

No.A.12011/13/2024-MPSC (DR-II)
MIZORAM PUBLIC SERVICE COMMISSION
Mizoram New Capital Complex, Aizawl

Dated Aizawl, the 9th July, 2024

Advertisement (Group 'B' Non-Gazetted Post) No.5 of 2024 – 2025

The under mentioned vacant posts can be applied online on the Mizoram Public Service Commission's online portal <https://mpsconline.mizoram.gov.in> till **09/08/2024**. Recruitment to the following posts will be done through common competitive examination with similar questions in non-technical subjects i.e. Paper - I & II but separate questions in technical subjects i.e. Paper-III & IV for each post.

Applications not submitted will be ignored even if payment for application is made, therefore, applicants must verify if their application is submitted after the payment is completed.

Name and No. of Post	Name of Department	Pay Level in the pay Matrix	Education and other qualifications required
Laboratory Technician-2 (Two) Posts	Health & Family Welfare	Level 6	B.Sc in Medical Laboratory Technology from recognized Institution.
Junior Engineer (Civil) -2 (Two) Posts	Horticulture	Level 7	1. 3 (three) years Diploma in Civil Engineering from recognised institution. 2. Proficiency in Auto CAD
Junior Engineer (Contract Basis) (Electrical) - 4 (Four) Posts	Power & Electricity	Level 7	High School leaving Certificate or Equivalent with 3 years, Diploma course in Electrical from the Government's recognised Institute.
Surveyor -15 (Fifteen) Posts <i>1(one) post reserved for PwBD i.e Locomotor disability including cerebral palsy, leprosy cured, dwarfism, acid attack victims and muscular dystrophy</i>	Land Revenue & Settlement	Level 6	Bachelor's Degree who have completed 1 (One) year survey course
Sign Language Interpreter - 1 (one) Post	Social Welfare, Tribal Affairs, Women & Child Development	Level 8	1. Graduate from a recognised university with diploma in Sign Language from a recognized centre (RCI approved) 2. Working experience in disability sector for a minimum of 1 (one) year
Extension Officer (HTH) - 5 (Five) Posts	Commerce & Industries	Level 6	HSSLC with 3 years Diploma Handloom / Textile / Handicraft / Garment / technology from a recognized University / Institution

1. Common eligibility criteria:

i) Age Limit:

A candidate must not be less than 18 years and not more than 37 years of age on the last date of application (the upper age limit is applicable till December, 2024 as per the Government of Mizoram Gazette Notification vide No. A. 12018/31/2020-P&AR (GSW) dt.10.03.2023 and published in the Mizoram Gazette extra ordinary issue No. 134 dt.14.03.2023). Further relaxation to the upper age limit will be as per Notification No.A-12011/1/2019-P&AR (GSW) dt.3.6.2019 (published in the Mizoram Gazette Extraordinary, Issue No. 375 dt.10.6.2019) as amended from time to time. For age proof documents, HSLC/HSSLC Certificates which clearly shows the candidate's date of birth shall be accepted. In the absence of date of birth in such certificates, the relevant documents issued by the competent authority may be accepted.

ii) Mizo Language Proficiency:

A candidate must achieve a minimum score in the qualifying test of Mizo Language Proficiency as prescribed by the Government from time to time. However, a candidate who studied Mizo subject in Class-X standard (HSLC) or above within Mizoram or who opted for Mizo subject as MIL outside Mizoram is exempted from taking the qualifying test paper (Reference: the Mizoram Gazette Notification vide No.A-11019/1/2021-P&AR (GSW) dt.09.04.2024 issue No.247).

iii) Computer Proficiency:

Computer Proficiency as prescribed by the Mizoram Group 'A', 'B' and 'C' posts Service/Recruitment (Amendment) Rules, 2023 notified vide No. A.12018/31/2020-P&AR (GSW) dated 10.03.2023 respectively. (Details can be seen on MPSC website).

Documentary support to prove all eligibility conditions should not be dated later than the last date of application.

2. Disqualification :

- (i) Canvassing by a candidate directly or indirectly will disqualify his/her candidature.
 - (ii) Particulars/Details to be mentioned in the application should be completely and correctly stated. Any application not specifying the required information of a concerned candidate shall be liable to be rejected.
 - (iii) Any candidate who, on verification at any stage of the recruitment process, does not fulfil any of the eligibility conditions will be disqualified.
3. Government servants will have to apply through proper channel.
 4. **Syllabus** for the examination are available for download on the Commission's official website <https://mpsc.mizoram.gov.in> and placed alongside this Advertisement.
 5. Any other information pertinent to this advertisement will be published on the Commission's official website.

In case of queries/clarification regarding their applications, candidature, etc. candidates may contact MPSC's Helpline No. 0389-3596493 on working days between 10:00am and 4:30pm.

Sd/-ZOSANGZUALI PACHUAU
Controller of Examinations

Copy to:-

1. Sr.PPS to Chairman, Mizoram Public Service Commission, Aizawl.
2. PPS/PS to Members, Mizoram Public Service Commission, Aizawl.
3. PA to Secretary, Mizoram Public Service Commission, Aizawl.
4. The Secretaries to the Govt. of Mizoram, H&FW, Horti, P&E, LR&S SWTA&WCD and C&I Departments with reference to the letters No. A.32015/2/2023-HORT dt.8.9.2023 No.A12026/1/2023-P&E dt.15.03.2024 NO.A.32014/5/2022-REV dt.17.5.2024 No.A.11013/31/2011-SWD dt.10/04/2024 No.A.11013/34/2012-SWD dt.18/09/2023 No. A.12025/12/2022-C&I dt.7/06/2024 respectively.
5. All Administrative Departments, Govt. of Mizoram.
6. All Heads of Departments, Govt. of Mizoram.
7. Deputy Commissioners, Aizawl / Lunglei / Siaha / Champhai / Kolasib / Serchhip / Lawngtlai / Mamit / Saitual / Khawzawl / Hnahthial with two spare copies each. One copy should be displayed in the Notice Board.
8. Resident Commissioner / Additional / Joint / Deputy / Asst. Resident Commissioners, Mizoram Houses – New Delhi / Kolkata / Mumbai / Guwahati / Shillong / Silchar / Bengaluru with two spare copies each for display in the Notice Board of Mizoram Houses.
9. District Employment Officer, Aizawl, Lunglei, Siaha, Champhai, Kolasib, Serchhip, Lawngtlai and Mamit with two spare copies each for display in the Notice Board.
10. All Officers, Mizoram Public Service Commission.
11. All Sections, Mizoram Public Service Commission.
12. Confidential Cell, Mizoram Public Service Commission, with 2 spare copies.
13. I.T. Cell, Mizoram Public Service Commission for uploading on the website.
14. Notice Board.
15. Guard File.



