DETAILED SYLLABUS FOR THE POST OF HEAD MASTER (HIGH SCHOOL) / ASSISTANT EDUCATIONAL OFFICER IN GENERAL EDUCATION DEPARTMENT

(Cat.No.: 268/2021)

(Total Marks - 100)

GENERAL KNOWLEDGE AND CURRENT AFFAIRS (5 Marks)

Salient Features of Indian Constitution

Salient features of the Constitution - Preamble- Its significance and its place in the interpretation of the Constitution.
Fundamental Rights - Directive Principles of State Policy - Relation between Fundamental Rights and Directive Principles - Fundamental Duties.
Executive - Legislature - Judiciary - Both at Union and State Level. - Other Constitutional Authorities.
Centre-State Relations - Legislative - Administrative and Financial.
Services under the Union and the States.
Emergency Provisions.
Amendment Provisions of the Constitution.

Social Welfare Legislations and Programmes

Social Service Legislations like Right to Information Act, Prevention of atrocities against
Women & Children, Food Security Act, Environmental Acts etc. and Social Welfare Programmes like Employment Guarantee Programme, Organ and Blood Donation etc.

RENAISSANCE IN KERALA

Towards A New Society

Introduction to English education - various missionary organisations and their functioning- founding of educational institutions, factories.printing press etc.

Efforts To Reform The Society

(A) Socio-Religious reform Movements
SNDP Yogam, Nair Service Society, Yogakshema Sabha, Sadhu Jana Paripalana Sangham, Vaala Samudaya Parishkarani Sabha, Samathwa Samajam, Islam Dharma Paripalana Sangham, Prathyaksha Raksha Daiva Sabha, Sahodara Prasthanam etc.

(B) Struggles and Social Revolts
Upper cloth revolts.Channar agitation, Vaikom Sathyagraha, Guruvayoor Sathyagraha, Paliyam Sathyagraha. Kuttamkulam Sathyagraha, Temple Entry Proclamation, Temple Entry Act .Malyalee Memorial, Ezhava Memorial etc.

Malabar riots, Civil Disobedience Movement, Abstention movement etc.

Role Of Press In Renaissance

Malayalee, Swadeshabhimani, Vivekodayam, Mithavadi, Swaraj, Malayala Manorama, Bhashaposhini, Mathnubhoomi, Kerala Kaumudi, Samadarsi, Kesari, AI-Ameen, Prabhatham, Yukthivadi, etc

Awakening Through Literature

Novel, Drama, Poetry, *Purogamana Sahithya Prasthanam, Nataka Prashtanam,* Library movement etc

Women And Social Change

Parvathi Nenmenimangalam, Arya Pallam, A V Kuttimalu Amma, Lalitha Prabhu.Akkamma Cheriyan, Anna Chandi, Lalithambika Antharjanam and others

Leaders Of Renaissance

Thycaud Ayya Vaikundar, Sree Narayana Guru, Ayyan Kali.Chattampi Swamikal, Brahmananda Sivayogi, Vagbhadananda, Poikayil Yohannan(Kumara Guru) Dr Palpu, Palakkunnath Abraham Malpan, Mampuram Thangal, Sahodaran Ayyappan, Pandit K P Karuppan, Pampadi John Joseph, Mannathu Padmanabhan, V T Bhattathirippad, Vakkom Abdul Khadar Maulavi, Makthi Thangal, Blessed Elias Kuriakose Chaavra, Barrister G P Pillai, TK Madhavan, Moorkoth Kumaran, C. Krishnan, K P Kesava Menon, Dr.Ayyathan Gopalan, C V Kunjuraman, Kuroor Neelakantan Namboothiripad, Velukkutty Arayan, K P Vellon, P K Chathan Master, K Kelappan, P. Krishna Pillai, A K Gopalan, T R Krishnaswami Iyer, C Kesavan. Swami Ananda Theerthan , M C Joseph, Kuttippuzha Krishnapillai and others

Literary Figures

Kodungallur Kunhikkuttan Thampuran, KeralaVarma Valiyakoyi Thampuran, Kandathil Varghese Mappila. Kumaran Asan, Vallathol Narayana Menon, Ulloor S Parameswara Iyer, G Sankara Kurup, Changampuzha Krishna Pillai, Chandu Menon, Vaikom Muhammad Basheer. Kesav Dev, Thakazhi Sivasankara Pillai, Ponkunnam Varky, S K Pottakkad and others

METHODOLOGY OF TEACHING THE SUBJECT 5 Marks

- History/conceptual development. Need and Significance, Meaning Nature and Scope of the Subject.
- Correlation with other subjects and life situations.

