

FURTHER DETAILS REGARDING MAIN TOPICS OF
PROGRAMME No. 09/2020 (Item No: 30)

BLOOD BANK TECHNICIAN GRADE II
MEDICAL EDUCATION SERVICE

Category Number: 127/2018

BIOCHEMISTRY

Cleaning and care of Laboratory glasswares

Cleaning of Laboratory glassware and plasticware: describe various methods. Describe about different cleaning solutions. Preparation of chromic acid. Eg. for different cleaning solutions.

Preparation of solutions

Preparation of Normal, Molar and Percent solutions. Describe about the preparation of standard solution of oxalic acid, sulfuric acid, hydrochloric acid, sodium hydroxide, silver nitrate and potassium permanganate.

Collection of Biological specimens for analysis

Blood:- Describe about the collection of blood: venipuncture and capillary puncture. Mention about the various blood collection sites in children and adults.

Preparation of anticoagulated bulbs and tubes for blood collection: sodium fluoride, heparin, EDTA, citrate, oxalates.

Methods for separation of serum and plasma.

Blood collection by using vacutainers.

Urine:- Methods for collection of urine. Describe about various urine preservative.

Carbohydrates

Describe about the classification of carbohydrates: Monosaccharides, oligosaccharides and polysaccharides with examples.

Properties of glucose, fructose, sucrose, lactose and galactose. Define glycolysis.

Describe The Embden-Meyerhof pathway of Glucose metabolism.

Define Glycogenolysis and Gluconeogenesis.

Hormonal regulation of blood sugar.

Diabetes mellitus:- Classification of Diabetes mellitus: IDDM, NIDDM. New classification: type1, type2, other specific types and gestational diabetes.

Normal values of Blood sugar: FBS, PPBS, RBS. Diseases related to increased Bl. glucose value. Describe various estimations used for blood glucose.

G.T.T. various methods and interpretation.

Glycosylated Hb.(HbA1C): definition. Methods of estimation and Normal range.

Glycosuria- methods for detection

Pentosuria-methods for detection.

Lipids

Significance of Triglycerides.

Cholesterol synthesis. Role of liver in cholesterol metabolism. Different methods of estimation. Normal value and interpretation.

Plasma lipoprotein: LDL, HDL, VLDL and Chylomicrons. Lipid profile tests and normal values.

Ketone bodies: Describe Ketonemia and ketosuria.

Protein

Basic knowledge about the structure of proteins: Primary, secondary, tertiary and quaternary structure of protein.

Total protein and albumin estimation methods. Total protein normal value and interpretation.

Fractionation of protein by electrophoresis.

Describe the transaminase reactions.

Urine

Describe the methods for detection of specific gravity and pH reaction of urine.

Detection of abnormal chemical constituents like protein, sugar, ketone bodies, bile salts, bile pigments, blood and urobilinogen. Various tests for Bence Jones protein.

Estimation of VMA, 17-ketosteroid and 5-HIAA in urine.

Blood analysis

Estimation of Blood urea, uric acid, creatine, creatinine, calcium, phosphorus, sodium, potassium, bicarbonates, amylases, phosphatases, LDH and CPK in blood.

Urea and creatinine clearance tests.

CSF examination

Describe the physical and chemical examination. Estimation of chloride, sugar and protein in CSF.

Colorimetric analysis

Describe the principle of colorimetric analysis. Describe the working principle of spectrophotometer and fluorometer.

pH

Define pH. Describe various methods for pH detection. Describe Henderson and Hasselbalch equation.

Electrophoresis

Various methods. Separation of serum protein fractions . Normal and abnormal patterns.

Chromatography

Define. Describe various methods. Describe urine aminogram.

Quality control

QC in Biochemistry: only basics

MICROBIOLOGY

Sterilisation and Disinfection

Describe the various sterilization methods: dry heat, moist heat, filtration, radiation, ultrasonic and sonic vibrations.

Introduction to disinfection: Define. Describe various important disinfectants and antiseptics: alcohols, aldehydes, dyes, halogens, phenols, gases. Their action and application.

Medical microbiology

Morphological classification: based on shape of bacteria:- cocci, bacilli, vibrios, spirilla, spirochaetes, actinomycetes, mycoplasmas.

Growth requirements:- water, a source of carbon, oxygen, temperature, H-ion concentration, light.