(VANLALTANPUIA)
Jt. Controller of Examinations

Syllabus for Direct recruitment to the Posts of Lab. Technician, Junior Engineer (Civil), Junior Engineer (Electrical), Surveyor, Sign Language Interpreter and Extension Officer (HTH) vis-a-vis Advertisement (Group 'B' Non-Gazetted Post) No.5 of 2024 – 2025 under Mizoram Public Service Commission

The examination shall comprise of the following Papers.

1) Paper – I : General English	: 100 Marks (3 hours)
2) Paper – II : General Knowledge (MCQ)	: 100 Marks (2 hours)
3) Paper – III : Technical Subject (MCQ)	: 200 Marks (2 hours)
4) Paper – IV : Technical Subject (MCQ)	: 200 Marks (2 hours)
Total of Written Examination	: 600 Marks
5) Personal Interview	: 80 Marks
Total	: 680 Marks

Syllabus on Papers I & II shall be common for all the Posts mentioned in the Advertisement referred above. However, syllabuses on Technical subjects for the said posts are disparate and based on education qualification required for each post. Besides, except for the post of Extension Officer under Commerce & Industries Department all other posts have Technical Paper – IV in their respective syllabus.

DETAILED SYLLABUS:

1) General English: 100 Marks (3 hours)

The detailed syllabus in General English paper shall be similar to that of the General Competitive Examinations.

2) General Knowledge (MCQ): 100 Marks (2 hours)

- (a) Current events of state, national and international importance : 12 marks
- (b) History of India and Indian National Movement : 12 marks
- (c) Indian and World Geography - Physical, Social, Economic Geography of India and the World : 12 marks
- (d) Indian Polity and Governance - Constitution, Political System, Public Policy, Duties & Rights Issues : 12 marks
- (e) Economic and Social Development, Sustainable Development, Poverty, Inclusion, Demographics, Social Sector initiatives, and other related issues : 12 marks
- (f) General issues on Environmental Ecology, Bio-diversity and Climate : 12 marks
- (g) General Science : 12 marks

The topics listed above shall cover the State of Mizoram wherever applicable.

- (h) General awareness on Mizo culture, its heritage and society : 16 marks

Syllabus for direct recruitment to the post of Laboratory Technician under Health & Family Welfare Department

PAPER – III (Technical Subject) (100 MARKS) (MCQ - 2 Hours)

Unit – I	Anatomy and Physiology	10 Marks
Unit – II	Biochemistry (Principles, Metabolism, Analytical Biochemistry, Applied Biochemistry)	40 Marks
Unit – III	Microbiology, (Basic Microbiology, Microbial technique, Bacteriology, Mycology, Immunology, Serology & Virology, Molecular Biology, Applied Microbiology)	40 Marks
Unit – IV	Parasitology	10 Marks

PAPER – IV (Technical Subject) (100 MARKS) (MCQ – 2 Hours)

Unit – I	Pathology & Clinical Pathology, Basic Laboratory Technique & instruments.	20 Marks
Unit – II	Hematology i) Basic, Technique, Systemic ii) Blood Banking & Immunohematology	40 (30 + 10) Marks
Unit – III	Histopathology (Basic, Technique)	30 Marks
Unit – IV	Cytopathology (Basic, Technique)	10 Marks

DETAILED SYLLABUS

Paper – III (Technical Subject) (Full Marks - 100) (MCQ - 2 Hours)

Unit – I **Anatomy & Physiology **(10 Marks)****

- a) Musculo skeletal system
 - Bones :- types, structure and functions
- b) Digestive System:-
 - Gross anatomy of digestive organs
 - Physiology of Digestion
 - ❖ Digestive juices – Secretion, Composition and functions
- c) Respiratory System:-
 - ❖ Gross anatomy of respiratory organs
 - ❖ Physiology of respiration
 - ❖ Oxygen and Carbon dioxide transport

- d) Cardiovascular System :-
- ❖ Gross anatomy of heart and blood vessels
- e) Excretory System:-
- ❖ Gross anatomy of excretory organs
 - ❖ Function of Kidneys, mechanism of urine formation.
 - ❖ Structure and function of Kidney
- f) Reproductive System:-
- ❖ Gross anatomy of Male & Female reproductive organs
 - ❖ Physiology of menstruation
- g) Cerebro spinal fluid
- ❖ Formation, composition of CSF
- h) Endocrine System:-
- ❖ Gross anatomy of endocrine organs
 - ❖ Brief description of Endocrine hormone and their functions.