- Aims, Objectives, and Values of Teaching - Taxonomy of Educational Objectives - Old and revised
- Pedagogic analysis- Need, Significance and Principles.
- Planning of instruction at Secondary level- Need and importance. Psychological bases of Teaching the subject - Implications of Piaget, Bruner, Gagne, Vygotsky, Ausubel and Gardener - Individual difference, Motivation, Maxims of teaching.
- Methods and Strategies of teaching the subject- Models of Teaching, Techniques of individualising instruction.
- Curriculum - Definition, Principles, Modern trends and organizational approaches, Curriculum reforms - NCF/KCF.
- Instructional resources- Laboratory, Library, Club, Museum- Visual and Audio-Visual aids - Community based resources - e-resources - Text book, Work book and Hand book.
- Assessment; Evaluation- Concepts, Purpose, Types, Principles, Modern techniques - CCE and Grading- Tools and techniques - Qualities of a good test - Types of test items- Evaluation of projects, Seminars and Assignments - Achievement test, Diagnostic test – Construction, Characteristics, interpretation and remediation.
- Teacher - Qualities and Competencies - different roles - Personal Qualities - Essential teaching skills - Microteaching - Action research.

Physics (10 Marks)

Module I – 5 Marks

Particle dynamics-Newton's laws of motion, rotational dynamics, conservation laws- Linear momentum, angular momentum, energy. Simple harmonic motion, damped and forced oscillations, wave motion-progressive waves, super position of waves, Doppler effect.
Frames of reference, special theory of relativity

Elasticity-Young's modulus, rigidity modulus, bulk modulus, surface tension, viscosity.

Module II - 5 Marks

Reflection, refraction, dispersion, interference, diffraction, scattering, polarization, fibre optics, lasers, basic idea of spectroscopy.

Heat and thermodynamics-conduction, convection, radiation,laws of thermodynamics, Carnot engine, entropy.

Statistical distribution-ensemble, phase space, Maxwell-Boltzmann statistics.

Chemistry (10 Marks)

Module III - 5 Marks

Atom Models– Planck's quantum Theory - Photoelectric effect -de Broglie's relation – Dual nature of matter and radiation, Heisenberg's uncertainty principle. Atomic orbitals and Quantum numbers - Pauling's Exclusion principle - Hund's rule of maximum multiplicity -Aufbau's principle – Electronic configuration of atoms.

Ionic bond – Properties - Born-Lande equation (derivation not expected) – Born-Haber cycle – Fajan's rules and its applications. Covalent bond - Valence bond theory–VSEPR Theory - Concept of Hybridisation –-Types: sp, sp^2, sp^3, dsp^2, sp^3d, d^2sp^3,sp^3d^2 - Explanation with simple examples .Molecular Orbital Theory – LCAO - Bonding and anti bonding molecular orbitals - Bond order. Theories of Metallic bonding: Free electron theory, valence bond theory and band theory (Basics concepts only).Hydrogen bond – Intra and inter molecular hydrogen bond.

Periodic laws, – Periodic properties – Electronegativity scales (Pauling and Mullikan scales) – Effective nuclear charge – Slater rule – Diagonal relationship

Representative and Transition Elements – General Characteristics, preparation and properties of simple compounds. Lanthanides and actinides

Metals: Occurrence, Concentration of ores, Refining of metals, Extractive metallurgy of Al, Fe, Ni, Cu and Ti – Classification of steel, hardening of steel.

