PUBLIC SERVICE COMMISSION, WEST BENGAL

Scheme and Syllabi for Screening Test for recruitment to the posts of Assistant Professor in Bengali, Botany, Chemistry, Commerce, Computer Science, Education, English, Geography, Geology, History, Mathematics, Microbiology, Nutrition, Philosophy, Physics, Physiology, Political Science, Sanskrit, Sociology and Zoology for General Degree Colleges in the West Bengal Education Service under the Higher Education Department, Govt. of W.B. vide Advt. No. 29/2019

Scheme of Exam.

1. Type of examination – MCQ type test.

2. No. of questions – 100 (70 questions on relevant subject & 30 questions on English and General Awareness).

3. Full Marks – 100 (Each question carries 1 mark). There will be negative marking for wrong answer. 1/3 mark will be deducted for each wrong answer.

4. Duration – 1 hour 30 minutes.

১. পাঠ্য বস্তু:

ক) উপন্যাস: কৃষ্ণকান্তের উইল – বঙ্কিমচন্দ্র চট্টোপাধ্যায়;
আরণ্যক – বিভূতিভূষণ বন্দ্যোপাধ্যায়;
বলয়গ্রাস – আশাপূর্ণা দেবী;

খ) কাব্য: * মেঘনাদবধ কাব্য – মাইকেল মধুসূদন দত্ত: চতুর্থ, ষষ্ঠ, নবম সর্গ।
* জীবনানন্দ দাশ: বনলতা সেন কাব্যগ্রন্থ: — প্রথম পাঁচটি কবিতা;
* সুভাষ মুখোপাধ্যায় – পদাতিক কাব্যগ্রন্থ: — প্রথম পাঁচটি কবিতা;
* কাজী নজরুল ইসলাম – বিদ্রোহী, আমার কৈফিয়ৎ

গ) নাটক: * বিসর্জন: রবীন্দ্রনাথ ঠাকুর;
* নরক গুলজার: মনোজ মিত্র;

ঘ) প্রবন্ধ: * নির্বাচিত প্রবন্ধ: কাজী আব্দুল ওদুদ: প্রথম পাঁচটি প্রবন্ধ;
* শ্রেষ্ঠ প্রবন্ধ: অন্নদাশঙ্কর রায়: প্রথম পাঁচটি প্রবন্ধ

ঙ) ছোটোগল্প — রবীন্দ্রনাথ ঠাকুর → মেঘ ও রৌদ্র;
শরৎচন্দ্র চট্টোপাধ্যায় → মহেশ;
মানিক বন্দ্যোপাধ্যায় → টিকরব;
সৈয়দ মুস্তাফা সিরাজ → গাছটা বলেছিল;
জ্যোতিরিন্দ্র নন্দী → গিরগিটি;

২. বাংলা সাহিত্যের ইতিহাস —
* মঙ্গলকাব্য – (মনসামঙ্গল, চণ্ডীমঙ্গল, ধর্মমঙ্গল)
* বৈষ্ণব কাব্য – (বিদ্যাপতি, চণ্ডীদাস, জ্ঞানদাস, গোবিন্দদাস)
* ফোর্ট উইলিয়াম কলেজ, বিদ্যাসাগর, দীনবন্ধু, গিরিশ ঘোষ, দ্বিজেন্দ্রলাল রায়, প্রমথ চৌধুরী, সত্যেন্দ্রনাথ দত্ত;

P.T.O.

৩. বাস্তব ব্যাকরণ :

* সন্ধি, সমাস, প্রত্যয়, কারক ও বিভক্তি, পদ-পরিবর্তন, লিঙ্গ পরিবর্তন, অশুদ্ধি-শুদ্ধিকরণ, এক কথায় প্রকাশ;

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN BOTANY** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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.

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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.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF ASSISTANT PROFESSOR IN CHEMISTRY FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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≡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.

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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.

3. **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 noble 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.
(iii) Manufacture of Steel, Alloy Steels.

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.

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.

BUSINESS ORGANISATION AND AUDITING

1. Organisation of Board of Directors – Appointments, Number of Directors, Minority Representation in the Board, Power, Duties, Remuneration, Meetings of the Board, Tenure of Office.
2. Corporate forms of business – on the basis of ownership, nature and size.
3. Vouching and verification of Assets and Liabilities.

A C C O U N T A N C Y

1. Final Accounts of Trading & Non-Trading concerns.
2. Accounting from incompletes records – (including conversion into double entry).
3. Accounting for venture and Bill of Exchange.
4. Partnership - Admission & Retirement & Dissolution of Firm.
5. Issue of Shares & Debentures.
6. Accounts of Holding company (excluding chain, cross and multiple holding).
7. Amalgamation & Absorption of companies.
8. Rectification of Errors.
9. Changes in Financial position - Fund Flow.
10. Accounting ratios & Financial position.
11. Cost-Volume-Profit analysis and Management Decisions.

Digital System Design
Circuit Theorty & Basic Electronics

Digital System Design :

Boolean algebra: Fundamentals of Boolean algebra, Switches and inverters, Functionally Complete Gates (AND, OR , NOT) NAND, NOR, switching function and Boolean function. De Morgan's Theorem. Application of Boolean algebra: Minterm, Truth Table and minimization of switching function up to four variables. Algebraic & K-map method of Logic circuit Synthesis: two level and multi level, 2 variables Boolean functions, 3 variables Boolean function

Combinational Circuits: Standard Gate assemblers, IC chips packaging nomenclature, Comparators, Decoders, Demultiplexers, Data selectors/multiplexer, Encoder, Seven segment display unit. Multiplexed display, Keyboard encoder.

Sequential Circuits: Flip-Flop (1 bit) SR, JK, D, T, Shift Register, Counter.
Finite State Model-State diagram, Synchronous and Asynchronous system (illustrative counter design), Single and two phase clocks. Successive approximation, Basic ladder circuits, D/A and A/D converter, Counter Ramp, ROM & PLA (basic idea).

Logic Circuit design using TTL, MOS and CMOS circuits, Relative comparison.
Integrated Circuits: SSI, MSI, LSI, VLSI classification.

Circuit Theory & Basic Electronics:

Passive circuit: parameters, equilibrium, conditions, Kirchoff's law; representation by differential equations; solutions; impedance and reactance.
LCR Circuits: frequency domain analysis, resonance and phases. Vector representation, resonance, and circuit diagrams. Network equations, signal flow graphs.
Theorems: superposition, reciprocity, Thevnin, Norton, maximum power transfer. Solutions using Laplace transformations: transient and steady state response. Transfer functions: poles and zeros.
Elementary physics of semiconductors: P-N junction diodes; Zener diodes; BJT; FET; MOSFET. Equivalent circuit for diodes, transistors, FETs. Operational amplifier (op amp).