Unit – II Biochemistry (40 marks)

- a) Introduction and scope of Biochemistry, cleaning and care of laboratory glass ware and equipments, preparation and storage of Distilled water, Analytical balance, calorimeter, spectrophotometer, pH Meter, flame photometer, S.I. unit of measurement, Preservation and disposal of biological sample, Basic statistics – mean, median, modes, SD, CV, normal reference ranges. Acid and base, pH, buffer solution, indicator, standard solution, storage of chemicals, water, electrolytes, acid base balance
- b) * Carbohydrate, Lipids, Proteins – Classification, Properties, Biological importance, functions.
- Amino acids, nucleic acids, Enzymes, Co–enzymes – Definition, classifications, Biological role/importance.
- c) Glycolysis, TCA–cycle, Electron transport chain, Pentose Phosphate Pathway, Glyconeogenesis, Gluconeogenesis, Cori–cycle, Blood sugar and its regulation.
- d) Fatty acid, cholesterol, lipoproteins, Purine ribonucleotide – Biosynthesis, utilization, Ketone bodies formation and its utilization.
- e) Amino acids, vitamins, mineral – classification, Biological role, deficiency state.
- Transamination, Deamination, Biological importance of catecholamine, GABA, Serotonin, Histamine, Melanin.
- f) * Tumour – markers – Brief history, classifications, clinical applications, Laboratory test (AFP, CEA, PSA)
- Liver function test, renal function test.
 - Thyroid function test, Enzymes and co–enzyme in diagnosis of the diseases, Hormone analysis.
 - Cardiac function test
 - Qualitative test for – Carbohydrates, lipids, proteins, Bence Jones's Protein
 - Estimation of Serum electrolytes, and bicarbonates Blood sugar

- Quantitative test for organic constituent (Urea, uric acid, creatinine) inorganic constituent (sodium, Potassium, calcium, ammonia, chloride, Phosphate, bicarbonate and sulphate in urine with clinical significance and study of abnormal constituent or urine (glucose, Protein ketone bodies, blood, bile salt, bile pigments).

g) * Radio Immuno Assay (RIA)

- Enzyme Link Immuno sorbent Assay (ELISA)
- Chromatography (thin layer paper, gas, liquid Electrophoresis, (gelectrophoresis, liquid electrophoresis)

Unit - III Microbiology - (40 marks)

a) * Introduction, brief history of Microbiology, origin of microbial life – theory of spontaneous generation.

*Safety measures in microbiology

- Classifications and nomenclature of bacteria (five kingdom concept)
- Sterilization – Principle, methods, antiseptic, disinfectants.
- General characteristic of Bacteria, anatomy of bacteria (shape, size, components)
- Growth and nutrition of bacteria, classification of bacteria on the basis of nutritional requirements, measurement of cell mass and factor affecting growth.
- Cultivation of microbes (Bacteria)
- Culture technique (media preparation and inoculation)
- Isolation of Pure cultures (streak plate, spread plate, pours plate and serial dilution)
- Identification of microbes by colony morphology.

b) Bacteriology, Normal Micro flora of human body, Germ theory of diseases, microbial infection (types, sources and transmission)

- Bacterial toxin (Endotoxin & exotoxin)
- Bacterial morphology, isolation, identification, Pathogenicity, Lab diagnosis (Culture, Biochemical test, Hanging drop method for motility, Anaerobic, aerobic culture methods of staphylococcus, streptococcus, Neisseria Gonorrhoea, N. meningitidis, Clostridium tetani & C. perfringens)
- E.coli, Vibrio cholera, Salmonella typhi, Shigella, Mycobacterium / Mycobacterium tuberculosis, Spirochetes – Treponema pallidum.
- Collection, preservation, transportation of clinical specimens for microbial investigation.
- Bacteriological methods of examination of blood, faeces, pus, sputum, throatswab and urine
- Antibiotic sensitivity test (Disc diffusion and broth dilution methods)
- Hospital acquired infections and their control.

- Waste disposal and management
- c) Instruments & Glass ware:
- Autoclave, Incubator, Laminar Airflow,
 - Hot air oven, water bath, vortex shaker,
 - Petri dish, test tube, screw cap tube, glass spreader/ L-rods, Pasteur pipettes.
- d) Medical Mycology:
- Classification and nomenclature of fungi
 - General characteristics, structures, reproduction, cultivation
 - Medically important Division of fungi
 - Morphology, culture characteristics, Pathogenicity, Lab diagnosis of Common Pathogenic fungi, (Aspergillus Sp., Candida Sp., Cryptococcus Sp., Dermatophytes, Penicillium Sp.)
- e) Immunology
- Introduction, Antigens (Types and properties) Antibodies/ Immuno globintypes and properties)
 - Antigen – antibody reactions and their applications (Agglutination,precipitation, complement fixation and neutralization tests)
 - Immunity (Innate & Acquired)
 - Hypersensitivity
 - Immunodeficiency diseases
- f) Serology
- Quality control measures in serology
 - Common serological technique and their applications (VDRL, Widal, RA test,ASO, Pregnancy test, Hbs Ag and HCV, HIV, mantoux test)
- g) Medical Virology
- Classification, nomenclature, general characteristics (Morphology, chemical,biological properties and multiplication)
 - Cultivation of viruses (chick embryo, cell culture and animals)
 - Bacteriophages (lytic and lysogenic cycles)
 - Morphology, cultural characteristics, Pathogenicity and Laboratory diagnosisof the following viruses
 - ❖ Poliomyelitis
 - ❖ Mumps
 - ❖ Measles
 - ❖ Hepatitis A,B,C
 - ❖ Cytomegalovirus
 - ❖ Rabies
 - ❖ HIV/AIDS
- h) Molecular Biology
- Introduction
 - DNA & RNA

- Isolation of DNA (Genomic & Plasmid)
- Plasmids (types and Importance)
- i) Principles, methods and application of
 - ELISA, Immunofluorescence test, Western Blot
 - PCR

Unit - IV Parasitology (10 marks)

- a) Introduction, classification, characteristics of human parasites
 - Collection, storage and transportation of specimens, preservation of parasites
 - Morphology, transmission, life cycle, Pathogenicity and Lab. Diagnosis of :-
 - ❖ Entamoeba histolytica, Giardia Lamblia, Trichomonas vaginalis, Leishmaniadonovani and L. tropica. Plasmodia species, Toxoplasma gondii, nematodes- Intestinal flukes, Blood flukes, Lung flukes, Liver fluke.
- b) Common vectors of human diseases (mosquito, flies, ticks and fleas)

PAPER – IV (Technical Subject) (Full Marks – 100 Marks) (MCQ - 2 Hours)

