) Balance of Power, ii) National Interest, iii) Bi-Polarity and Uni-polarity, iv) Non-Alignment, v) Neo-Colonialism, vi) Globalization –Emergent Issues in International Relations: i) Development, ii) Regionalism and Intergration, iii) Terrorism – Indian Foreign Policy : Basic Principles – UNO : Objectives, Organs and Functions, Role of UNO in Peace keeping and Human Rights.

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