Culture media

Describe the composition, preparation, pH adjustment, sterilization and storage.

Types of media are: simple, complex, synthetic or defined, enriched, enrichment, selective, indicator, differential, sugar, transport, aerobic and anaerobic media.

Important culture medias are : nutrient broth, peptone water, glucose broth, bile broth, nutrient agar, blood agar, MC conkeys agar, chocolate agar, Muller Hinton agar, alkaline peptone water, carry blair medium, L J medium, Loefflers serum, XLD agar, TCBS agar, Robertsons cooked meat medium.

Staining

Describe different methods of staining: simple, differential, special and negative staining.

Their principles, methods and application.

Important bacterial stains are: Grams stain, acid fast stain and modified acid fast stain.

Medically important bacteria

Describe about staphylococci, streptococci, pneumococci, meningococci, gonococci, corynebacteria, mycobacteria, enterobacteriaceae, spirochaetes, vibrios, pseudomonas, anaerobic spirochaetes, aerobic spore bearers, other anaerobic bacteria, mycoplasma, chlamydia.

Antibiotic susceptibility test

Describe about the antibiotics in common use. Preparation and storage of antibiotics for susceptibility test. Describe the different methods for sensitivity test: - diffusion test, dilution test (MIC and MBC estimation).

Specimen processing

Describe microscopy, culture, biochemical identification, serological identification, pathogenicity test and antibiotic sensitivity test.

Parasitology

Morphology and classification:- Protozoa and helminthes. Describe about protozoa, nematodes cestodes and trematodes. Describe about the morphology, life cycle and lab diagnosis of these parasites.

Processing of specimens in parasitology:- Microscopy-blood smear(thin and thick smear). Stool examination for parasites, parasitic ova, larva-their identification.

Concentration methods.

Mycology

Describe the classification of fungus: Yeast, yeast like, filamentous, dimorphic fungi. Enumerate the common contaminant fungi. Describe the morphology, cultural characteristics and methods for identification.

Describe the common diseases of fungal origin:- cutaneous, subcutaneous, submucous, systemic.

Opportunistic fungal infections.

Clinical mycology:- Describe the collection of specimens like swabs, biopsy materials, pus, blood, skin scrapings, sputum etc.

Stain:-Lactophenol cotton blue.

Processing of specimen:- Microscopy-KOH preparation, LPCB preparation, Gram stain, negative stain.

Cultivation:- Sabourauds dextrose agar, special solid media, slide culture in identification.

Virology

Describe the structure, classification of DNA viruses and RNA viruses. Describe the morphology, cultivation and identification of viruses.

Medically important viruses:- special emphasis on Hepatitis and HIV infections.

Clinical virology:-Collection of specimens- throat swab, throat washings, respiratory secretions, CSF, stool, specimens from skin lesions, biopsy materials etc. Describe the transportation of specimens. Special care in handling of specimens from patients with HBV and HIV infections.

Staining:-Fluorescent antibody techniques.

Virus isolation:- Animal embryo, eggs, cell culture. Describe virus inclusions in diagnosis.

Immunology

Describe immunology and immunity. Describe various antigen antibody reactions.

Serology:- Describe the principle, procedure and interpretation of agglutination (Widal, Weil-felix test, Paul-bunnell test, Coombs test.) Precipitation (Elek test, VDRL test, RPR card test) Neutralisation (ASO test.) Describe about fluorescent antibody test, ELISA.

PATHOLOGY

Blood banking

Describe about human blood group systems:- ABO, Rh ,P MNSs, Lewis, Luthern, li, Kidd, Duffy, Kell etc. Describe about subgroups of ABO system. Other variants of ABO blood group(Bombay blood group).

Describe ABO group of offspring from the various possible ABO mating.
ABO distribution among Indian population in percentage.

Rh blood group system:- Mention different Rh antigens. Rh typing methods (using complete and incomplete anti-D)

Coombs test:-Describe direct coombs and indirect coombs test. Their applications.

Rh-HDN :- significance. Prevention methods for Rh-HDN.

Antibody titration:- Describe the technique. Mention minimum required titre for anti-A, anti-B, anti-AB, anti-Rh(D) and Coombs sera.

Essential components in Blood bank:- Refrigerator, agitator, blood bank centrifuge, equipments in donors bleeding room and component separation room.
Tests on donor blood:-Describe grouping, cross matching and serological tests on donors blood.