Unit – I: Pathology & Clinical Pathology , Basic Lab. Techniques & Instruments (20 Marks)

- (a) Pathology – definition, Branches
 - Acute and Chronic inflammation (definition, characteristics)
 - Sub acute, granulomatous inflammation (definition, characteristics)
 - Changes in inflammation
 - Chemical mediators of inflammation
- (b) Cell Injury
 - definition, causes, Ischaemia, necrosis
 - apoptosis, degeneration, dehydration
- (c) cellular adaptation of growth and differentiation (Atrophy, Hypertrophy, Hyperplasia, Metaplasia, Dysplasia, Anaplasia)
- (d) Neoplasia (Benign and Malignant, definition, characteristics, etiology, spread)
- (e) Cell of Immune System (B&T lymphocytes, macrophage, dendritic and langerhan’s cells, NK Cells)
- (f) Laboratory organization, role of laboratory technicians and responsibilities, safety measures, instruments, reporting and recording, common laboratory accidents and its preventions, handling of infectious materials, preventions and disposal, reagents and its

storage.

(g) Routine examination and clinical significant of –

- Urine
- Stool
- Body fluids (Ascitic fluid, pleural fluids, pericardial fluid, synovial fluids, CSF, seminal fluids, sputum)
- Medico legal importance of semen analysis and abnormal morphology of sperm

Unit – II: (i) Haematology
(30 Marks)

(a) * Introduction to haematology

* Blood – components, collection, anticoagulants, preparation of smears & quality

* Haemoglobin, TLC, DLC with absolute count, WBC, Red cell indices, Reticulocytes (methods of estimation, clinical significant)

* Erythropoiesis, Granulopoiesis, Megakaryopoiesis (normal, abnormal & clinical significant)

* Blood parasites, bone marrow smears

(b) * Haemoglobin (normal and abnormal, Biosynthesis, Haemoglobinopathies and its investigation)

(c) RBC – structure, erythropoietin, functions

(d) WBC – Physiology, pathological variation

(e) Platelets – functions, purpuras, investigation of disorders, thrombocytosis, thrombocytopenia

(f) Haemostasis (Coagulation) – Normal mechanism, abnormal, investigation of abnormal haemostasis)

* Thrombosis – definition, causes

(g) Leukaemia – definition, classification (FAB), Acute & Chronic leukaemias, Lab. features of Acute & Chronic leukaemia (AML, ALL, CML, CLL) Aleukaemic Leukaemia, Leukaemoid reaction, Myelodysplastic syndrome (definition Lab. features)

(h) Anaemias (Normochromic, Normocytic, Megaloblastic, Microcytic hypochromic, Anaemia of infections, Haemolytic Anaemias) – Definition, classification, causes, laboratory, features and investigations)

(i) Thalassaemia (Trait, Minor, Major)

- Sideroblastic Anaemia
- Pancytopenia, Aplastic Anaemias, Pure red cells aplasia (Definition, causes, lab. investigation etc)
- (j) * Coagulation disorders, lab. diagnosis, causes, haemophilia, DIC
 - * lymphoma – definition, causes, classification, lab. features/diagnosis
 - * Myeloma – definition, causes, classification, lab. features/diagnosis
 - * Polycythaemia – definition, causes, classification, lab. features/diagnosis
 - * Purpuras – definition, causes, classification, lab. features/diagnosis
- (k) Staining – Leishman’s stain, MGG, Giemsa’s, PAS, Sudan B-Black, Iron, Fats, NAP, Acid Phosphatase, Esterase (Principle, composition, methods & results)

(ii) Blood Banking & Immuno Haematology (10)

- (a) Introduction
 - Blood bank organization, equipments, donor registration
 - Blood groups – types, technique of grouping
 - Donor’s selection, collection of blood
 - Preservatives (storage), laboratory screening of blood for transfusion
- (b) * Cross matching, compatibility testing
 - * Coomb’s test
 - * Transfusion reaction
 - * Antigens, Antibodies (properties, production), Complements, Sensitization, Agglutination, Haemolysis, Neutralization, Precipitation, Complement fixation, Immune response.
- (c) Diseases transmitted through blood and their screening, Haemolytic diseases of new born.
- (d) Blood component preparation and its uses, Haemaphereis, Massive transfusion, Autologous transfusion, exchange transfusion.

Unit – III: Histopathology – Basic & Technique (30 Marks)

- (a) * Cells and tissues – definition, cells and its organelles, function, cell cycle, mitosis meiosis
 - * Epithelial tissues, definition, classifications & functions
 - * Connective tissues (bone & cartilage)
 - * Muscle tissues
 - * Nerve tissues
- (b) Histology of different systems & organs – Respiratory system,

Alimentary system, Excretory systems, Reproductive system (male & female), Endocrine system.

(c) Histopathology technique –

- Sample reception, registering, labeling
- Fixative & fixation, (definition, classification, details of fixative, aims & object, fixation and preservation)
- Decalcification (definition, methods & test of end point decalcification)
- Grossing (definition, material required)
- Processing of tissues (manual & automatic)
- Waxes (types of waxes)
- Microtomies (types of microtome, knives, honing & stropping)
- Dehydration, clearing, impregnation, embedding or blocking (definition, chemicals used etc)
- Section cutting, mounting, labeling

(d) Immunohistochemistry (definition, purposes)

(e) Staining

- Theory, progressive & regressive, metachromasia, mordants, Accentators
- Staining preparation, procedures of –
 - Haematoxyline and Eosin stain
 - MGG stain ; connective tissue stains,
 - Giemsa's stain ; mucicarmine stains
 - Z.N. stain
 - PAS stain

Unit – IV: Cytology (Basic, technique) (10 Marks)

(a) Definition of cytology, material for operation and establishment of cytology laboratory, role of cytology in the diagnosis, branches of cytology

(b) * Reception, registration, numbering and supply of material for collecting specimens.

* Preparation of cytological smears

* Cytological fixation – aims & objects, chemical use for cytological fixation & methods of fixation

* Progressive changes of the cells.

