

- 5.4 Ex-servicemen of Punjab Domicile shall be allowed to deduct the period of his service in the Armed Forces of Union from his actual age and if the resultant age does not exceed the maximum age limit prescribed for direct appointment to such a vacancy in the Service Rules concerned by more than three years, he shall be deemed to satisfy the condition regarding age limit.
- 5.5 The upper age limit is also relaxed up to 42 years for widows, divorcees and certain other categories of women.
- 5.6 The upper age limit is also relaxed up to 47 years for "Persons with Disability" of Punjab.

Note: Provisions mentioned in Punjab Civil Services (General and Common Conditions of Service) Rules, 1994 amended from time to time may be considered

6. PATTERN AND SCHEME OF COMPETITIVE EXAMINATION FOR SELECTION

6.1 PROCEDURE FOR SELECTION

The procedure for selection of candidates for the posts of Lecturer Medical Lab Technology (Group-A) (Subordinate Institutions) in the Department of Technical Education and Industrial Training, Government of Punjab will be as per the following details:-

Subject Matter	No. of Questions	Total Marks
Written Competitive Examination	120	480
Interview	-	60
Total Marks	-	540

The written competitive examination for the post will be scheduled soon.

6.2 PATTERN OF THE WRITTEN COMPETITIVE EXAMINATION

The pattern for written competitive examination comprising of 120 questions (@ 4 marks for each question) is as follows:

Sr.No.	Topic	No. of Questions	Marks (Each Question carries 4 marks)	Type of Questions
1.	Questions from the Subject (Part-A of Syllabus)	100	400	MCQs (Multiple Choice Questions)
2.	Questions from General Knowledge & Current Affairs, General Mental Ability, Logical Reasoning & Quantitative Aptitude. (Part-B of Syllabus)	20	80	
Total		120	480	

The important points to note:

- I. The Question Paper will be in English language only.**
- II. Each question carries 4(four) marks and, for each correct answer candidate will get 4 (four) marks.**
- III. There will be Negative Marking (One Mark for each question) in the written examination for questions wrongly answered i.e. for each in correct answer, 1(One)**

General Information regarding 06 posts of Lecturer Medical Lab Technology (Group-A) (Subordinate Institutions) in the Department of Technical Education and Industrial Training, Government of Punjab in the year of 2022

ANNEXURE (VIII)

PART-A

I--ANATOMY AND PHYSIOLOGY

- 1) Introduction to human body, its anatomy and physiological organization
- 2) Cell organization and function
- 3) Skeletal system-bones, joints and muscles
- 4) Blood morphology, chemistry and function-- Blood cells. Blood groups, Hb
- 5) Respiratory system- Lungs Volumes and capacities
- 6) Cardiovascular system Heart rate, cardiac cycle, blood pressure, Hypertension
- 7) Alimentary system-mechanism and physiology of digestion and absorption.
- 8) Excretion system- Structure of nephron, Urine formation
- 9) Male and female genital system
- 10) Central Nervous System Sensory, Sympathetic & Parasympathetic
- 11) Endocrine Glands & Hormones- Their secretion and functions
- 12) Skin-Function & Structure
- 13) Special Senses - Eye, Ear and Nose (in brief)

II-CLINICAL MICROBIOLOGY

- 1) Introduction & brief history-definition, history (Louis Pasteur, Robert Koch, Joseph Lister, Paul Ehrlich), Safety measures in Microbiology
- 2) Care and maintenance of laboratory equipments (including glassware)
- 3) Principles, functioning, care of microscopes ie. Monocular/Binocular microscope, Dark ground microscope, Phase contrast microscope, Fluorescent microscope and Electron microscopes.
- 4) Sterilization and Disinfection principles - Physical & Chemical Agents, Antiseptics and Disinfectants
- 5) Growth and Maintenance of Microbes- Bacterial division, Bacterial growth & nutrition
- 6) Culture Media-Definition, uses, classification, Transport Media, Anaerobic Media,
- 7) Staining Methods- Principles of staining methods -Simple, Grams, ZN, AFB, Negative
- 8) Collection and Transportation - Principles, Containers, Samples- Urine, Faeces, Sputum, Pus, Body fluids, Swab, Blood.
- 9) Disposal of Laboratory/Hospital Waste-- Non-infectious, Infected sharp and non

General Information regarding 06 posts of Lecturer Medical Lab Technology (Group-A) (Subordinate Institutions) in the Department of Technical Education and Industrial Training, Government of Punjab in the year of 2022

sharp waste disposal, Disposal of contaminated material.