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Computer Organization

Instruction: Operation Code and Operand. Zero, One, Two and Three address instruction. Instruction types. Addressing modes. Stack organization.
Memory: Types of Memory. Memory Hierarchy: CPU Register. Cache Memory, Primary Memory, Secondary Memory. Virtual Memory (Introduction only). Memory organization – Linear two-dimensional Von Neumann vs Harvard Architecture, Different storage technology.
I/O system organization and interfacing. Bus: SCSI, PCI, USB (Introduction and comparative study); Tri state Devices, Bus Arbitration.
Fixed and Floating Point Arithmetic: Addition, Subtraction, Multiplication & Division.
ALU – Combinational ALU, Two's Complement Addition, Subtraction unit
Control Unit: Control Structure and Behavior, Hardwired Control and Micro programmed Control: Basic Concept, Parallelism in Microinstruction
I/O: Polling, Interrupts, DMA, I/O Bus and Protocol.

Data Structures

Definition: Concepts of data types. Elementary structures, Data types and their interpretation.
Complexity: Advantages and Disadvantages. Big 0 Notation, Big-omega and Big-theta notations, Growth of Functions:
Arrays: Types, Memory representation. Address translation. Functions of single and multi dimensional arrays with examples.
Linked Structures: Single and doubly linked list (non-circular and circular). List manipulation with pointers: Insertion and deletion of elements.
Stacks and Queues: Definition. Representation. Uses and Applications, Infix notation to postfix notation: conversion and evaluation. Application of queues.
Recursion: Divide and Conquer, Elimination of Recursion, When not to use recursion?
Binary trees: Definition, Quantitative properties, Internal and external. Properties, minimum and maximum path length of a binary tree. No of nodes, height.
Searching: linear and binary serarch, Performance and complexity.
Hashing: Concepts, Advantages and disadvantages. Different types of hash functions, Collision and Collission Resolution Techniques – Open addressing with probing, Linear Chaining, Coalesced, Application.
Sorting: Terminology, Performance Evaluation, Different Sorting Techniques (Bubble, Insertion, Selection, Quick sort, Merge sort. Heap, Partition Exchange, Radix with iterative and recursive description).

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Operating System

What is OS? Multiprogramming OS (Concurrent Processing System), Concepts of process & Threads, Concept of Interrupts, System Calls OS – an interrupt driven system. Files, Shel Structures of OS: Monolithic, Layered, Virtual, Client Server and distributed Model. *Concepts* o *Synchronization:* Semaphores, Critical Regions, Inter Process Communication Mechanism *Processor Management:* Scheduling, Round-robin, Priority Queue. I/O management: *Memor Management:* Multiprogramming, swapping, Paging, Virtual memory, Page Replacemer techniques. Concepts of *File Systems:* Files, Directories, File Servers, Dead Lock: Definition Avoidance, prevention, Detection and Recovery.

Data Communication & Computer Network

Data Communications, Transmission media; Network: Protocol and standards; Analog & Digit Signals, Periodic & Non-Periodic Signals, Time and Frequency Domain; Multiplexing: FDM TDM and Application, Encoding D/A and A/D Encoding; Concepts of Centralized an Distributed Computing; Advantages of Networking; Layered architecture: OSI Architectur Basic Features, LAN, MAN and WAN; simple PC Based Network: Example, block diagrar Mode of operation and characteristic features. IP addressing, Flow Control: Stop-and-wa Sliding Window, and ARQ.

Theory of DBMS

Basic concept. File Management systems. Advantages of DBMS, Physical, Conceptual an External Models, ER Diagram, Data Models: Relational, Hiearchical, Network; file Organisatio Sequential, Indexed Sequential, Random, Inverted; Query Languages, Relational Algebra Calculus, Functuional Dependencies, Normal forms: INF, 2NF, 3NF and BCNF; Structur Query Languages, Steps of query Processing. Concurrent Processing. Elementary Concepts Security, Integrity.

Object-Oriented Programming Concepts

Concepts: Difference with procedure oriented programming. Data Abstraction and Informatio Hiding: Objects, Classes & Methods, Encapsulation, Inheritance, Polymorphism. Input-Outpu Function and Operator overloading. Constructors and Destructors, Copy Constructors an Assignment Operator, Overloading, Single and Multiple Inheritance, Polymorphism and Virtu Functions, Namespace, Exception Handling, Templates.

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Microprocessor

Evolution of Microprocessor: Architecture of 8.bit and 16 – bit microprocessor, Machine language instructions (8 bit). Addressing Modes, Instruction formats, Instruction sets, Instruction cycle, Clock cycles, Timing diagrams. Interrupts, Bus and Interfacing concepts : Memory interfacing, I/O Interfacing and Ports. Storage Device Interfacing, Programming a Microprocessor, Interrupt Handling, Methods of Interrupts Priority and Management Case Studies: 8085 and 8086 microprocessor, 32 bit processor.

Compiler

Basic concepts of compilers and interpreters. Different phases of compilation.
Lexical analyzer concept; Design using FSM.
Parser: Top down and Bottom up; Recursive descent; LL (1); LR (1); LALR (1); Comparison, Symbol tables: organization and management techniques. Runtime storage management – static allocation; dynamic allocation, activation records; heap allocation, recursive procedures
Semantic Analysis – attributed translation: procedure calls. Syntax directed translation and intermediate codes.
Code Optimization: Basic blocks, loop optimization, flow graph. Machine dependent optimization, code generation. Error handling – detection, reporting, recovery and repair.
Compiler Writing Tools; LEX; YACC.

Web technologies & Multimedia

Web pages – types and issues, Comparison of different technologies (eg. Microsoft, Sun-Micro systems, etc). WWW- basic concepts, web-client & web-server, application server, http protocol (frame format), universal resource locator (URL), HTML-different tags, sections, images & pictures, listings, tables, frames and forms.

Basic concepts of Multimedia, Different forms of multimedia – text, audio, image & video. Sound-types, computer representation of sound & sampling. Examples of audio tools (Sound forge, etc.). Animations – Tweening, Morphing in multimedia with examples.