* Nuclear criteria of malignancy

(c) * Exfoliative cytology – definition, source of samples for exfoliative cytology

* Body cavity fluid (Pleural effusion, Pericardial effusion, Ascitic fluids, sputum, urine, synovial fluids, CSF, Pus and Abscess)

– Methods of collection, fixation, methods of cytopreparations &

staining

- Clotted & blood fluids (methods of cytopreparations)
- Cellular components in Benign and malignant effusion, acute and chronic inflammations

(d) Interventional cytology, (FNAC) Fine Needle Aspiration Cytology

- Definition
- Application, methods
- Role of FNAC
 - Common sites
 - Advantage & disadvantage, limitations
 - Complications, precaution & contra-indications
 - Preparation of smears
 - General properties of wet and dry smears
 - Imprint, crush smears, biopsy sediments, cell block preparations

(e) Aspiration of specific lesion eg. cyst, thyroid, lung, peritoneum, prostate, testis, radiological imaging aids for FNAC

(f) Methods of collection, fixation and cytopreparation of samples from

- Female Genital tracts, Respiratory tracts, Gastro-intestinal tracts, urinary tracts etc.

(g) Staining

- Pap's stain
 - Chemical requirements, preparation of various chemicals for pap's stain
 - Various pap's stain methods
 - Types of haematoxylene and its preparation
 - Stain maintenance
 - Preparation of graded alcohols (50%, 60%, 70%, 80%, 85%)
 - Preparation of 0.5% HCl, Lithium Carbonate, EA modified, 0.2% HCl, 1% Ammonium hydroxide in 70% ethanol, Orange G-6
- Bismark Brown, EA-50, EA-36
 - Procedures of Pap's stain
- MGG stain
 - Giemsa's stain
 - Modified pap's stain
 - PAS stain, Alcian Blue Staining
 - Mayers & South Gate Mucicarmine stain
 - Gram's stain
 - ZN stains

Quality controls (Internal & External) definition, methods, advantage

Syllabus for Direct Recruitment of JE (Civil) under Horticulture Department

Paper – III (Technical Subject) (MCQ - 2 Hours)

Building materials (25 questions)	-	50 marks
Soil Mechanics and Foundation Engineering (25 questions)	-	50 Marks
Hydrology and rain water Harvesting (15 questions)	-	30 Marks
Design of RCC Building Members and RCC Water Tank (10 questions)	-	20 Marks
Protective Works, Slope stability and Land (25 questions)	-	50 Marks

Paper-IV (Technical Subject) (MCQ - 2 Hours)

Estimating, Costing and Valuation (25 questions)	-	50 Marks
Transportation Engineering and Surveying (25 questions)	-	50 Marks
Environmental Engineering (10 questions)	-	20 Marks
Design of Steel Structures and Steel Water Tanks (10 questions)	-	20 Marks
Professional practices (15 questions)	-	30 Marks
Aptitude Test (15 questions)	-	30 Marks

Paper – III (Technical Subject) (MCQ) (2 Hours)

1. **Building Materials (50 Marks)**

Physical and Chemical properties, Classification, Standard Test, Uses and Types of Materials:- Building stones, Bricks, Silicate based materials, Cement and Mortars, Sand, Aggregates, Asbestos products, Timber and Wood based Products, Paints, Varnishes, Ferrous metals, Lubricants, Sealants for joints, Polymers and Plastics, Protective and decorative coatings.

2. **Soil Mechanics and Foundation Engineering (50 Marks)**

Origin of soil, phase diagram, Definitions Void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and interrelationship of different parameters, Grain size distribution curves and their uses. Index properties of soils Atterberg's limits, ISI soil classification and plasticity chart. Permeability of soil, coefficient of permeability, determination of coefficient of permeability, Shear strength of soils, direct shear test, Vane shear test, Triaxial test. Soil compaction, Laboratory compaction test, Maximum dry density and

optimum moisture content, earth pressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test, standard penetration test. Foundation engineering:- Foundation classification, Different type and selection criteria of foundation type, Requirements for a stable foundation, Minimum depth for shallow foundation, Definitions of bearing capacity of soil, Type of failure of soil below foundation footing, Determination of size of foundation footings.

3. Hydrology and Rainwater harvesting-(30 Marks)

Hydrological cycle, Water budget equation, Precipitation :- forms, characteristics of precipitation on india, measurement, losses from precipitation. Run-off :- hydrograph, characteristics of streams, yield, droughts, surface water resources of india. Ground water :- forms, aquifer properties, geological formations as aquifers. Wells, Well losses, Specific capacity, Ground water capacity. Rainwater harvesting:- Definition of terms :- aquifer, artificial recharge, bore well, dry well, open wells, water table. Components of roof top rainwater harvesting and conservation system. Calculation of amount of rainwater that can be harvested from roof top. Design tanks. General recommendations for rainwater parameters for settlement harvesting. Quality of rainwater and method of treatment.

4. Design of RCC Building members and RCC water tanks (20 Marks)

Principles of Limit state method (LSM) and Working stress method of design, Provisions of IS:456 and IS:13920 (Latest version) -Materials, workmanship, inspection, testing, placing and requirement of reinforcement, requirement of cement, aggregates and water. Water/Cement ration. Characteristic load & Strength, Partial factor of safety, Stress-strain characteristic of concrete and steel, Limit state of Durability, limit state of collapse in flexure and shear, limit state of serviceability. Theory and design of singly reinforced members. Bond, anchorage, development length and splicing. Design and IS code provisions for short columns, one way and two way slabs, isolated footing. RCC water tanks: Indian standard codes and provisions prescribed for designing water retaining structures, causes and control of cracking, joints in water retaining structures. Removal of formworks/shutters. Lining, lighting protection and ventilation of water tanks. Regular capacity and design capacity of water tanks. Classification and layout of elevated tanks. Nomenclature and functions of ancillary

items of water retaining structures. Components of water retaining structures.