Isomerism in coordination compounds - Werner's theory -EAN rule - Valence bond theory - Crystal filed theory - Splitting of d-orbitals in octahedral, tetrahedral and square planar complexes –Applications

Organometallic Compounds: Definition, Classification and Applications

Radioactivity –Natural and artificial, Nuclear stability – N/P ratio –Nuclear forces –Half life period – Gieger Nuttal rule –Disintegration series – Transmutation , Nuclear fission and Nuclear fusion –Application of radioactive isotopes

Module IV - 5 Marks

Uniqueness of Carbon , Classification of organic compounds - Hybridization of carbon in organic compounds. Structural and Stereoisomerism, Baeyer strain theory, Conformation and configuration - Specific rotation – Chirality, Enantiomers, Diastereomers– Racemic mixture - Resolution methods

Inductive effect, Mesomeric effect, Hyperconjugation and Electromeric effect - Steric effect. *organic reactions:* Substitution, Addition, Elimination and Rearrangement . Mechanisms of SN1, SN2, E1 & E2

Nomenclature of organic compounds– Preparation and properties of alkanes, alkenes, alkynes, alkyl halides, alcohols, aldehydes and ketones, carboxylic acids & their derivatives.

Aromaticity, Huckel's rule - Structure and stability of benzene, Electrophilic substitution reactions in benzene with mechanisms

Grignard reagent-Preparation and synthetic applications

Classification of polymers, preparation and applications of important polymers, biodegradable polymers

Biomolecules: Carbohydrates, proteins, nucleic acids, vitamins (Classifications with examples, applications/functions)

Zoology (10 Marks)

Module I – 5 Marks

PHYSIOLOGY, BIOCHEMISTRY & DEVELOPMENTAL BIOLOGY

1) Physiology :

- **Nutrition :**

  Types, Balanced diet, Nutritional disorders – Vitamin deficiency diseases, life style diseases, role of fibres, nervous & neuronal control of digestion.

- **Circulation :**

  Blood and its composition, blood group, blood clotting mechanisms, anticoagulants, heart beat, pacemaker and conducting system of heart, blood

pressure, pulse, common cardiovascular diseases – ECG, angiogram, angioplasty.

- **Respiration :**

Gas exchange, respiratory pigments, Haemoglobin, Transport of respiratory gases – Regulation of respiration - Respiratory disturbances – Apnoea, dyspnoea, hypoxia, hyper and hypo capnia, asphyxia, CO poisoning, asthma

- **Excretion :**

Nephron – Structure, Urine formation, role of kidney in osmoregulation, composition of urine, abnormal constituents of urine, renal disorders – nephritis, haematuria, renal calculi, acidosis and alkalosis, Dialysis.

- **Muscle Physiology :**

Types of muscles, Ultrastructure of striated muscle fibre, Muscle proteins, Muscle twitch, All or none law, Rigor mortis, Physiological and biochemical changes in muscle contraction.

- **Nerve Physiology :**

Structure of neuron, types; Synapse – types, nerve impulse propagation, Synaptic transmission, Reflex action, Neurotransmitters, EEG. Nerve disorders – epilepsy, Parkinson's diseases, Alzheimer's.

- **Endocrinology :**

Endocrine glands in man, hormones and disorders, mechanism of hormonal activity.

2 Biochemistry:

Biomolecules – Carbohydrates, Proteins, lipids and nucleic acids – structure and classification with examples.

- **Metabolism :**

Carbohydrate– glycogenesis, glycogenolysis, glycolysis, Kreb's cycle Electron Transport Chain.

- **Lipid:**

Beta Oxidation – Protein – deamination, transamination, Urea formation

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- **Enzymes:**

Mechanism of enzyme action, factors affecting enzyme action, Isoenzyme, Coenzyme, enzyme inhibition and activation.

3. Developmental Biology

Theories :

Preformation, Epigenesis, Recapitulation and Germplasm.

- Spermatogenesis, Oogenesis, Typical egg and Sperm.

- Types of eggs.

Fertilization :

Agglutination, Amphimixis, Physiological and biochemical changes during and after fertilization, Parthenogenesis, Artificial Parthenogenesis – Arrhenotoky, Thelytoky, Obligatory and facultative; Significance of fertilization and Partheogenesis.

Cleavage :

Types, Morula, blastula (different types), fate maps. Gastrula – Morphogenetic movements – concept of germ layers.