- 10) General Characteristics and classification of Bacteria
Morphology- Shape, Capsule, Flagella, Spore. Motility test.
- 11) Morphology, culture characteristics, biochemical reactions, pathogenicity, lab diagnosis and antimicrobial sensitivity testing of-Staphylococci, Streptococcus. Neisseria, Corynebacterium, Mycobacterium, Enterobacteriaceae family. Pseudomonas, Vibrio, Bacilli & Clostridium, non sporing anaerobes, Spirochaetes.
Mycoplasma.
- 12) Medical parasitology-Introduction, Collection, preservation and processing of-stool. blood, fluids.
- 13) General characters & classification of protozoa and helminths.
- 14) Morphology, lifecycle, pathogenicity and lab, diagnosis of-Entamoeba histolytica. Giardia intestinalis, Plasmodium, Ascaris, Ancylostoma
- 15) Mycology-Morphology, Classification & Cultivation of fungus, Lab diagnosis of Cutaneous, Sub-cutaneous and Systemic Mycosis (in brief), Opportunistic fungal infections, Common Laboratory Contaminants.
- 16) Immunology & Serology-Immunity, Principles of Innate & Acquired immunity.
Immune

Response-Humoral & cell mediated, Antigen- Definition, Types, properties. Antibodies/Immunoglobulins- Definition, Properties, Sub types.
- 17) Features of Antigen-Antibody Reactions-Precipitation, Agglutination, Complement fixation test, Neutralization, Flocculation, Hyper sensitivity - Auto immune disorders
- 18) Medical Virology- Introduction, Nomenclature, Classification of viruses
- 19) General properties of viruses including Size, shape, symmetry Cultivation of viruses and antiviral agents, Brief Knowledge about- Rabies, Polio virus, Pox viruses. Hepatitis Viruses, HIV, Arbo viruses (dengue), Influenza
- 20) Preservation of microbes and lyophilisation methods, Total and viable counts of Bacteria, Testing of disinfectants-Rideal-Walker, Chick-Martin and In-use tests
- 21) Nosocomial infection, Bacteriological examination of water, milk and air.
- 22) Lab Diagnosis of common bacterial infection viz: Pyogenic infections. Respiratory tract infections, Meningitis, Diphtheria, whooping cough, Food-poisoning, Enteric fever, Urinary tract infection, Leprosy, Typhus fever, Syphilis. Gonorrhoea and other STD's
- 23) Serological tests:- Widal, ASO, LFT, CRP, Rosewaller, VDRL
- 24) Automation in Microbiology. Advanced techniques in microbiology-ELISA, RIA CCIEP Co-agglutination GLC HPLC etc..

III-HAEMATOLOGY AND BLOOD BANKING

- 1) Introduction Lab safety and instrumentation
- 2) Composition and functions of blood and formation
- 3) Anticoagulants, their uses, mode of action

General Information regarding 06 posts of Lecturer Medical Lab Technology (Group-A) (Subordinate Institutions) in the Department of Technical Education and Industrial Training, Government of Punjab in the year of 2022

- 4) Physiological variations in Hb. PCV. TLC. MCV MCH MCHC and platelets (Normal and absolute values in haematology.)
- 5) Hemoglobinometry- methods of estimation, errors involved and standardization of instruments
- 6) Haemocytometry- procedures for cell counts, visual as well as electronic red cell leucocytes and platelet counts Errors involved and mean to minimize such errors.
- 7) Romanovsky dyes, preparation and staining procedures of blood smears.
- 8) Morphology of normal blood cells and their identifications.
- 9) ESR-factors influencing ESR procedures for estimation & their significance
- 10) Hematocrit value by macro and micro methods their merits and demerits.
- 11) Physical, chemical and Microscopic Examination of urine
- 12) ABO and Rhesus blood group system. Principal of Blood grouping. Blood grouping techniques.
- 13) Compatibility tests in blood transfusion, Lab investigations of transfusion reactions and mismatched transfusions, prep of packed cells and various fractions of blood for transfusion purpose.
- 14) Hemoglobin- synthesis functions and degradation LE cell phenomenon, Foetal haemoglobin, Plasma Haemoglobin
- 15) Anaemias Definition and classification, Laboratory investigation for megaloblastic anaemia, iron deficiency anaemia and haemolytic anaemia. Leukemia-definition and classification, Haemopoietic disorders, Stainings
- 16) Hemostasis-Definition. Basic concept and principle.
- 17) Coagulation-Basic Physiology, coagulation factors, Regulators of blood coagulation, Bleeding Time-Duke's method, Clotting Time- Capillary tube method & Lee white's method, PT, aPTT, TT, Clot retraction time, Determination of fibrinogen.
- 18) Bleeding disorders-Platelet disorder(Platelet function tests)-Thrombocytopenias-causes including aplastic anemia, -DIC(Laboratory test for assessing bleeding disorders and disseminated intravascular coagulation), ITP,- Hemophilia
- 19) Mechanism of fibrinolysis-tests for fibrinolysis
- 20) Screening donor's blood for infectious agents HIV, HCV, HBV, Treponema palladium, Plasmodium and bacterially contaminated Blood