5. **Protective works, Slope stability and Landslide correction (50 Marks)**

Design, construction, specifications and uses of Retaining walls, Breast walls, Toe walls, Crib walls and Revetment walls. Classification of slope movement. Causes of slope movement. Landslide investigations. Stability analysis, corrective measures and design considerations

PAPER –IV (Technical Subject) (MCQ - 2 Hours)

1. **Estimating, Costing and Valuation (50 Marks)**

Estimate, Glossary of technical terms, Analysis of rates, Methods and unit of measurement, Items of work - Earthwork, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering. Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule. Centre line method, Mid-section formula, Trapezoidal formula, Simpson's rule. Cost estimate of Septic tank, flexible pavements, Tube well, isolated and combined footings, Steel Truss, Piles and pile-caps. Valuation - Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.

2. **Transportation Engineering and Surveying (50 Marks)**

Highway Engineering cross sectional elements, geometric design, types of pavements, pavement materials aggregates and bitumen, different tests, Construction and specifications of Granular Sub-Base (GSB), Water Bound Macadam (WBM) and Wet Mix Macadam (WMM), Gravel Road, Bituminous distresses and construction. Rigid pavement joint, Type of pavement maintenance. Highway drainage. Traffic Engineering Traffic signals, traffic operation, traffic signs and markings, road safety.

Surveying: Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of theodolite, Levelling, Definition of terms used in leveling, contouring, curvature and refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveying equipment.

3. Environmental Engineering (20 Marks)

Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage systems, circular sewer, oval sewer, appurtenances, sewage treatments. Surface water drainage. Solid waste management - types, effects, engineered management system. Air pollution - pollutants, causes, effects, control. Noise pollution - causes, health effects, control.

4. Design of Steel structures and Steel water tanks (20 Marks)

Riveted and Bolted joints:- types and definitions. Riveted joints: assumptions in the theory. Failures, strength and efficiency. Design of riveted joints for axially loaded members. Welded joints: processes, types and symbols, advantages and disadvantages. Terms used in the design of fillet welds and butt welds. Compression members - effective length, maximum slenderness ratio, typical cross-section, design of compression members. Steel tanks :- Types of steel tanks commonly used, accessories commonly required, pressed steel tanks.

5. Professional practices (30 Marks)

Schedule of works, Schedule of rates (SOR), Analysis of rates, Technical specifications, Cost indices. Stages for execution of works:- administrative approval, expenditure sanction, technical sanction, deviations, extra and substituted items, contingencies, work charged establishment, Types of estimate. Tendering and Agreement sale, opening and acceptance of tenders, earnest money, performance guarantee, security deposit, extension of time, liquidated damage, advance payment to contractors. Measurement book writing, recording, testing of measurement, loss of measurement book. Contract - definition, essential elements of a valid contract, offer and acceptance. Free consent (Definition and consequences) coercion, undue influence, fraud, misrepresentation, mistake. Special contracts :- indemnity, guarantee, bailment and pledge, agency.

6. Aptitude Test (30 Marks)

(a) Numerical And Figure work Tests: (8 Marks)

These tests are reflections of fluency with numbers and calculations. It shows how easily a person can think with numbers. The subject will be given a series of numbers. His/Her task is to see how the numbers go together to form a relationship with each other. He/She has to choose a number which would go next in the series.

(b) Verbal Analysis And Vocabulary Tests: (8 Marks)

These tests measure the degree of comfort and fluency with the English language. These tests will measure how a person will reason with words. The subject will be given questions with alternative answers, that will reflect his/her command of the rule and use of English language.

(c) Visual And Spatial/3-D Ability Tests: (6Marks)

These tests are used to measure perceptual speed and acuity. The subject will be shown pictures where he/she is asked to identify the odd one out; or which comes next in the sequence or explores how easily he/she can see and turn around objects in space.

(d) Abstract Reasoning Tests: (8 Marks)

This test measures the ability to analyse information and solve problems on a complex, thought based level. It measures a person's ability to quickly identify patterns, logical rules and trends in new data, integrate this information, and apply it to solve problems.

Detailed Syllabus on Paper III & IV (Technical Subjects) for recruitment to the post of Junior Engineer under Power & Electricity Department.

1. Paper – III (Technical Subject) (MCQ) : 200 Marks (2 hours)

i) Power System-I

- I. Generation of Electrical Power
 - (1) Thermal Power Plants
 - (2) Hydro Electric Generation Unit
- II. Power Planning Economic and Tariff
- III. Sub-Station : 60 marks

ii) Power System-II

- I. Principle of Distribution System/Principle of Transmission and Distribution
- II. Material of Overhead Lines
- III. Concept on Line Design, Construction and L.A.
- IV. Detail of Service Connection
- V. Construction Details of Under Ground Cable
- VI. CEA Safety Regulations : 60 marks

iii) Switch Gear and Protection-I

- I. Protective Relays
- II. Relay Application and Characteristics
- III. Feeder Protection
- IV. Generator Protection
- V. Motor Protection
- VI. Circuit Breakers : 30 marks

iv) Instrumentation and Control-I

- I. Overview of Instrumentation and Control System
- II. Pressure Measurement
- III. Transducers
- IV. Signal Conditioning : 30 marks

v) High Voltage Engineering (E)-I

- I. Overview of the Power Generation, Transmission and Distribution
- II. Measurement of High Voltages
- III. Over Voltage : 20 marks

2. Paper – IV (Technical Subject) (MCQ) : 200 Marks (2 hours)

i) Electrical Machine-I

- I. Transformer
- II. Storage Batteries : 40 marks

ii) Electrical Machine-II

- I. Induction Motor
- II. Three Phase Synchronous Machine
- III. Single : 30 marks

iii) Power Electronics/Electronic Devices & Circuits-II

- I. The Thyristor and their Characteristics
- II. Power Diodes & Power Transistors
- III. Line Cumulated Converters
- IV. A.C. Voltage Controllers
- V. D.C. Chopper & Switch Mode power Supply
- VI. Power Supplies
- VII. A.C. Drivers
- VIII. A.C. Voltage Control : 30 marks

iv) Repairing of Household Equipment-II

- I. Ceiling Fan/Exhaust Fan
- II. Fluorescent Lamp/Sodium Vapor Lamp
- III. Split Type/Window Air-Conditioning : 20 marks

v) Non-Conventional Sources of Energy

- I. Solar Radiation
- II. Wind Energy
- III. Solar Cell : 80 marks

Detailed Syllabus on Paper III & IV (Technical Subjects) for recruitment to the post of Surveyor under Land Revenue & Resettlement