Cell differentiation :

Unipotency, Pleuri and totipotency, Gene action – Homeotic genes, Hox genes.

Development:

- Man – Implantation, Pregnancy, Placentation – Different types, function.

Teratology:

Definition, Causes of infection, drug and chemicals, metabolic imbalance, ionizing radiation, malnutrition, auto immunization.

Experimental Embryology:

Spemann's constrtiction experiment, Organizer and embryonic Induction, IVF and embryo transfer in man, cloning experiment in animals – Prenatal diagnosis – Amniocentesis, Chorionic villus sampling, ultrasound scanning, stem cells – embryonic and adult – Stem cell therapy.

Module II – 5 Marks

CELL AND MOLECULAR BIOLOGY, GENETICS, BIOTECHNOLOGY AND BIOINFORMATICS

CELL BIOLOGY :

Development and Scope, Cell theory and its Modern version.

Types of Cells: Prokaryotic and Eukaryotic. Ultra structure and functions of Plasma membrane, Plasma membrane model – fluid mosaic, Functions, Membrane transport, Cell communication - Modifications of Plasma membrane.

Cell organelles :

Nucleus - Structure, Interphase, nuclear envelope – functions.

Nucleolus - Structure, nucleolar organizer and functions.

Mitochondria - Structure and function, Oxidative phosphorylation.

Endoplasmic reticulum - Structure and function , types.

Lysosomes - Morphology, Polymorphism and functions.

Ribosomes - Different types – sub units, functions.

Centrioles and basal bodies – Structure and function.

Microbodies – Peroxisomes, glyoxisomes, funcions.

Cell division

MOLECULAR BIOLOGY :

Gene expression : Central dogma in Molecular Biology, One gene – one enzyme, one gene – one polypeptide hypotheses.

Genetic code - Wobble hypothesis.

Contributions of Khorana, Nirenberg and associates, RNA polymerase, chaperones, protein synthesis.

Gene regulation: Operon concept – Lac and Trp operon.

Bacterial Recombination : - Transformation, Conjugation and Transduction.

GENETICS AND BIOTECHNOLOGY :

Human Genetics: Karyotyping, pedigree analysis, chromosomal anomalies in man

a) Autosomal (e.g. Down syndrome, Edwards syndrome)

b) Allosomal (e.g. Turners and Klinefelters syndrome)

Biochemical genetics:

Disorders Phenylketonuria, alkaptonuria, albinism, tyrosinosis.

Biotechnology: -

Scope of Biotechnology, Recombinant DNA Technology, Techniques in gene cloning, restriction endonucleases, ligases, major steps in cutting and joining of DNA, Probes, linkers.

Blotting Techniques

Southern, Northern and Western, DNA finger printing.

Genomic library

cDNA library, PCR, DNA sequencing

Human Genome Project

Hybridoma and monoclonal antibodies, transgenic organisms.

Practical applications

Medicine, agriculture, industry, pollution control, forensic & judiciary.

Potential hazards of Biotechnology.

IMMUNOLOGY AND MICROBIOLOGY

Immunology:

Immunity : Definition, Types.

Immune System :

Primary and Secondary.

Immunogens:

Antigens – Definition, types.
Antigen – antibody reactions.

Immune responses :

Allergy – Classification.
AIDS, Autoimmunity, Vaccines.

MICROBIOLOGY:

Survey of microbes – Viruses – Prions, Viroids, Bacteria, Protozoa.

- Applied microbiology in various fields.

Microbial diseases in man.

Botany (10 Marks)

Module III- 5 Marks

MICROBIOLOGY - Bacteria: Ultra structure, reproduction, genetic recombination, economic importances (Industrial uses, food preservation and spoilage, biopesticides, biofertilizers, sewage treatment, nitrogen fixation and symbiosis), staining techniques

Viruses: structure and reproduction – RNA and DNA viruses, bacteriophages, TMV and HIV

MYCOLOGY AND LICHENOLOGY

Fungi: General characteristics, reproduction and life cycle, heterothallism and parasexuality

Distinguishing characters of different classes of fungi representing the following genera: Mastigomycotina (Pythium), Zygomycotina (Rhizopus), Ascomycotina (yeast), Basidiomycotina (Agaricus) and Deuteromycotina (Cercospora)

Economic importances of fungi: industrial, medicinal, food and agriculture
(Biofertilizers and Biocontrols)

Lichens: Economic and ecological importances, habit of crustose, foliose and fruticose lichens – homomerous and heteromerous

General account and economic importance, structure, reproduction and lifecycle of Usnea.

