

**FURTHER DETAILS REGARDING MAIN TOPICS OF
PROGRAMME No. 07/2018 (Item No.12,13,14,15,16,17,18,19,20,21,22&23)**

**JUNIOR LABORATORY ASSISTANT, JUNIOR LAB ASSISTANT,
LABORATORY TECHNICIAN Gr.II**

MEDICAL EDUCATION ,HEALTH SERVICES

**(Category No.551/15,224/17, 409/17,457/17, 458/17,554/17,
635/17,636/17,637/17,638/17,639/17,007/18)**

PART - I

Blood and Phlebotomy

Methods of blood collection - Capillary Puncture

Arterial puncture and venous puncture

Sites of blood collection: Capillary and Venous.

Identification of blood cells: Leishman's stain Blood cell types: RBC, WBC, Platelets (Identifying characters and Normal Range)

Hematology

Heamocytometry

Counting chamber : improved Neubauer

Total cell counts: RBC,WBC,Platelet,Absolute Eosinophil count. (Diluting fluids, Normal value, Clinical Significance), Reticulocount : Clinical significance

Hemoglobin estimation : Enumerate methods ,WHO recognized method : cyanmethhaemoglobin method,significance.

PCV - Methods, Wintrobe 's method, Normal value clinical significance.

ESR- Method (westergren's method), Normal value,Clinical Significance.

Test for coagulation: Bleeding time methods & Normal value of Duke's method. Clotting time methods & Normal value of Capillary tube method

Automation

Heamotology analyser, Haemogram, CBC

Blood Banking and Immuno haemotology

Blood group antigens and antibodies.

Blood group system.

(ABO and Rh system in detail)

Inheritance of blood group.

Hemolytic Disease of New Born (HDN)

Blood grouping techniques.

Cell grouping and Serum grouping.

Slide and tube method

Transfusion phlebotomy

Donor screening , Donor selection criteria.

Blood bank-Anticoagulants.

Blood components.

Compatibility testing and issue of blood.

Cross matching-Minor and Major.

Mention 3 phases.

Transfusion reaction:Name only.

Clinical Pathology

Analysis of Urine, Sputum, Stool, Semen, CSF
(physical,Chemical, Microscopic examination, Importance)

Biochemistry

Blood Glucose estimation

Types of samples: FBS, PPBS,RBS

Methods of estimation.Normal value, Clinical significance,

Relevance of HbA1c

Renal function test

Enumerate the common test included.

Common method used for the estimation of Blood urea,
Serum creatinine (normal values). Clearance test (Urea &
Creatinine)

Liver function test

Common tests included. Method used for estimation of
Bilirubin (Malloy and Evelyn method)

Lipid profile

Tests included in lipid profile

Common method for the estimation of cholesterol.

Other parameters of Diagnostic importance. Serum electrolytes: Sodium, Potassium. Normal value and Clinical significance.

Name cardiac Markers.

Name Tumor Markers.

Microbiology

Classification of bacteria based on Morphology.

Sterilization methods.

Hot Air Oven, Autoclave (Use)

Disinfectants & Antiseptics (Application)

Culture Media: Classification of culture media with example.

Culture Methods: Streak , Stroke, Stab, Lawn culture, Anaerobic technique (gaspak)

Identification of bacteria : Different methods .

Detection of motility : Names of different methods (Hanging Drop Method)

Staining : (Simple stain, gram stain, AFB stain)

Diagnostic significance.

Biochemical tests : Coagulase, Catalase, & IMViC

Immunology

Types of immunity, types of antibody (IgG, IgA, IgM, IgD, IgE)

Parasitology

Laboratory diagnosis of Malaria (Disease, Mode of transmission, host, causative agent. Types of Malaria, Thick and thin smear. Other stains used: JSB, Other methods : card method ,QBC.

Laboratory Diagnosis of Filariasis .

(Disease, mode of transmission, host and nocturnal habit.

Lab diagnosis : Wet smear examination , thick smear examination, concentration techniques.