Plasma and plasma substitutes:- Describe the preparation and storage of FFP, PRP and PPP.

Transfusion reactions:- Describe Immunological (immediate and delayed type), Non immunological(immediate and delayed type).

Donor selection criteria:-Describe the criteria for selection. Describe the Hb screening technique using Copper sulfate method.

Blood bank records:- briefly describe about the donor register, patient record, cross matching record, components register, issue register etc.

Histotechnology and cytology

Fixation:-Describe the purpose of fixation. Classification of fixatives according to ingredients, mode of action and materials used. Preparation and use of following fixatives: 10%of neutral formalin, formol saline, Zenkers acetic acid, Zenkers formalin, Carnoys fluid.

Methods of removing formalin pigment from sections.

Decalcification:-Different methods. Preparation of reagents used.

Microtomes:-Describe various microtomes with principle, working , advantages and disadvantages of Rotary, rocking, sledge, and freezing microtomes.

Microtome knives- different types. Sharpening and care of knives.

Preparation of paraffin sections:- Describe various stages in tissue processing (dehydration, clearing, infiltration). Different methods of embedding. Describe the principle and use of vaccum embedding.

Treatment of blocks before cutting.

Principle, operation and care of automatic tissue processors. Describe in detail about the recognition and correction of faults occurring in blocks and sections.

Defects of processing:- rectification of defects.

Staining:- Describe the principle of staining. Describe the principle, procedure and result of following **Stains:** Ehrlichs, Mayers, and Harris haematoxylin; Van Giesons stain, Reticulin stain, PAS, Perls Prussian blue, Rubanic acid, Masson Fontana, AFB stain, PTAH stain.

Basic principle of Immuno histo chemistry.

Frozen sections:- Describe about freezing microtomes. Principle and use of Freezing microtomes. Preparation of frozen sections and staining. Advantages of frozen sections. Describe about cryostat.

Cytology:- Describe the collection, preparation of smears , fixation, staining. Describe about PAP stain, Shorrs stain. Describe the Buccal smear preparation. Barr body demonstration.

Cytogenetics:- Define Karyotyping. Brief description about abnormal chromosomes.

Haematology

Describe about the composition of blood

Haematopoiesis: Describe about the development of red cells, leucocytes and thrombocytes- demonstration.

Normal and abnormal blood cell morphology. Their functions and identification.

Haemoglobin: Describe the structure, function of Hb.

Anaemia: classification of anaemia. Describe about the symptoms and lab diagnosis of IDA, sickle cell anaemia, thalassaemia, megaloblastic anaemia, pernicious anaemia, H. spherocytic anaemia.

Leukaemia: Describe the classification of lukaemia. Clinical symptoms and lab diagnosis of AML, ALL, CML, CLL and Multiple myeloma.

Blood coagulation and haemostasis: Describe the whole blood coagulation time, clot retraction test, clot lysis test, bleeding time, tourniquet test, one stage prothrombin time test, partial thromboplastin time test.

Collection of blood: Describe the Capillary and venous blood collection. Technique of collection by finger prick, earlobe incision, venepuncture. Method of collection from infants.

Anticoagulants: EDTA, Double oxalate, Heparin , Trisodium citrate etc.

PCV: Macro and micro methods in detail.

Calculation and interpretation of Red cell indices. Preparation and examination of thin and thick smear.

Staining: Describe Romanowsky stains. Preparation of Leishmans, Wrights, Fields and Simeons stain.

ESR estimation: Describe various methods.

Blood parasites: Describe about Malaria, Kala azar, Trypanosomes and Microfilariae.

Sickle cell preparation, LE cell preparation, Osmotic fragility test: principle, method and interpretation.

Clinical Pathology

Urinalysis: Physical, chemical and microscopical examination of urine in detail.

Stool examination: Chemical and microscopic examination in detail. Describe about the occult blood test in stool.

Sputum examination: Describe about the physical, microscopical examination of sputum.

Semen analysis: Describe about the Physical, microscopical and chemical examination of semen.

Pregnancy test: Describe about the Bio assays and Immunological assays for pregnancy detection.

CSF examination: Describe the Physical, chemical and microscopical examination of CSF.

Other body fluids: Describe about the pleural, pericardial, synovial and peritoneal fluid examination.

Differentiate between Transudate and Exudate.

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