C- Programming

C- language

Contd...P/5

Numerical Methods

1. Errors and Approximation.
2. Bisection method, Newton-Raphson method.
3. Gauss Elimination, Matrix inversion by Gauss-Jordan elimination, Gauss- Saidel Iterative method.
4. Newton's interpolation, Lagrange's interpolation.
5. Curve fitting by least-min square.
6. Trapezoidal rule, simpson's 1/3 - rule.
7. Euler's and Modified Euler's measure.
8. Faster order Runge-Kutta method for solving differential equations.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN EDUCATION** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

Module-I : PHILOSOPHICAL FOUNDATION OF EDUCATION AND CONTRIBUTION OF GREAT EDUCATORS

1. Relationships between education and philosophy,
2. Child centric and Life centric education,
3. Functions and scope of education-individual and social perspective. Education for Human Resource development.
4. Education as propagation of values,
5. Schools of philosophy and their influence on education: Idealism, Naturalism, Pragmatism and Existentialism.
6. Schools of Indian Philosophy
   Basic features and Influence on Education –
   a) Vedic schools (Sankhya, Yoga, Nyaya)
   b) Non-Vedic schools (Charvak, Buddhist, Jain and Islamic tradition)
7. Contribution of great Educators :
   a) Rousseau
   b) Froebel
   c) Montessori
   d) Bertard Russell
   e) Dewey
   f) Rabindranath Tagore
   g) Vivekananda
   h) Aurobinda

Module-II : PSYCHOLOGICAL FOUNDATION OF EDUCATION

1. Introduction to Psychology, relation between education and Psychology. Different perspectives of psychology (Biological, Cognitive, Developmental, Associationist – A brief overview).
2. Personality development, Trait approach, Psychoanalytical theory of Personality, Erikson's stages of Psycho-social development.
3. Stages and types of Development and their Educational significance :
   a) Physical and motor development, Factors affecting Physical and motor development.
   b) Cognitive development, brief outline of Piaget's theory of Cognitive development.
   c) Language development.
   d) Emotional development and Emotional Quotient.
   e) Moral development, Theories of Piaget and Kohlberg.
4. Neural basis of cognition: Neuron – structure and electrical potentials, synoptic transmission, structure and functions of human brain, Neuro – endocrinal system.
5. Perception: Factors influencing perception, role in cognition.
6. Attention: Selective and divided attention. Role of attention in the cognitive process. Factors of attention.
7. Memory: acquisition, storage and retrieval of information, sensory memory, short term and long term memory, forgetting.
8. Motivation: types and factors.
9. learning: Laws of learning, classical and operant conditioning, insight learning, concept learning, Bandura's social learning theory.
   Transfer of learning: Concept and application.
10. Intelligence: Theories of intelligence – Spearman, Thurston, Guilford and Gardener, Measurement of Intelligence.

Contd P/2

Module-III : **DEVELOPMENT OF EDUCATION IN INDIA**

1. Synoptic study of Brahmanic, Buddhist and Islamic Education in Ancient and Medieval India with respect to
   a) Aims and Objectives
   b) Subject of study
   c) Methods of teaching including teacher – pupil relationship
   d) Evaluation
   e) Centre of Learning
   f) Education of woman

2. Brief outline of events relating education from 1757 to 1947
   a) Missionaries activities (Srirampur Trio)
   b) Charter Act of 1813
   c) Bengal Renaissance – Contribution of Rammohan Ray H.L.V. Derozio and Vidyasagar
   d) Adams Report
   e) Anglicist – Orientalist controversy – Macaulay's Minute & Bentinck's resolution
   f) Wood dispatch (Recommendations only)

3. Brief outline of –
   a) Hunter Commission 1882-83 (Primary and Secondary Education)
   b) Curzon Policy (Quantitative development of Primary education
   c) National Education Movement (cause and effect)
   d) Calcutta University Commission (1917-1919)
   e) Basic Education (concept & development)
   f) Sargent Plan

4. Constitutional provision for Education in India

5. Brief outline of the recommendations made by different Education Commission :
   a) University Education Commission (1948-49)
      (Aims of Higher Education & Rural University)
   b) Secondary Education Commission (1952-53)
      (Aims, Structure & Curriculum of Secondary Education)
   c) Indian Education Commission (1964-66)

6. National Policy on Education (1986)

7. Current issues in education :
   a) Equalization of Education Opportunities
   b) Programmes on Universal Elementary Education (~~DPEP & SSA~~ SSA)
   c) Non-formal education and alternative schooling, Education of women
   d) Education for children with special needs

Module-IV : **SOCIOLOGICAL FOUNDATION OF EDUCATION**

1. Sociological Foundation of Education-Sociology of education, Nature, Scope, Method of Study.

2. Society and Education –
   a) Society : Its origin and factors and their influences on education (population, location, religion, class, culture, technology, economy).
   b) Impact of different political systems on education (capitalism and socialism).

3. Social groups and education –
   a) Social groups (primary, secondary and tertiary)
   b) Socialization : the role of the family and school

4. Education and culture

Contd P/3

5. Social change and Education –
   a) Social change : Its definition and role of education.
   b) Social change in India (Sankritization, Westernization, Modernization and Globalization).

6. Education and Social Communications –
   Informal agencies of Social Communication.

7. Education and Contemporary Social Issues :
   a) Unemployment
   b) Poverty
   c) National Disintegration
   d) Population explosion .

Module-V : **EDUCATIONAL ORGANIZATION AND MANAGEMENT**

1. Principles of Educational organization : Concept of School organization it's principle.

2. Aspects of School Organization –
   a) School Plant, Building, Equipment, Sanitation, Play ground, Workshop, Library, Computer Room.
   b) ~~Midday meal, School medical service, co-curricular activities.~~
   c) Inclusive education.

3. Educational Management and Administration –
   Primary, Secondary and Higher Education :
   Board of Secondary Education, Council of H.S. Education, Council of Higher Education.

4. Concept of educational management –
   Meaning, nature, need and scope, Role of Educational manager.

5. Types of Educational Management –
   Autocratic, Democratic, Lassie – Fair supervision.

6. Educational Planning –
   Meaning, need and significance of educational planning.
   Types and strategies of educational planning. Steps in Educational planning
   Institutional Planning.

7. Leadership – Meaning, nature and styles .

Module-VI : **GUIDANCE & COUNSELING**

1. Psychology of adjustment :
   Concept of adjustment – adjustment and adaptability, homeostasis, defence mechanisms: Criteria of good adjustment.

2. Malajustment – meaning of maladjustment – Conflict and frustration,
   Manifestation of maladjustment in Childhood and adolescence – a synoptic view of problem behaviours.

3. General causes of maladjustment – Biological and Environmental – role of parent and educational institution in promoting mental health.

4. Stress, stressors – personal and environmental stress, coping strategies and therapies – behaviours, cognitive and humanistic therapies.

5. Concept of guidance – meaning and nature of guidance – different forms of Guidance (group and individuals) Types of Guidance (educational, vocational).

6. Counseling – meaning – types and techniques – directive, non directive, eclectic – individual and group counseling.

Contd. … P/4.

7. Identification and guidance for special learners – gifted, slow learners, learner with learning disabilities, MR/mentally challenged.