Paper	Subject	Marks	Duration
Paper - III	1. Introduction of surveying 1) Concepts and purpose of Surveying. 2) Instrument used for Linear and angular measurement. 3) Classification of Survey based on Instrument used. 4) Classification based on Method used. 5) Fundamental Principles of Surveying. 6) Process of Surveying. 7) Cadastral Survey.	50	2 hours with compensatory time of 20 minutes per hour for persons with benchmarked disabilities
	2. Chain Survey 1) Definition 2) Methods of Chain Survey 3) Instrument used	20	
	3. Compass survey 1) Definition 2) Methods of Chain Survey 3) Instrument used	20	
	4. Plane Table Survey 1) Principles of Plane Table Survey 2) Accessories 3) Methods	20	
	5. Levelling Survey 1) Definition 2) Methods 3) Principles of leveling booking and reducing levels	20	
	6. Theodolite Survey 1) Theodolite Traverse 2) Source of error in Theodolite 3) Mistakes in Theodolite	20	
	7. Modern Survey instruments a. GPS 1) Types of Instrument 2) Methods used for survey with GPS 3) Advantages b. Total Station 1) Components of Total Station 2) Advantages 3) Procedures of Total Station a. Traversing b. Layout of points	30	
	8. Cartography - Introducing to Cartography	20	
	TOTAL	200	
Paper - IV	MATHEMATICS	50	2 hours with

	Geometry 1) Triangle 2) Similar Figures 3) Similarity of Triangles 4) Areas of Similar Triangles 5) Pythagoras Theorem 6) Circles 7) Construction of Tangents to a circle 8) Division of Line Segment		compensatory time of 20 minutes per hour for persons with benchmarked disabilities
	Coordinate Geometry 1) Distance Formula 2) Section Formula 3) Area of Triangle	40	
	Trigonometry 1) Trigonometry Ratios 2) Trigonometry Ratios of Some Specific Angles 3) Trigonometry Ratios of Complimentary Angles 4) Trigonometry Identities 5) Heights and Distances	50	
	Mensuration 1) Area related to Circles 2) Areas of Sector and Segment of a circle 3) Areas of Combination of Plane Figures 4) Surface Areas and Volumes	40	
	Statistics 1) Mean of Grouped Data 2) Mode of a Grouped Data 3) Median of a Grouped Data 4) Graphical Representation of Cumulative Frequency Distribution.	20	
	TOTAL	200	

Detailed Syllabus on Paper III & IV (Technical Subject) for recruitment to the post of Sign Language Interpreter under Social Welfare, Tribal Affairs, Women & Child Development

Paper III Technical	Indian Sign Language Interpretation: Theory	200	2 hours with compensatory time of 20 minutes per hour for persons with benchmark disabilities
Paper IV Technical	Indian Sign Language Interpretation: <ul style="list-style-type: none"> • Practical • Personal Interview 	200	40 minutes Basic communication -10 minutes Advanced communication - 10 minutes Basic Interpretation - 10 minutes Personal Interview - 10 minutes

Paper - III	<u>UNIT-I: Deaf, Deafness and Communication Options</u>	Marks	Duration
	<p>1: Deafness and associated terminology</p> <p>1.1 Concept of hearing loss 1.2 Misconcepts about deafness</p> <p>2: Understanding the context</p> <p>2.1 Medical and Socio-cultural model: Meaning, global and Indian Scenario 2.2 Legislations, policies and practice in India</p> <p>3: Meaning and Scope of Communication</p> <p>3.1 Meaning, definition and scope of communication 3.2 Communication challenges and sign language use</p> <p>4: Communication: Modes and Options</p> <p>4.1 Oralism, Total Communication and Educational Bilingualism 4.2 Modes of linguistic communication (Aural/Oral, Visual/Manual, Visual/Graphical): Meaning and nature</p> <p>5: Overview of Language</p> <p>5.1 Definition and design features of language and Indian Sign Language 5.2 Linguistic Theories and Sign Languages</p>	50	3 hours with compensatory time of 20 minutes per hour for persons with benchmark disabilities
	<p><u>UNIT-II: Deaf Culture, History, Identity and Sign Language</u></p> <p>1: History of deafness</p> <p>1.1 Historical development in the deaf community</p> <p>2: Concept of Culture and the deaf communities</p> <p>2.1 Deaf culture in India and rest of the world: An overview</p> <p>3: Concept of identity and the deaf</p> <p>3.1 The deaf identity and Deafhood: Problems and Issues</p> <p>4: Sign Languages</p> <p>4.1 Sign Languages for education and literacy 4.2 Role and significance of technology for</p>	50	

	<p>communication and learning</p> <p>5: Deaf Community and Society</p> <p>5.1 Legal rights of the deaf</p> <p>5.2 Participation of deaf people in education and other spheres</p>		
	<p><u>UNIT-III: Indian Sign Language Linguistics</u></p> <p>1: Structure of ISL: Basic Components</p> <p>1.1 Introduction to Linguistics</p> <p>1.2 Features of signs</p> <p>2: Time and Space in ISL</p> <p>2.1 Representation of time in space</p> <p>2.2 Indexing and Localization</p> <p>3: Structure of ISL: Sentences</p> <p>3.1 Concept and types of a sentence</p> <p>3.2 Word sign order</p> <p>3.3 Transforming a sentence</p> <p>4: Other Linguistic Aspects of ISL</p> <p>4.1 Features of conversations, texts and stories in ISL</p> <p>4.2 Acquisition of sign languages and the critical period</p>	50	
	<p><u>UNIT-IV: Interpretation – Principle, Practices and Ethics</u></p> <p>1: Interpreting: the Concept</p> <p>1.1 Interpreter and Interpreting</p> <p>1.2 Role of Context in interpreting</p> <p>2: Role and Responsibility of an Interpreter</p> <p>2.1 Role of an Interpreter</p> <p>2.2 Responsibility and essential skills sets required in an interpreter</p> <p>3: Code of Ethics</p> <p>3.1 Professionalism in SL interpreting</p> <p>3.2 Code of Ethics</p> <p>4: Interpreting in India</p>	50	