IV-HISTOPATHOLOGY AND CYTOLOGY

- 1) Terminology-Histology, Histopathology, Biopsy, Autopsy, Autolysis, Putrefaction
- 2) Compound microscope-optical system, magnification and maintenance.
- 3) Reception, recording, labeling and preservation of histological specimen
- 4) Fixation- Fixatives- classification & their Composition
- 5) Preparation of Tissue- Paraffin embedding and embedding media.
- 6) Decalcification- Process, Types, mechanism & advantage

General Information regarding 06 posts of Lecturer Medical Lab Technology (Group-A) (Subordinate Institutions) in the Department of Technical Education and Industrial Training, Government of Punjab in the year of 2022

- 7) Microtomy-Microtome types - Working principle, care and maintenance
- 8) Microtome Knives- types, Sharpening of knives (Honing-Stropping) Automatic Knife sharpener-uses, care and maintenance, Use of abrasives and lubricants
- 9) Section Cutting-Rough& Fine, cutting faults and remedies, Tissue floatation bath,
- 10) Theory of staining (Routine), Mountants and types of mounting media
- 11) Dye Chemistry- Principle and mechanism of routine stain (Haematoxylin and Eosin) Various steps of staining (Haematoxylin and Eosin)- Deparaffinization, Hydration, Nuclear Staining, Differentiation, Blueing, Counterstaining, Dehydration, Clearing and Mounting, Results
- 12) Definition- Solvents, Mordants, Accelerators, Metachromasia (brief), Use of controls in staining and their significance
- 13) Frozen Section- Reception and processing of frozen tissue, Freezing microtome cryostat- Working, care & Frozen section cutting
- 14) Microscopy- working principle, maintenance and applications of various types of microscopes -Dark ground microscope, Polarizing microscope, Phase contrast microscope, Interference microscope, U.V. light microscope. Micrometry.
- 15) Principle, significance and interpretation of stains-PAS, Silver impregnation Stain Reticulin fibre, ZN-for AFB and Leprae, Masson's trichrome stain, Pearl's Prussion Blue- Iron, Oil Red O-fat, Gm stain.
- 16) Exfoliative Cytology-Introduction, Preparation of vaginal & cervical smears,
- 17) Fixation (Cytological Specimen) - Definition, Various types of Cytological fixatives Cytological special stains Principle, procedure & Interpretation of- PAS& ZN Stain
- 18) Aspiration Cytology - Principle & Uses of FNAC (Fine Needle Aspiration Cytology). Staining Techniques-MGG, PAP Stain, H&E Stain
- 19) Museum Techniques- Introduction to museum- Reception, fixation and processing of various museum specimens, Preparation of mounting solutions, and Care of mounted specimen, cataloguing of museum specimen
- 20) Autopsy-Introduction to autopsy technique and its use

V-CLINICAL BIOCHEMISTRY

- 1) Introduction to biochemistry - Definition & Importance, SI Units and their use
- 2) Volumetric apparatus and their calibration
- 3) Cleaning of laboratory glass and plastic ware-Different cleaning agents (soaps, detergents, chromic acid)
- 4) Important instruments-principle, working, handling and care of - Balance (Analytical, electrical/electronic), Centrifuge, Calorimeter, Spectrophotometer, Ion selective electrodes, Glucometer, Flame photometer, pH meter
- 5) Anticoagulants-Definition, Types, Uses, Merits and Demerits
- 6) Blood fractions - Preparation of Serum and Plasma, Different protein precipitating Reagents, Preparation of protein free filtrate (PFF)