8. ~~Organizing guiding services of different levels of education.~~ Multi-axial classification of mental disorders — DSM IV Axis I & II category. ++

Module-VII : **EVALUATION IN EDUCATION**

1. Educational Measurement and Evaluation – Concept, Scope and Needs.

2. Tools and Techniques of Evaluation –
   a) Test : Types, use of Norm – Referenced test and Criterion – Referenced test, essay type and objective type tests.
   b) Observation – Concept and Use
   c) Inquiry – concept and use
   d) Cumulative Record Card – concept and Use

3. Scales of Measurement – Nominal, Ordinal, Interval, Ratio.

4. Criteria of Standardized test
   a) Validity
   b) Reliability
   c) Objectivity
   d) Usability
   e) Norms

5. Construction of a Standardized Test

6. Statistics – Use in Education

7. Organization and Graphical Representation of data – Pie Chart, Bar diagram, Histogram, Frequency polygon, Ogive.

8. Measures of Central tendency – Mean, Median, Mode – Calculation and application

9. Measures of Variability – Range, Quartile Deviation, Standard Deviation – Calculation and application

10. Percentile and percentile rank – Calculation and application, including graphical Representation

11. Characteristics of Normal curve

12. Skewness and Kurtosis – Concept

13. Concept of Z – Score – Calculation and use

14. Linear Correlation – Concept and Use – Co-efficient of Linear Correlation : Product – moment method and Rank difference Method – calculation

Module – VIII : **EDUCATIONAL TECHNOLOGY**

1. Concepts need and scope of educational technology.

2. Systems approach to education : Definition of systems, need for systems approach, classification of systems & components of a System.

3. Computer and its role in education.

4. Use of media in education : Audio (Radio & Tape), Visual (Projector), Audio-visual (T.V. & C.C.T.V.).

5. Models of teaching : Nature, Concepts and different families of Teaching Models, Advantages of the use of Models of Teaching.

Contd. … P/5.

6. Communication and educational technology : Components of communication process, Role of communication in effective teaching-learning process, Factors affecting classroom communication.

7. Instructional techniques : Mass instructional techniques (basic concepts only), Personalized techniques – Programmed learning, Mastery Learning, Microteaching.

8. Distance education : Concepts, types and usefulness – Application of technology in Distance education.

Module – IX : **CURRICULUM STUDIES**

1. Concept of curriculum : Explicit Curriculum, Hidden Curriculum, Nature of Curriculum.
   Bases of Curriculum : Philosophical Sociological & Psychological.

2. Principles of Curriculum Construction.

3. Objectives of curriculum : Need to form objectives of curriculum.
   Sources of objectives of the curriculum : Society, Discipline, Needs of students.

4. Curriculum development – Contest based, process based, Product based and Systems based.

5. Determinants of content selection : Culture based, Knowledge based, Need based.

6. Curriculum evaluation : Meaning and Utility, Sources and means of curriculum evaluation. Formative and Summative evaluation.

Module - X : **COMPARATIVE EDUCATION**

Any one country from UK, USA, China.

1. Concept, meaning, scope of Comparative Education.

2. Various issues of the Indian educational system with special reference to school Education in comparison among India and SAARC countries on –
   a) Structure of education
   b) Administration
   c) Curriculum
   d) Examination
   e) Teacher education
   f) Education for all
   g) Distance education and open learning

3. Comparison between India and any one of the following countries, UK, USA and China in regard to Universalization of Elementary Education.

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SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN ENGLISH** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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 I)
d) Alexander Pope	The Rape of the Lock
e) R. K. Narayan	The Guide
f) Amitav Ghosh	The Shadow Lines
g) P. B. Shelly	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

l) One more text from H. S. Syllabus to be added

3. Grammar

4. Vocabulary

Antonym, synonym, idiomatic usage of language,

Figures of speech etc.

mark)

5. Test of Comprehension

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

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN GEOGRAPHY** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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.

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.

General Geology:

Composition of the planets and meteorites. Abundance of elements in the universe and earth. Origin of the Earth. Internal constitution of Earth. Heat flow and geothermal gradient. Gravity, gravity anomalies on earth and Isostasy. Earth as a magnet, magnetic anomalies.
Earth's internal processes, volcanism and global distribution of volcanoes. Earthquakes: causes, effects, earthquake belts. Seismic zones of India.

Structural Geology:

Stress and strain- basic concepts, analysis of stress-strain in two-dimension, stress and strain ellipse. Behavior of rocks under stress. Stress-strain relationships of elastic, plastic and viscous materials.
Unconformity: different types and their recognition
Fold and Fault: geometry and classifications, mechanisms. Fold and thrust belt.
Shear zones and shear sense markers.
Classification of joints, foliation, lineation and their relations with folds.

Geomorphology and Remote Sensing:

Basic concept of geomorphology, common landforms related to action of wind, river and glacier; coastal landforms. Geomorphology and its relation to structure and lithology.
Aerial photographs and their interpretations. The Electromagnetic spectrum.
Orbiting satellites and sensor systems. Indian remote sensing satellites.
Applications of remote sensing in geology. Basic concepts of GIS and GPS.

Geotectonics:

Continental drift and sea-floor spreading hypotheses, linear magnetic anomalies.
Plate tectonics- types of plate-boundaries and their characteristic features.
Island arc, continental rift system, active and passive continental margins.
Palaeomagnetism. Mountain building and orogeny.

Palaeontology:

Definition, types and significance of fossils. Modes of preservation of fossils.
Species concept in biology and binomial nomenclature. Index fossils and their significance.
Description of hard-part morphology of brachiopoda, cephalopoda, pelecypoda and gastropoda.
Evolutionary trend in Hominidae, Equidae and Proboscidae.
Description and importance of Siwalik fauna, Gondwana flora and fauna.

Stratigraphy:

Geologic time scale, Principles of determination of absolute and relative ages of rocks and geological events. Importance of unconformities in stratigraphy.
Lithostratigraphic, biostratigraphic, magnetostratigraphic, chronostratigraphic and geochronologic units and their inter-relations.
Geological evolution of Precambrian terrains of Dharwar, Singbhum and Rajasthan.
Evolution of Proterozoic Cuddapah and Vindhyan basins.
Geological evolution of the following Phanerozoic basins/ successions of India: Gondwana, Spiti, Kutch, Siwalik, Assam and Bengal.

Hydrology and Engineering Geology:

Hydrologic cycle, vertical distribution of groundwater, porosity, permeability, hydraulic conductivity, transmissivity and storage coefficient. Aquifers: properties and classifications. Exploration for groundwater, groundwater recharge, rainwater harvesting. Groundwater provinces of India and West Bengal.
Engineering properties of rocks. Geological investigations for dams, tunnels and reservoirs.
Landslides: classification, causes and prevention.

Mineralogy:

Elements of crystal symmetry, Hermann-Mauguin symmetry notation. Crystal classes, crystal systems, crystallographic axes- interfacial angle and axial ratio. Crystal faces and linear directions, their nomenclature and interrelationship.
Crystal forms in different crystal classes and crystal habits.
Twining. Concept of space lattice, space group and unit cell.