	4.1 Need for sign language interpreter license, CRE, renewal & cancellation of license, India and international scenario.		
Paper - IV	<p style="text-align: center;"><u>UNIT-I: Basic Communication</u></p> <p>1: BASIC VISUAL EXPRESSIVE SKILLS</p> <p>1.1 Greetings and introductions</p> <p>1.2 Simple Adjectives relating to emotions and feelings, colors and shapes using pictures</p> <p>1.3 Pronouns and Nouns : Household, School, Community living (Explanation of pictures)</p> <p>1.4 Basic direct communication and dialogues</p> <p>1.5 Basic picture stories</p> <p>2: BASIC COMMUNICATION SKILLS: Level 1</p> <p>2.1 Verbs, Sentences</p> <p>2.2 Kinship terms (Flowcharts) and Indexing</p> <p>2.3 Body parts, Health and Ailments, Behaviour norms</p> <p>2.4 English Manual Alphabet (two-handed), Numbers and Numerals</p> <p>2.5 Food, Profession and Work terms, Money, Measures</p> <p>2.6 Calendar items, Time, Directions</p> <p>2.7 Interrogatives</p> <p>3: BASIC COMMUNICATION SKILLS: Level 2</p> <p>3.1 Negation</p> <p>3.2 Festivals, Social Life</p> <p>3.3 Nature, Weather, Animals</p> <p>3.4 Location, Place names, Languages</p> <p>3.5 Transportation</p> <p>4: BASIC COMMUNICATION SKILLS: Simple technical terms</p> <p>4.1 Simple technical terms: School Subjects</p> <p>4.2 Simple technical terms: Telecommunication</p> <p>4.3 Simple technical terms: Government and Legal setup</p> <p>4.4 Simple technical terms: Medical terms</p> <p style="text-align: center;"><u>UNIT-II: Advanced Communication</u></p> <p>1: ADVANCED COMMUNICATION SKILLS</p> <p>1.1 English Manual Alphabet (one-handed) for deaf-blind</p> <p>1.2 Degree of colour, size and shape, handling objects</p> <p>1.3 Advanced level of picture description and picture stories</p> <p>1.4 Dialogues and role play</p>	50	2 hours with compensatory time of 20 minutes per hour for persons with benchmark disabilities
		50	

	<p>2: ADVANCED COMMUNICATION SKILLS</p> <p>2.1 Signing abstract concepts 2.2 Location – spaces 2.3 Repeated, Alternating and Unrealized actions 2.4 Plural actions and objects 2.5 Expressing movement 2.6 Signing picture stories, jokes</p> <p>3: ADVANCED COMMUNICATION SKILLS: Technical signs</p> <p>3.1 Technical terms: High school terms 3.2 Technical terms: Computer Science and ITI related signs 3.3 Technical terms: Commerce</p> <p>4: ADVANCED COMMUNICATION SKILLS: Regional variations</p> <p>4.1 Mediation during interpreting 4.2 Regional variation and sign switching</p>		
	<p><u>UNIT-III: Basic Interpretation</u></p> <p>1: LISTENING AND SIGNING COMPREHENSIVE SKILLS</p> <p>1.1 Listening comprehension 1.2 Signing comprehension</p> <p>2: BASIC SKILLS</p> <p>2.1 Expressive skills (Spoken and sign language fluency) 2.2 Basic tactile interpreting for Deaf - Blind 2.3 Note – taking</p> <p>3: INTERPRETING SKILLS (BASIC)</p> <p>3.1 Sign to voice: Short sentences, phrases and paragraphs</p>	50	

	3.2	Voice to sign: Short sentences and phrases	
	3.3	Interpreting in a pre-primary/primary school setting	
	3.4	Interpreting TV News/Shows/Telephone	

Syllabus on Paper III (Technical Subject) for recruitment to the post of Extension Officer (Handloom, Textile and Handicraft) under Commerce & Industries Department.

Paper-III	Weaving theory (WTTC) (25 Questions)	50 marks	3 hours with additional time of 60 minutes for PwBD candidates who are eligible for getting scribe.
	Textile calculation (WTTC) (10 questions)	20 marks	
	Chemical Processing/Dyeing (15 questions)	30 marks	
	Fabric structure (25 questions)	50 marks	
	Textile testing (25 questions)	50 marks	
	TOTAL	200 marks	

SYLLABUS FO MIZO LANGUAGE PROICIENCY TEST (QUALIFYING TEST)

Duration : 2 hours

Full mark : 50

Qualifying marks/Pass mark : 20

1. Essay writing : 10 marks
(Candidate will choose one topic from three given topics with word limit of not less than 200 words)
2. Letter writing : 10 marks
3. Comprehension : 10 marks
(Question will be set in Middle School Standard)
4. Poetry : 10 marks
(Object Type and short answer type questions will be set in Middle School Standard. Marks for each question will range from 1 to 3 marks)
5. Grammar : 5 marks
(Question will be set in Middle School /standard)
Mizo Thufing ad Ṭawng Upa : 5 marks
(Question will be set in Middle School standard)

Note 1: A Candidate who studied Mizo subject in Class-X standard (HSLC) or above within Mizoram or who opted for Mizo subject as MIL outside Mizoram is exempted from taking the qualifying test paper.

Note 2: Questions and answers shall be written in Mizo only. Answers written partly in one language and partly in another language shall not be evaluated and awarded to zero marks.