PLANT PATHOLOGY

Principles of plant pathology – biotic and abiotic causes of plant diseases

Classification of plant diseases on the basis of causative organisms and symptoms:

Transmission and spread of diseases – quarantine regulations – disease control measures

Study of the following diseases – causal agent, symptoms, etiology and control measures : Tapioca mosaic disease, Citrus canker, Blast of paddy

BRYOLOGY

Structure, reproduction and life cycle of the following types: Hepaticopsida (Riccia), Anthoceratopsida (Anthoceros), Bryopsida (Fuaria)

Economical importances of bryophytes

PTERIDOLOGY

Structure, reproduction, life cycle and affinities of following types: Psilotum (Psilopsida), Selaginella (Lycopsida), Equisetum (Sphenopsida) and Marsilea (Pteropsida)

Heterospory and seed habit

Affinities of pteridophytes with bryophytes and gymnosperms

Economic importances of pteridophytes - Biofertilizer

GYMNOSPERMS

General characters, structure (external and internal), reproduction and life cycle of following gymnosperms – Cycas, Pinus, Gnetum

Origin and evolution of gymnosperms and their affinities with pteridophytes and angiosperms

Economic importances of gymnosperms

PALAEOBOTANY

Objectives of palaeobotany, geological time scale, methods of fossilization, fossil pteridophyte (Rhynia)

Module IV - 5 Marks

PLANT PHYSIOLOGY

Water in relation to plants: Water potential, diffusion, osmosis, DPD, turgor pressure, osmotic pressure, exosmosis, endosmosis, plasmolysis

Transpiration: Mechanism of guard cell movement, role of K ions, anti-transpirants

Mechanisms of water absorption, passive and active

Translocation of water: transpiration pull

Water stress and physiological consequences

Mineral nutrition – essential and non-essential elements and their role in growth and development

Mechanism of mineral absorption- active, passive and fecilitated

Photosynthesis: chloroplast as photosynthetic apparatus, light phase, cyclic and non-cyclic photophosphorylation, dark reaction, C3, C4 and CAM path ways, photorespiration

Translocation of photosynthates: phloem transport, phloem loading and un-loading

Growth and Development : Concept of hormone and growth regulators on plant, hormones and their action: auxins, GA, cytokinines, ABA, ethylene

Photoperiodism, and vernalization

Photomorphogenesis, phototropism, gavitropism,

Nyctinastic, Seismonastic movement

METABOLISM AND BIOCHEMISTRY

Biological nitrogen fixation, symbiotic nitrogen fixation, biochemistry of nitrogen fixation and genetics of nitrogen fixation

Biosynthesis of amino acids, reductive amination and transammination, GS/GOGAT pathways

Oxidation of fatty acids, alpha and beta oxidation of fatty acids, cellular respiration of proteins

CELL BIOLOGY

Chromosomes, morphology, telomere, satellite, primary and secondary constrictions, nuclear organizer, chromosome banding, heterochromatic and euchromatic, nucleosomes, polytene and lampbrush chromosomes, chromosomal aberrations – deletion, duplication, inversion and translocation

Numerical aberrations: anueploidy and euploidy

Cell cycle: mitosis and meiosis, significances of meiosis

GENTICS AND MOLECULAR BIOLOGY

Mendel's experiments, symbols, terminology, Mendalian laws, Monohybrid cross, Dihybrid cross, backcross, Test cross, Modified Mendelian ratios inter actions of genes, epistasis, Complementary genes, Inhibitary genes, quantitative inheritance

Multiple alleles- Self sterility in nicotiana

Linkage and crossing over- 2 point and 3 point crosses, Linkage maps, Interference and co-incidence

Sex determination and Sex linked inheritance

XX-XY type, XX- XO type, Sex determination plants, criss cross inheritance, Sex limited and sex influenced traits