Physical properties of minerals. Classification of minerals on the basis of chemical composition.
Crystal chemistry: bonding, coordination principles, isomorphism, polymorphism, solid solution, exsolution. Elementary thermodynamics. Structural classification of silicate minerals. Physical, chemical and optical properties of pyroxene, amphibole, feldspar and carbonate groups.
Optically isotropic, uniaxial and biaxial characters of minerals. Pleochroism, birefringence, extinction angle, double refraction, interference figures and optic sign.

Igneous Petrology:

Forms of igneous rock bodies. Description and origin of common structures and textures of igneou rocks. Phase rule and its derivation; concept of the liquidus; one-, two- and three-component systems. Diopside-anorthite, forsterite-silica, albite-anorthite, diopside-forsterite-silica systems. Bowen's reaction series. Processes of diversification of igneous rocks: differentiation, assimilation, and partial melting.

Basis of classification of igneous rocks and different classification schemes– CIPW norm; IUGS classification. Petrography and petrogenesis of: granite, basalt, anorthosite, alkaline and , ultramafic rocks.

Metamorphic Petrology:

Agents and types of metamorphism.

Texture of metamorphic rocks, metamorphic crystallization.

Classification of metamorphic rocks. Concept of metamorphic grade and metamorphic facies, facies series. Prograde and retrograde metamorphism. Metamorphism and tectonics. ACF, AKF diagrams. Regional metamorphism of pelitic and mafic rocks, and contact metamorphism of impure carbonate rocks. Metasomatism and granitisation. Migmatites. Granulite terrains of India.

Sedimentology:

Processes of formation of sedimentary rocks, provenance, diagenesis and lithifaction.

Textural components; Textural parameters- porosity, permeability.

Classification of sedimentary rocks-terrigenous and chemogenic. Types of fluid. Aqueous fluid flow-current and wave.

Primary sedimentary structures, their processes of formation and significance. Flow regimes, bed forms, their internal structures and fields of stability.

Facies, facies association and facies models- fluvial, deltaic and beach-barrier bar systems.

Sandstone, conglomerate and limestone: definition, composition, classification.

Environmental Geology:

Natural hazards – earthquake, tsunami, volcanic eruption, landslides, floods, and droughts.

Impact of human activities on wetlands and forests, use of fertilizers on land.

Pollution of groundwater, surface water and ocean.

Composition of air, air pollution, effects of air pollution on human health.

Impact of mining on atmosphere, biosphere, lithosphere and hydrosphere. Industrial and radioactive waste disposal.

Environmental Protection, legislative measures, processes of mitigation.

Economic Geology:

Classification of ore deposits, protore, ore, gangue, tenor and grade.

Ore forming processes: magmatic, sedimentary, metamorphic, hydrothermal and supergene.

Controls of ore localization, ore textures and structures.

Metallogenic provinces and epochs.

Geology of important metallic deposits of India: chromite, copper, iron, lead-zinc, manganese and uranium-thorium.

Geology of important non-metallic deposits of India: bauxite, mica, phosphates, barite, diamond and graphite. Rock as construction material.

Raw materials used in iron and steel, cement, refractories, fertilizer industries.

Coal: its origin, chemical, macroscopic and microscopic constituents, ranks, classification, grade and utilization. Distribution of coal in India.

Petroleum and natural gas deposits with special reference to their origin, migration and accumulation. Distribution of petroleum and natural gas in India.

Methods of mineral prospecting (geological, geophysical and geochemical), mineral beneficiation and ore dressing.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN HISTORY** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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).

MEDIEVAL HISTORY

1. Medieval Europe (Feudalism, Charlemagne, Empire vs Papacy & Crusades).
2. Medieval India (1206-1707 AD).

MODERN INDIA (1757-1947)

MODERN EUROPE & WORLD (1789-1945)

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN MATHEMATICS** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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 - $\Delta \nabla E$

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 P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF ASSISTANT PROFESSOR IN MICROBIOLOGY FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

1. **Biomolecules:** Monosaccharides, amino acids, proteins, purines and pyrimidines, fatty acids, sterols, triglycerides, phospholipids. Structure, isomerism, chemical reactions (qualitative and quantitative tests).
2. **Biomolecules:** Polysaccharides (starch, cellulose, pectin), proteins, DNA, RNA, complex lipids. Structure, nature of bonds, assay methods, localization in cells. Denaturation of proteins, Cot curve and T_m for DNA
3. **Thermodynamics:** Concepts of free energy, enthalpy, entropy, equilibrium constants. First and second law of thermodynamics
4. **Theoretical basis of Microscopy:** compound, light, phase contrast, fluorescent, electron, resolving power.
5. **Theoretical basis of spectrophotometry, spectroflourimetry:** Orbital theory, concept of chromphore and fluorophore, Lambert-Beer's Law, light scattering, IR spectroscopy
6. **Fundamentals of radioactivity:** Decay constant, half life, applications of isotopes in radioimmunoassay, glucose metabolism, DNA synthesis, pulse-chase experiments.
7. **Basic statistics:** Population, sampling, probability, distribution, variance, regression analysis, confidence interval
8. **Microbial Cell Biology:** Cell structure and composition. Structure and function of Plasma Membrane, Structure and function of organelles, Cell signaling, Cytoskeleton elements and cell motility. Protein trafficking, Secretory pathways, Cell cycle.
9. **Basic chemistry for Microbiology:** pH, buffer, hydrolysis of water, chemical interaction, Solubility, Partition coefficient, Hydrogen bonds, Van der Waals interaction, Peptide bonds.
10. **General microbiology:** Evolution of prokaryotes and unicellular eukaryotes, Eubacteria and Archaebacteria, bacterial cell walls-composition and structure, difference with eukaryotic cell walls, anaerobic and aerobic metabolism, generation of ATP, organization of bacterial DNA, plasmids and their role, chemotaxis and quorum sensing
11. **Growth of microorganisms:** Types of media used, factors influencing growth, pH, temperature, osmotic pressure, salt concentration, measurement of growth, growth kinetics, synchronized growth, the chemostat, growth in solid media, differential media, selective media, isolation of pure culture, characterization through biochemical tests and ribotyping
12. **Staining methods:** Dyes, chromophoric and auxo-chromic groups, basic dyes, acidic dyes, principles of staining, mordants, simple stains, differential stains, Gram stain and its mechanism, acid fast stain and its mechanism, endospore stain, Negative staining, Feulgen stain
13. **Eukaryotic microbes:** General characteristics, vegetative and reproductive structure of algae, cyanophyta, fungi, protozoa (giardia, plasmodium, entamoeba)