Histotechnology And Cytology

Histotechnology :Tissue processing (steps of tissue processing), Microtomes, staining: (H and E stain)

Diagnostic cytology : Types of specimen , Processing , Fixation (fixatives used), Staining, advantages and application of diagnostic cytology

PART II

PHYSICS

Units and measurement : Units for measurement, CGS Unit , SI unit, Accuracy and errors in measurement, Significant figures

Motion in one, two and three dimensions: Distance and displacement, Speed and velocity, Acceleration, Equations of motion, Projectile motion, Uniform circular motion

Laws of Motion : Newtons laws of motion, Force, Inertia, Linear momentum and its conservation, Friction

Work, Energy and Power : Work, Energy, Different forms of Energy, Kinetic Energy, Potential energy, Conservation of energy, Power

Rotational motion : Centre of Mass, Angular momentum and its conservation, Torque, Principle of moments, Moment of Inertia, Rotational kinetic Energy

Gravitation : Mass and weight, Acceleration due to gravity and its variation with height and depth

Mechanics of solids and liquids : Elastic properties of solids, Stress, Strain, Hooke's law, Modulus of Elasticity, Fluid pressure, Pascal's law, Buoyancy, Surface tension, Viscosity, Capillary rise, Bernoulli's theorem and its applications

Heat: Measurement of temperature, Thermal expansion, Specific heat capacity, Latent Heat, Transfer of heat, Newton's law of cooling.

Waves: Longitudinal and transverse waves, Speed of wave motion, Reflection of waves, Echo.

Electrostatics: Electric charges and their properties, Coulomb's law, Electric field, Electric potential, Capacitance, Capacitors in series and parallel, capacity of a parallel plate capacitor

Current electricity : Electric current, Ohm's law, Resistance and resistivity, Resistance in series and parallel, Carbon resistors, Kirchoff's

Magnetism : Earth's magnetism, para, dia and ferromagnetic substances, Electromagnets and permanent magnets.

Electromagnetic induction: Faraday's law, Lenz's law, Eddy current, Self Induction, Mutual induction

Alternating current: AC generator, LCR circuit, Reactance, Impedance, Resonance, Transformer

Electromagnetic waves : Electromagnetic waves and their properties, Electro magnetic spectrum and their uses

Optics: Reflection, Refraction, Total internal reflection, Refraction through prism, Refraction through lens, Lenses in contact, Magnification, Power of lens, Dispersion, Scattering, Interference, Diffraction, Polarisation, Microscope, Telescope

Dual nature of matter and radiations: Photoelectric effect, Matter wave

Semiconductors: Conductors, insulators and semiconductors, Intrinsic semiconductors, Extrinsic semiconductors, Diode, Transistor

PART- III

CHEMISTRY

Periodic classification of elements - Earlier classifications - Modern Periodic law and Periodic Table - various groups in Modern Periodic Table

Classification of elements in blocks- Periodic properties and their variation along group and period with reason

Allotropes of Carbon - Diamond and Graphite their structure and properties

Compounds of Nitrogen -Ammonia and Nitric acid, compounds of sulphur -sulphuric acid

Lanthanoids and Actinoids-Interhalogen compounds

Types of water-Hardness of water-causes of hardness and its removal

Different atom models by J J Thomson, Rutherford, Neils Bohr-
Quantum numbers and orbital representation-orbit and orbital-
Electronic configuration and Auf-bau principle

Colloids and emulsions-type of colloids with examples-colloids
around us

Ores of different metals -methods of extraction of metals

VSEPR Theory and shapes of molecules

Seven crystal systems with examples

Different types of electrochemical cells

Different methods used for purifying organic compounds -
distillation, crystallisation, sublimation

Tests for alcohol, aldehydes, ketones, phenol

Molarity, molarity calculations

Mole concept calculations

Chemicals in food, medicines and as cleansing agents

Green house effect-acid rain

Different polymers with examples

Hydrocarbons-general formula -structural representation

PART - IV

BOTANY

1. Diversity in Living World

Biodiversity, Taxonomy, Taxonomic hierarchy, Binomial nomenclature, Tools for study of Taxonomy - Museums, Zoos, Herbaria, Botanical gardens

Biological classification -Five kingdoms, virus, viroids and lichen

Plant Kingdom - Brief classification of plants with examples

2. Structural Organisation in plants

Plant morphology - root, stem and leaf structure & modification, Flower morphology, floral diagram and floral formula of Fabaceae, Solanaceae and Liliaceae

Plant anatomy - Internal structure of plant, tissues, tissue systems, Primary structure of stem, root & leaf. Secondary growth in stem and root

3. Cell and cell division

Structure of plant and animal cell, various cell organelles and their function.

Biomolecules-structure and function of proteins, carbohydrates, lipid, nucleic acids; Enzymes-types, properties and mode of action .

Cell division-cell cycle,mitosis &meosis

4. Plant Physiology

Transport in plants -cell to cell transport, plant water relations, transport of water and minerals, transpiration and its mechanism, guttation and translocation of minerals.

Plant nutrition-classification of minerals in plants, their role, deficiency symptoms, nitrogen cycle, biological nitrogen fixation.