Extra nuclear inheritance plastid inheritance in mirabilis, coiling of shells in snails

Mutation- Types, Mutagens, Physical and Chemical, Molecular basis of Mutations, transitions, transversion, frameshift

Nucleic acids- DNA, RNA – Evidence of DNA as genetic material DNA structure Watson and Cricks model, types of DNA, A,B,Z, RNA structure types (mRNA, tRNA, rRNA)

DNA replication, enzymology of DNA replication, semi conservative mode, Meselon and Stahls experiments, molecular mechanism of replication

Gene Expression- Genetic Code, transcription in Prokaryote and Eykaryote

Post transcriptional modifications, translation, teminism

EVOLUTION

Molecules and origin of lives, evolution of Prokaryotic and Eukaryotic cells, Mitochondrial and endosymbiotic theory, Chloroplast and endosymbiotic theory.

Theories on origin and evolution of species, Lamarkism, Darwinism, Weismann, Devries, Neo Darwinism

History (5 Marks)

- Vedic Age, Jainism and Buddhism.
- Mauryas and Guptas.
- State and Society in medieval India – Sultanate, Mughal and Vijayanagar.
- Advent of Europeans – Birth and Growth of British power in India – Impact of Colonialism.
- Emergence of Nationalism – Struggle for Freedom – Partition of India.
- Sources of Kerala History – Jainism and Buddhism in Kerala.
- Kerala in the Sangam Age – Perumals of Mahodayapuram – Bhakti Movement.
- Rise of Modern Travancore – Resistance against Colonialism – Pazhassi Raja, Velu Thambi and Paliyathachan.
- Renaissance in Kerala – Social and Religious reform movements.
- National Movement in Kerala – Aikya Kerala Movement – Formation of Kerala State.

ECONOMICS (5 Marks)

Indian economy, Development Economics, Public Finance and Kerala Economy

Overview of Indian economy – Economic Planning – Five Year Pans in India- Major Development Issues: Poverty, inequality, unemployment – Concepts of Human Development: Measurement of Development – PQLI, HDI – Concept of sustainable development – Structure of Taxes and Expenditure of the Government – Concepts of Federal Finance – Development Experience of Kerala – Demographic transition, gender issues, migration and urbanization.

Political Science (5 Marks)

1. International Politics and Organizations. Diplomacy, Foreign Policy, Collective Security, Disarmament and Arms Control. UNO-Principal organs and functions. New trends: Globalization, WTO.
2. Public Administration. Principles of Organization, Bureaucracy: merits and demerits, New Public Administration, New Public Management, Development Administration, Significance of Local Self Government Institutions in India.
3. Political Thinkers. Plato, J S Mill, Aristotle, Rousseau, Marx, Gramsci and Gandhiji: Major contributions

GEOGRAPHY (5 Marks)

Human and Regional Geography

Population – World population distribution, growth – migration – settlements – rural and urban – climatic regions of the world – Types of agriculture in the world - distribution of iron ore and coal in the world– distribution of industries in the world – iron and steel – cotton textiles. Physiography of India – drainage – climate – soils – forests – Distribution, growth and density of population in India - Distribution of rice, wheat, cotton and sugar cane in India. Irrigation and multipurpose projects of India. Distribution of iron ore, coal, bauxite, mica, petroleum and atomic minerals – non-conventional energy resources – Distribution of iron and steel, textiles, and agro based industries in India – Transport in India – Geography of Kerala

MATHEMATICS (10 Marks)

Module I – 5 Marks

Elementary Set Theory, Relations, Partial order, Equivalence relation, Functions, bijections, Composition, inverse function, Quadratic equations –relation between roots and coefficients, Mathematical induction, Permutation and combination.

Trigonometric Functions – Identities solution of triangles, heights and distances.

Geometry – Length and area of Polygons and circle.

Solids – Surface area and volume, Euler's formula.

Module II– 5 Marks

Calculus - Limits, Continuity, Differentiability, Derivatives, Intermediate Value Theorem, Rolle's Theorem, Mean value Theorem, Taylor and Maclaurin's series, L'Hospital's rule. Partial differentiation, homogeneous functions, Euler's Formula.