14. **Control of microbial growth by physical and chemical agents:** High temperature, low temperature, sanitizer, germicide, bacteriostatic agent, phenolic compounds, alchohols, heavy metals and their compounds, dyes, detergents, evaluation of antimicrobial agents. Antibiotics and chemotherapeutic agents, sulfonamides, penicillin, streptomycin, tetracycline, metronidazole, mode of action, drug resistance.
15. **Molecular biology of microbes:** DNA replication, mechanism (rolling circle,bidirectional); transcription, mechanism, rho-dependent/independent termination; *lac*, *trp*, *ara* operons. Translation, mechanism, functions of m-RNA, r-RNA, t-RNA. Non-ribosomal peptide synthesis. Splicing and Spliceosome, Processing of RNA, Regulation of gene expression, Synthesis of Gramicidin
16. **Enzymology:** Enzyme, co-enzymes/factors, metal activators. Kinetics, competitive, non-competitive, un-competitive inhibition, use of the Michaelis-Menten equation and Lineweaver-Burke plots, examples of each type of inhibition. Allosteric enzymes; factors that affect enzyme activity.
17. **C-Metabolism and bioenergetics:** Carbohydrate metabolism, EMP, HMP pathway and TCA cycle with entry of sugars and amino acids into the pathways. ATP generation, by aerobic and anaerobic pathways; utilization of N-compounds, S-compounds and CO_2 as electron acceptors, bacterial photosynthesis. Oxidation of fatty acids, metabolism of phospholipids and triglycerides.
18. **Metabolism of N compounds:** Amino acid metabolism, urea cycle, metabolism of glycine, phenylalanine and lysine. Synthesis of purines and pyrimidines, precursors and synthesis of AMP and GMP, ATCase
19. **Environmental and Food microbiology:** Microbial species in air, water and soil. Detection of the microbes from these sources. Analysis of water samples for BOD and COD, coliform test, microbial treatment of sewage and waste water, bio-remediation and major microbes involved in it. Soil microbial communities, plant pathogens bacterial, fungal and viral; N-fixing, biogeochemical cycles for C, P and S. Bio-fuels from biomass using microbes. Microbes and food spoilage, preservation of food samples, pasteurization of milk; microbes in fermented food, curds, yoghurt, single cell protein. Food borne diseases
20. **Microbial genetics:** Structure and organization of the gene, exons and introns; genetic exchange of information, transformation, conjugation, transduction, transposon. Mutations spontaneous and induced, mechanisms of mutations, site directed mutagenesis, repair of mutations. Detection of mutation, recombination techniques
21. **Recombinant DNA technology:** Methods for isolation, purification and amplification of DNA/RNA. Use of restriction enzymes, RFLP, RAPD, fingerprinting, Southern, Northern and Western blotting. Cloning vectors and their use, transformation using T_i plasmids. DNA library and BLAST search. Use of over expressed proteins in microbes for commercial/pharmaceutical use

22. **Industrial Microbiology:** Selection of cultures, gene mining, metagenomics. Strain improvement, use of Extremophiles and their enzymes. Fermenters-stirred tank, bubble column, air lift, packed bed. Immobilized microbes and their use. Fermentation conditions, static, submerged, solid phase. Industrial production of ethanol, acetic acid, penicillin, vitamin B_{12}. Preservation of cultures
23. **Medical microbiology:** Normal microbial flora in the human system. Pathogens, production of toxins both endo and exo. Neurotoxin, enterotoxin and cytotoxin, producers and effects on human health. Common microbial diseases, bacterial, viral, fungal and protozoal: causative agents and therapy. Viruses: components, classification based on nucleic acid structure, viroids, prions. Bacteriophage, isolation, estimation, replication of T4 and lambda. Replication of dsDNA animal virus.
24. **Immunology:** Immunoglobins, organization and expressions of Ig genes; B cell maturation, activation and differentiation; MHC/ HLA; antigen processing and presentation; T-cells, T-cell receptors, T-cell maturation, activation and differentiation; cytokines; cell mediated and humoral effector responses, auto immunity, immunodeficiency diseases, transplantation immunology, cancer and immune system. Monoclonal and polyclonal antibodies, monoclonal antibody technique.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN NUTRITION** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

MODULE I : BASIC NUTRITION

1. Nutritional Requirement & formulation of RDA – Reference Man & Reference Woman. Adult consumption Unit.
2. Energy in Human Nutrition – Idea of Energy & its unit, Energy Balance – Assessment of Energy Requirements- Determination of Energy in Food – B.M.R. & its regulation – SDA.
3. Macro nutrients- definitions, classifications, sources deficiencies, functions, Daily Requirements.
4. Carbohydrates – Effects of too high –too low carbohydrates on health – Glycemic Index.
5. Proteins - Effects of too high – too low proteins on health – Assessment of protein qualities (BV, PER, NPU) – Factors affecting protein bio- availability including anti-nutritional factors.
6. Lipids – Classification of fatty acids – nutritional significance of PUFA, MUFA, SFA, W-3 fatty acids.
7. Vitamins & Minerals – Biochemical & Physiological roles- Sources – daily requirements, deficiencies – effects of excess intake.
8. Fibre – Classification – sources – composition – nutritional significance.
9. Water – Factions – daily requirements, water balance.
10. Antioxidants.
11. Probiotics & Prebiotics.
12. Food toxicants – natural & artificial – effects on human body.

MODULE – II : Therapeutic Nutrition & Dietetics

1. Etiology, Pathology, metabolic changes, clinical manifestations, complications, dietary modification & management of following disorders. :
   a) Disorder of upper gastrointestinal tract, small intestinal tract & large intestinal tract.
   b) Renal disorder.
   c) Dyslipidaemia / coronary heart disease.
   d) Obesity
   e) Underweight

f) Nutritional anaemia
g) Liver & gallbladder disorders
h) Diabetes mellitus
i) Gout
j) Inborn errors of metabolism
k) Acidosis & alkalosis
l) Thalassemia

2. Surgical conditions & Burns – types, dietary managements & other managements.

MODULE – III : Physiology

1. Cardiovascular system – structure & function of heart, heart rate – cardiac cycle – cardiac output – blood pressure – its regulation – circulation of blood.
2. Gastrointestinal system – structure & function of various organs of G.I. tract – digestion & absorption of food – the role of enzymes & hormones on digestion & absorption.
3. Excretory system – structure & function of kidney, bladder, formation of urine, role of kidney in homeostasis – structure & function of skin – regulation of temperature of the body.
4. Reproductive system – role of hormones in reproduction – physiology of pregnancy, parturition, lactation & menopause.
5. Endocrine system – structure & functions of different endocrine glands – symptoms of deficiency & excess secretion of different endocrine glands.

MODULE – IV : Nutritional Biochemitry

1. Inter relationship between Biochemistry and other biological sciences including Nutritional Science.
2. Biomolecules: Fundamental concepts of Carbohydrate, Protein, Fatty acids, Nucleic acids, Phospholipids, Cholesterol and other steroids.
3. Detailed idea about Enzymes, Coenzymes, Cofactors, Isozymes, specificity of enzymes, enzyme kinetics, factors effecting enzyme activity and enzyme inhibition.
4. Metabolism: Definition (a) Glucose metabolism and its regulation.
   (b) Glycogen metabolism and its regulation.
   (c) Role of glucose & glycogen metabolism in regulation of Normal Blood glucose level.