Photosynthesis-photosynthetic pigments, photochemical phase-cyclic and non cyclic photophosphorylation, biochemical phase-photorespiration, C₃ and C₄ cycles. Factors affecting photosynthesis.

Respiration-aerobic & anaerobic respiration, steps in cell respiration-Glycolysis,TCA Cycle, Terminal oxidation, energy relation and respiratory quotient.

Plant growth and development: Phases of plant growth; Differentiation, dedifferentiation and redifferentiation; Growth regulators-auxin, gibberellin, cytokinin, ethylene, ABA, Seed dormancy; Vernalisation and Photoperiodism.

Reproduction in flowering plants: Development of male and female gametophytes; Pollination - types, agencies and examples.Outbreedings devices; Double fertilisation; Post fertilisation events-Development of endosperm and embryo and seed ,Special modes - apomixis, parthenocarpy, polyembryony.

5 Ecology and environment

Organism and Environment:Environmental factors, Ecological levels-species,population & community, ecological adaptations. Population attributes-growth birth rate and death rate and age distribution. Population interactions.

Ecosystem: Structure and function, Productivity,energy flow, food chain, food web and ecological pyramids. Biogeochemical cycles, Ecological succession.

Environmental issues : Air, water, soil and noise pollution. Solid waste management,radioactive waste management. Green house and global warming ,ozone depletion.

Zoology

1 Animal Physiology

Animal nutrition and its type, food components, malnutrition, disorder related to nutrition. Human digestive system and process of digestion

Respiration :Respiratory organs,Respiration in man - mechanism and its regulation, gas exchange, respiratory volume and respiratory disorders

Circulation:Blood and its composition. Human heart -structure and working ,double circulation, ECG, circulatory disorders

Excretion:Structure and function of human kidney, osmoregulation, regulation of urine formation. Other excretory organs

Locomotion and Movements : Human skeleton , types of joint, Types of muscle and structure, Mechanim of muscle contraction and disorders

Nervous co- ordination : Human Nervous system -structure and function of brain and spinal cord ,nerve impulse transmission .Sensory receptors - structure and function of eye, ear and tongue.

Endocrine system : endocrine glands, hormones and their functions,hormonal imbalance and disorders.

Reproduction and development:Human male and female reproductive system, menstrual cycle, gametogenesis fertilisation and embryogeny. Placenta and its function.

2 Genetics and Evolution

Heredity and variation : Mendelian inheritance. Non -Mendelian inheritance-incomplete dominance, co-dominance, multiple alleles and polygenic inheritance, Sex determination. Mendelian disorders and chromosomal disorders.

Molecular basis of inheritance: Structure of DNA and RNA, Search for DNA as genetic material, Nucleosomes. Functions of DNA - replication, transcription and translation .Central dogma, genetic code. Gene expression and regulation -Lac operon.

Evolution : Origin of life ,Theories of evolution, evidence of evolution , Natural selection and example, types of selection, Hardy-Weinberg's principle and human evolution

3 Animal Kingdom

Salient features and classification of animals, non -chordates and chordates up to classes level. Morphology and internal structure of Earthworm, cockroach and frog.

4. Biology and Human welfare

Birth control measures, Assisted reproductive technologies, STD Common problems of adolescence, problem associated with drugs, smoking and alcoholism

5. Application Biology

Animal and plant breeding, Tissue culture, Biotechnology principles and its applications in agriculture and medicine. Biopatent, Biopiracy, biofertilizers, sewage treatment, biogas and biomedical technologies.

PART V

General Knowledge, CURRENT AFFAIRS & RENAISSANCE IN KERALA

Facts about India

Geography of India - Physical features - Climate - Soils - Rivers - Famous sites - etc.

Demography - Economic and social development - Poverty alleviation - Economy and planning - etc.

History of India - Period from 1857 to 1947 - National movement

Five Year Plans

Facts about Kerala

Geographical Facts - Physical features - Climate - Soils - Rivers - Famous sites - Economic and Social deve - Historical importance - etc.

Renaissance in Kerala

Important Events/Movements/Leaders

Brahmananda Swami Sivayogi, Chattampi Swami, Sree Narayana Guru, Vagbhatananda, Thycaud Ayya, Ayya Vaikundar, Poikayil Yohannan (Kumara Guru), Ayyankali, Pandit Karuppan, Mannathu Padmanabhan, V. T. Bhattathirippad, Dr. Palpu, Kumaranasan, Vakkom Moulavi, Blessed Kuriakose Elias Chavara, Etc.

Current Affairs

Important world, national and regional events related to the political and scientific fields, sports, cinema and literature etc.

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.