Applications of differentiation - maxima and minima, critical points, concavity, points of inflection, asymptotes, Tangents and normals.

Integration – methods of integration, definite integrals – properties.

Fundamental theorem of calculus.

Applications of Integration – Area between curves, volume and area of revolution.

Double and Triple Integrals

Conic sections- Standard equations – Parabola, ellipse, hyperbola, Cartesian, Parametric and polar forms.

STATISTICS (10 Marks)

Module III– 5 Marks

Data Representation: Raw Data, Classification and tabulation of data, Frequency tables, Contingency tables; Diagrams – Bar diagrams, sub-divided bar diagrams, Pie diagrams, Graphs – Frequency polygon, frequency curve, Ogives.

Descriptive Statistics: Percentiles, Deciles, Quartiles, Arithmetic Mean, Median, Mode, Geometric Mean and Harmonic Mean; Range, Mean deviation, Variance, Standard deviation, Quartile deviation; Relative measures of dispersion – Coefficient of variation; Moments, Skewness and Kurtosis – Measures of Skewness and Kurtosis.

Probability: Random Experiment, Sample space, Events, Type of Events, Independence of events; Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Baye's theorem.

Module IV– 5 Marks

Random Sampling Methods: Sampling and Census, Sampling and Non-sampling errors, Simple random sampling, Systematic sampling, Stratified sampling.

Sampling distributions: Parameter and statistic; Standard error, sampling distributions – normal, t, F, Chi square distributions; Central limit theorem. Estimates, Desirable properties of estimate – Unbiasedness, consistency, sufficiency and efficiency.

Testing of hypothesis (basic concepts only) - Simple and composite hypotheses, null and alternate hypotheses, Type I error, Type II error, Level of significance, Power of a test.

Topics related to nature of work (10 Mark)

Module 1- Role and Functions of HM/AEO

Qualities- Personal, Physical, Moral, Intellectual, Emotional and Social

Functions- Planning, Organization and administration, Supervision or directing, Evaluation or controlling.

Relationship with Others- with teachers, with pupils, with public, with State Education Department, with State Education Board, with managing committees

Module 2- Basic Functions of Administration

Planning-objective, nature and functions related to planning

Organization-definition and functions
Direction-characteristics of good direction, work of direction in administration and functions
Controlling-meaning and definition and functions of control in administration

Module 3- Control Management

External Control- Ministry of Education, Government of India, Central Advisory Board of Education, CBSE, All India Council of Secondary Education, Central Social Welfare Board, All India Council for Teacher Education, National Council for Teacher Education, National Institute of Educational Planning and Administration and NCERT

Internal Control- General Education Department, SCERT, SIEMAT-Kerala, SIET, SSK,
State Resource Centre, College of Teacher Education and DIETs

Role of the Educational Manager in Crisis Management- Accommodation or Appeasement, Collaborative or Integrative, Competition or Domination, Sharing or Compromising, Neglect or Avoidance

Module 4 -Supervision and Inspection

Educational Supervision, features, objectives, scope, functions, kinds of supervision, difference between democratic and autocratic supervisor, modern supervision and elements influencing supervision

Educational Inspection-principles of effective inspection, aims and objectives, qualities of effective inspector and defects of present day inspection.

Module 5- Communication in Educational Administration-interpersonal communication, communication process, management style and communication, total communication, basic communication skills, assertiveness, giving and receiving feedback and problem solving.

Module 6- Management of Schools- concept of ideal school, characteristics of school management, principles of democratic school management, planning of school activities, role of HM in school activities, role of HM in teaching, approaches to management and
preparation of academic master plan.

Module 7- Delegation of Authority and Accountability- delegation-accountability, Staff Development Programmers, professional growth of teachers, in service programmes, conference techniques, refresher courses, content courses, teachers behavior, micro teaching and its merits and limits and simulated social skill training.

Module 8- Educational Administration in the State- policy formation and directions from higher officers, Public Education Rejuvenation Mission/VidhyaKiramam, important milestones of the educational history of Kerala, Kothari Education Commission and concurrent list of Indian Constitution.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.