5. Biological Oxidation and Energy production in the Eukaryotic cell.
6. Lipid metabolism: (a) Fatty acid synthesis (de novo) and chain elongation (Saturated & Unsaturated).
   (b) Biosynthesis of eicosanoids, cholesterol and their Pathophysiological importance.

7. Vitamins: Definition & structures of water soluble vitamins and their role as protective types of food.
8. (a) Nucleic acid, Nucleotide & Nucleoside, Doublehelical structure of DNA, different types of RNA.
   (b) Genetic code and different types of mutation.
   (c) Steps in Protein biosynthesis.
9. Molecular aspects of transport: Active and Passive transport systems with examples and mechanism of operation.
10. Proteins: (a) Classification of aminoacids and common methods of aminoacid breakdown.
    (b) Urea formation & clinical significance.
    (c) Uric acid biosynthesis and its clinical significance.

MODULE – V : Food Microbiology

1. General idea about growth of microorganism in our daily diet – in general.
2. Theoretical basis of Microscopy: Compound, light, phase – contrast, fluorescent & electron microscopy.
3. Microorganisms important in food:
   (a) Yeast – brief idea
   (b) Fungus – brief idea
   (c) Bacteria – Detailed structures of bacterial cell and Eukaryotic animal cell. Bacterial cell wall composition in detail in both gram positive and gram negative bacteria.
4. Cultivation of microorganisms: Culture media used, Nutritional requirements and factors affecting growth of microorganisms. Different phases of growth curve of bacteria.
5. Isolation & identification of microorganisms by different methods: Stains and Staining methods.
6. Control of growth of microbes by different physical methods as well as by chemical agents.

7. Food spoilage: Spoilage of cereals, vegetables, fruits and flesh foods and its prevention.
8. Microbiology of Water: Determination of quality of water with the help of concerned tests.
9. Microbiology of Milk: Definition & criteria of milk (on the basis of microbiology). Microflora present in milk kept at different temperatures, curdling of milk, Pasteurization of milk and milk borne diseases.
10. Food poisoning: Food borne infection like Cholera, Typhoid, Dysentry, Salmonellosis and Staphylococci infection.
11. Food safety & Food security.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF ASSISTANT PROFESSOR IN PHILOSOPHY FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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, Māyavāda

   (B) Rāmānuja Brahman, Cit & acit, 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.

P.T.O.

4. Induction

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

Western Philosophy : Epistemology, Metaphysics

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

Ethics and Social Philosophy

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

Psychology and Philosophy of Religion

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.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN PHYSICS** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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 & WAVES :

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

4. HEAT :

Kinetic Theory of Gases; Equations of State; Brownian Motion.

5. THERMODYNAMICS :

First & Second Laws; Entropy; Thermodynamic Functions.

6. OPTICS :

Geometrical Optics; Eye pieces; Physical Optics; Interference; Diffraction; Resolving Power; Polarisation.

7. ELECTRICITY & MAGNETISM :

Magnetic Effects of Current; Varying Current; Alternating Current.

8. ELECTRONICS :

p – n Junction Transistors & Uses.

9. MODERN PHYSICS :

Bohr's Theory; Milikan's Experiment; X-Rays; Moseley's Laws; Bragg Reflection; Radioactivity; alpha, beta, gamma Rays.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN PHYSIOLOGY** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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.

Group – A

Western Political Thought - Plato, Aristotle, Machiavelli, Rousseau, Bentham, J. S. Mill, Marx.

Indian Political Thought - Kautilya, Rammohan Roy, Vivekananda, Syed Ahmed Khan, Rabindranath, Gandhi, Ambedkar.

Political Concepts - State, Civil Society, Government, Governance, Power, Authority, Nation, Nationalism, Internationalism.

Political Ideas - Rights, Duties, Liberty, Equality, Justice, Rule of Law, People Participation.

Political Ideologies - Liberalism, Democratic Socialism, Feminism, Terrorism.

Different aspects of Democracy - Meaning and Theories of Democracy; Direct vs Representative Democracy; Electoral System; Electoral Reforms.

Political Process - Party System, Single Party, Bi Party, and Multi Party Systems; National Parties and Regional Parties; Lobbyists and Pressure Groups.

Forms of Government - Dictatorial vs Democratic; Totalitarian vs Liberal. Presidential vs Parliamentary, Unitary vs Federal.

Social Movements - Environmental movements, Women's movements, Human rights movements.

Group-B

Basic features of Indian Constitution - Constituent assembly, Salient Features of the Indian Constitution, Nature of Indian Federation, Centre-State relations, Legislative, Executive and Financial-Fiscal dimensions, Evolving political trends.

Fundamental Rights - Directive Principles & Fundamental duties - Constitutional provisions and judicial interpretations regarding fundamental rights.

Union Legislature - Composition, Powers and Functions of Lok Sabha and Rajya Sabha, Functioning of the Committee System.

Union Executive - President, Vice President - Election, Position, Functions, Prime Minister, Council of Ministers, Relationship between President and Prime Minister.

The Judiciary - Supreme Court and the High Courts, Composition and Functions, Judicial review and Judicial activism, Public interest litigations, Judicial reforms.

Government in the States - Governor, Chief Minister and Council of Ministers, Position and Functions.

State Legislature - Composition and Functions.

Local Government and Politics - Panchayati Raj: Evaluation, Structure, Powers and Functions, Municipal Government; Significance of 73rd and 74th amendments; Role of women, SCs & STs in Local Government.

Bureaucracy - Classical administration and Development Administration; Changing role of bureaucracy in Post-Colonial India, "Representative" bureaucracy, Issues of bureaucratic accountability.

Social Processes - Role of Peasants and Workers in Indian Politics; Role of Interest / Pressure Groups; Regionalism, Casteism, Linguism and Communalism in Indian Politics; Issues of Criminalisation, Corruption; Citizens' movements.

Public Administration and International Relations

Group - A

Public Administration

Theories of Administration - Scientific Management, Classical Theory, Weber's theory of bureaucracy, Riggsian Model of Echological Approach to Public Administration.

Forms of Public Organizations - Ministries and Departments; Corporations, Boards and Commissions.

Principles of Organization - (a) Hierachy (b) Unity of Command (c) Span of Control (d) Authority (e) Centralization, Decentralization and Delegation, (f) Line and Staff.

Processes of administration - (a) Decision - making and Policy Formulation (b) Communication and Control (c) Leadership (d) Co-ordination.

Accountability and Control - Legislative, Executive and Judicial Control over administration; Role of Civil Society; Public opinion and Media; Right to Information; Administrative Corruption; Grievance Redressal Machineries like Ombudsman.