General Information regarding 06 posts of Lecturer Medical Lab Technology (Group-A) (Subordinate Institutions) in the Department of Technical Education and Industrial Training, Government of Punjab in the year of 2022

- 7) Collection and preservation of clinical specimens - Blood, Urine, Stool. Other Body Fluids
- 8) Blood glucose/ sugar estimation, screening test and glucose tolerance test (GTT) –Reference values. True and apparent sugar, Renal threshold, Importance of ST/GTT
Clinical importance of blood sugar, ST/GTT
- 9) Blood urea -Formation and excretion of urea, Principle and procedures of different methods of urea estimation, Reference values, Clinical Importance
- 10) Serum Creatinine - Principle and procedure of various estimation methods, Reference values, Clinical importance
- 11) Serum proteins- Definition and types, Principle and procedure of various estimation methods. Reference values, Clinical importance
- 12) Electrolytes and trace elements- Functions of electrolytes (Na⁺, K⁺, Cl⁻, Ca²⁺, Fe²⁺) their metabolism, Principles and procedures of estimation of Na⁺, K⁺, Cl⁻ Reference values, Clinical importance.
- 13) Uric Acid- Principles and procedures various estimation methods, Reference Values Clinical Importance
- 14) Serum Bilirubin - Formation and excretion of bilirubin and bile pigments, Conjugated and unconjugated bilirubin, Principle and procedures of serum bilirubin estimation (Direct & Indirect), Reference values, Clinical importance.
- 15) Urinary Proteins and Creatinine - urinary proteins and creatinine estimation. Reference Values, Clinical importance
- 16) SGOT and SGPT-Principle and procedures of estimation, Reference values, Clinical importance
- 17) ALP and ACP- Principle and procedures of estimation, Reference values. importance
- 18) Serum Amylase-Principle and procedures of estimation, Reference values. Clinical importance
- 19) Renal Function Tests - Renal clearance test-Principle and procedures, Clinical importance
- 20) Serum Calcium and Phosphorus -Principle and procedures of estimation, Reference Values, Clinical importance
- 21) Lipid Profile- Formation of cholesterol, HDL and LDL cholesterol, Principles and procedures of estimation, Reference value, Clinical importance, Triglycerides, Estimation and importance of various ratios of HDL, LDL and VLDL
- 22) Urine Analysis- Normal composition of urine, Clinical importance of urine analysis, Qualitative analysis of proteins, sugar, bile salts, bile pigments, urobilinogen and Blood, Glycosuria and Albuminuria, Ketone bodies, 17 Ketosteroids
- 23) Stool Chemistry- Physical characteristics and chemical composition of stool. Significance of presence of blood and excess fat in stool, Occult blood detection
- 24) Cerebrospinal Fluid-Composition and functions of CSF, Methods of determination of proteins, sugar and chloride in CSF, Reference Values, Clinical importance
- 25) Biological fluids-composition and significance of biological fluids (peritoneal pleural, synovial, ascitic fluid and gastric juice)

- 26) Electrophoresis-Theory, Principle and procedure of paper, gel electrophoresis, method of elution, Clinical importance
- 27) Chromatography- Theory of Chromatography, separation between stationary and Mobile phases, Principle and procedure of Paper chromatography & Importance
- 28) Thyroid function tests- Functions of thyroid, Principle, reference values and clinical Importance of T3, T4 and TSH
- 23) Quality Assurance in Biochemistry as per National Standards
- 30) Automation in Biochemistry- Introduction, meaning, advantages, Auto analyzers-basic features, types, semi automated, fully automated, RIA and ELISA

PART-B

General Knowledge, Logical Reasoning & Mental Ability

(a) General Knowledge & Current affairs

General Knowledge and Current affairs of National and International importance including:

- (i) Economic issues.
- (ii) Polity issues.
- (iii) Environment issues.
- (iv) Geography.
- (v) Science and Technology.
- (vi) Any other current issues.
- (vii) (a) History of India with special reference to Indian freedom struggle movement.
- (b) History of Punjab- 14th century onwards.

(b) Logical Reasoning, Mental Ability & Quantitative Aptitude.

- (i) Logical reasoning, analytical and mental ability.
- (ii) Basic numerical skills, numbers, magnitudes, percentage, numerical relation appreciation.
- (iii) Data analysis, Graphic presentation charts, tables, spreadsheets.