Development Administration - Evolution of the Concept; Basic features.

Control of Public Expenditure - Parliamentary Control, Control of Parliamentary Committees;

Indian Administration - Continuity and Charge - brief historical outline.

Recruitment and Training of Civil Servants in India - Role of Union and State Public Service Commissions and Training Institution.

Organization of the Union Government in India - PMO, Cabinet Secretariat, Secretariat Administration.

Organization of the State Governments in India - Chief Secretary - Relationship between Secretariats and Directorates.

District Administration in India - Changing role of District Officers, Sub-divisional Officers & Block Officer; their interfaces with Local Self Government.

Group-B

International Relations

Some Basic Concepts of International Relations - (a) Balance of Power (b) Collective Security (c) Bi-polarity and Unipolarity (d) Neo-Colonialism (e) Globalization.

Foreign Policy - Concept and Techniques; Determinants of foreign policy.
Evolution of World Politics - League of Nations; United Nations; Cold War; Detente; Collapse of the Soviet Union; Regional Integrations; International Terrorism.

Non-Alignment - Evolution of the Movement and Role of India.

Major Issues in Indian Foreign Policy - Sino-Indian relations, Indo-Pak conflicts and the liberation of Bangladesh, developments in Sri Lanka, Indian role in promoting regional cooperation through S.A.A.R.C., the Kashmir question and India becoming a nuclear power. India and South East Asia; India's relations with U.S.A., China, Japan & Russia. India on the question of nuclear weapon. India and the U.N. system-India's role in U.N. peace keeping and global disarmament. India and the emerging international economic order.

Recent Global Issues - Egypt, Lebanon and Lybia.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN SANSKRIT** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

1. Sanskrit Texts (General Aquaintance only)

   A) Abhignanasakuntala

   B) Kumarasambhava (Cantos – I, III, V)

   C) Dasakumaracarita (Apaharavarmacarita only)

2. Alamkara and Chanda

   A) Alamkara (Arthalamkara only)

   B) Chanda (Samavritta only) – scanning and naming the metre

3. History of Sanskrit Literature (Vedic & Classical)

4. Elementary Sanskrit Grammar (Sandhi, Karaka, Samasa)

5. Translation from English to Sanskrit

6. Paragraph-writing in Sanskrit

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF **ASSISTANT PROFESSOR IN SOCIOLOGY** FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

Fundamentals of Sociology :

a) Modernity and social changes in Europe and emergence of Sociology.

b) Scope of the subject and comparison with other social sciences.

c) Sociology and common sense.

Pathfinders of Sociology :

a) Karl Marx – Historical materialism, mode of production, alienation, class struggle.

b) Emile Durkheim, Social fact, collective consciousness and social solidarity, suicide, religion and society.

c) Max Weber - Social action, ideal types, types of authority and bureaucracy. Protestant ethic and the spirit of capitalism.

d) Simmel : Formal Sociology : Forms & Types; Subjective & Objective Culture, Money; Metropolis.

e) Contemporary interpretations of Modern Sociology:
Talcoit Parsons - Social system and its four major problems, pattern variables.
Robert K. Merton – Latent and manifest function and dysfunction, conformity and deviance, reference groups.

f) Social System : Equilibrium, status, role, culture, heredity and environment, social control, conformity & deviance, forms of interaction, social interaction and everyday life. Types of human groups. Personality and socialization. Power, authority, legitimacy, sociology of political life. Religion in relation to solidarity and social conflict, magic, science and morality.
Social aspects of production, distribution, exchange and consumption.

g) Individual & groups : Personality & Socialization, classification of groups & their contemporary significance.

Inequality, Stratification & Mobility :

a) Concepts - equality, inequality, hierarchy, exclusion, poverty and deprivation.

b) Social mobility - open and closed systems, types of mobility, sources and consequences of mobility.

Economy & Society :

a) Social aspects of production, distribution, exchange & consumption, Social organization of work in different types of Society - slave society, feudal society, industrial / capitalist society, post – industrial society.

b) Formal and informal organization of work.

c) Labour & Society.

Politics and Society :

a) Power elite, bureaucracy, pressure groups and political parties.

b) Nation - state, citizenship, democracy, civil society, ideology.

c) Protest, agitation, social movements, collective action, revolution.

Religion & Society :

a) Religion in modern society: religion and science, secularization, religious revivalism, fundamentalism, pluralism.

b) Magic, religion & morality and science.

Science & Technology :

a) Ethos of science;

b) Scientific temper;

c) Social responsibility of science;

d) Social control of science;

e) Social consequences of science and technology;

f) Technology and social change.

Social research and methods of enquiry:

a) Importance of social research.

b) Survey Method - Questionnaires and interviews as technique.

c) Field Method – Observation (participant and non-participant) as technique.

d) Experimentation in Sociology.

Social & cultural change in modern society :

a) Development and dependency,

b) Agents of social change,

c) Education & social change,

d) Science, Technology & social change,

e) Dominant Culture,

f) Celebrity Culture.

Society & Culture in India :

Unity & diversity, modernity and tradition, contestation.

Approaches to the study of Indian Society :

Indological (Ghurye); Structural-functional (Srinivas); Marxist / Dialectical (Desai) ; Dalit (Ambedkar).

Major Social Groups :

Religious groups, linguistic and regional groups, castes & tribes.

Some Major Institutions :

Marriage, family, kinship patterns and changes affecting those; gender socialization; division of labour and economic interdependence, decision-making, centres of power and political participation; religion and society; Education, inequality, social change, contemporary trends.

Social Inequality :

Nature and types; traditional concepts of hierarchy, caste and class; the Backward Classes; concepts of equality and social justice in relation to traditional hierarchies; education, occupation; changing patterns of stratification.

Social change in modern India :

Westernization, Sanskritisation and secularization; directed and undirected change; legislative and executive measures; social reforms; social movements; industrialization & urbanization; associations and pressure groups.

Women & children :

Demographic profile of women; special problems - dowry, atrocities, discrimination; existing programmes for women and their impact. Situational analysis of children; child welfare programmes.

Globalisation & ecological crisis in India :

Ecological and Environmental movements in India.

Social problems in India :

1) Poverty in rural and urban areas,
2) Child labour,
3) Problem of youth,
4) Drug addiction,
5) Juvenile delinquency,
6) Problems relating to old age,
7) Population problem,
8) Mass illiteracy,
9) Problem of violence.

SYLLABUS FOR P.S.T./P.W.T. FOR RECRUITMENT TO THE POST OF ASSISTANT PROFESSOR IN ZOOLOGY FOR GENERAL DEGREE COLLEGES IN THE W.B.E.S. UNDER THE DEPTT. OF HIGHER EDUCATION, GOVT. OF W.B.

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.

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.