Azadi Ka Amrit Mahotsav

GOVERNMENT OF MIZORAM
HEALTH & FAMILY WELFARE DEPARTMENT
MIZORAM SECRETARIAT BUILDING, MINECO, KHATLA, AIZAWL – 796001
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NOTIFICATION

Dated Aizawl, the 16th April, 2025

No.A.11018/13/2023-HFW/100 : In the interest of public service, the competent authority is pleased to notify Syllabus for Direct Recruitment to the post of **Dialysis Technologist** under Health & Family Welfare Department as per Annexure.

This is issued with the approval of DP&AR(GSW) vide their *I.D.No.A.12018/7/2024-P&AR(GSW) dated 07.04.2025.*

Sd/-H. LALENGMAWIA
Commissioner & Secretary to the Govt. of Mizoram
Health & Family Welfare Department

Memo No.A.11018/13/2023-HFW/100 : Dated Aizawl, the 16th April, 2025

Copy to :

1. P.P.S. to Commissioner & Secretary, Health & Family Welfare Department.
2. Principal Director, Health & Family Welfare Department.
3. Director - DHS / DHME / ZMC&H / Ayush / Nursing, Mizoram.
4. Controller of Examinations, Mizoram Public Service Commission.
5. Website Manager, IT Cell, DHS.
6. Guard File.

16/04/2025

(LALHLIMPUII HMAR)
Under Secretary to the Govt. of Mizoram
Health & Family Welfare Department

Approved Syllabus for Direct Recruitment to the post of Dialysis Technologist (Level -7) under Health & Family Welfare Department

Paper	Subject	Marks
Paper-I	General English	100 marks (3 hours)
Paper-II	General Knowledge (MCQ)	100 marks (2 hours)
Paper-III	Technical Paper (MCQ)	200 marks (2 hours)
Paper-IV	Technical Paper (MCQ)	200 marks (2 hours)
	Personal Interview	80 marks
	Total	**680 marks**

Paper-I (General English) - 100 marks (3 hours)

a) Précis Writing : 10 marks
b) Letter Writing : 15 marks
c) Comprehension of given Passages : 15 marks
d) Grammar: Parts of speech : 20 marks
e) Correct Usage and Vocabularies : 20 marks
f) Formation of Sentence : 20 marks

Paper-II (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

Paper-III (Technical Subject) (MCQ) - 200 marks (2 hours)

I BASIC ANATOMY: 40 marks

Introduction to Anatomy. Basic Anatomical terminology. **Osteology** Upper limb - clavicle, scapula, humerous, radius, ulnaLower limb - femur, hipbone, sacrum, tibia, fibula Vertebral column **Thorax** - Intercostal space, pleura, bony thoracic cage, ribs sternum & thoracic vertebrae. **Lungs** - Trachae, bronchial tree. **Heart** - Surface anatomy of heart, chambers of the heart, valves of the heart, major blood Vessels of heart, pericardium, coronary arteries. **Myology** - Muscles of thorax, muscles of upper limb (arm & fore arm). Flexor and extensor group of muscles (origin, insertion, nerve supply, action). **Histology** - Types of tissue Epithelia - Squamous. Glandular Transitional Cartilage. Connective tissue - bone, fibrous tissue, muscle **Excretory system** - Kidneys, ureters, bladder, structure of nephrons.

II PHYSIOLOGY: 40 marks

The Cell: Cell Structure and functions of the varies organelles. Endocytosis and exocytosis. Homeostastis. Acid base balance and disturbances of acid base balances (Alkalosis, Acidosis) **The Blood**: Composition of Blood, functions of the blood and plasma proteins. Erythropoisis, pathological and Physiological variation of the RBC. Structure, function and metabolism of Hemoglobin. Erythrocyte Sedimentation Rate. Detailed description about WBC. Platelets, coagulation of blood, anti coagulants, bleeding disorders. Blood groups and oRh factor. **Cardio-Vascular System**: Physiological Anatomy of the heart. Heart sounds. Cardiac cycle, Cardiac output. Auscultatory areas. Cardiac murmurs. Arterial pressures, blood pressure. Hypertension. Hormonal regulations for arterial pressure and determination of arterial Blood pressure. Electro cardiogram (ECG). Applied physiology of coronary circulation. Foetal circulation. Circulatory shock. **Respiratory system**: Physiological Anatomy of Respiratory tract. Non-Respiratory functions of the Respiratory tract. Respiratory movements. Definitions and Normal values of Lung volumes and Lung capacities. Measurement of Lung volumes and capacities. Exchange of Respiratory gases in the Alveoli. Transport of Respiratory gases in the blood. Artificial Respiration. **Excretory system**: Urine Formation. Micturation. Renal function tests, renal disorders. Renal dialysis. **Reproductive system**: Physiological Anatomy of the Male & Female Reproductive organs. Formation of semen and spermatogenesis. Brief account of menstrual cycle. **Central Nervous system:** Functions of CSF. Significance of CSF Analysis. **Endocrine system**: Functions of the pituitary, thyroid,

parathyroid, adrenal and pancreatic Hormones. **Digestive system**: Physiological Anatomy of the GIT. Food Digestion in the mouth, stomach, intestine. Absorption of foods. Role of bile in the digestion.

III BIOCHEMISTRY: 40 marks

Biomolecules and the cell: Major complex biomolecules of cell and cell organelles-Prokaryotic andeukaryotic cell. **Carbohydrates:** Chemical structure, function- Classification-Monosaccharides-Disaccharides-Polysaccharides Homopolysaccahrides-Heteropolysaccharides-Glycoproteins. **Proteins**: Amino acids-Classification- Structure of proteins- Determination of protein structure- Properties of proteins- Denaturation-Classification of proteins- Antigen, Antibody- Types, Plasma proteins- Blood clotting. **Lipids**: Chemical structure, functions, Classification-fatty acids Triacylglycerols, Phospholipids, glycoproteins, Lipoproteins- Steroids - Amphipathic lipids. **Nucleic acids**: Purines and pyrimidine-Structure of DNA - Watson & Crick model of DNA - Structure of RNA - Types of RNA. **Enzymes**: Definition - Nomenclature - Classification - Factors affecting enzyme activity - Active site - Coenzyme - Enzyme Inhibition - Mechanism of enzyme action - Units of enzyme - Isoeznzymes - Enzyme pattern in diseases. **Vitamins & Minerals**: Fat soluble vitamins (A,D,E,K) - Water soluble vitamins-B-complex vitamins-principal elements(Calcium, Phosphorus,Magnesium, Sodium, Potassium, Chlorine andsulphur)- Trace elements - Calorific value of foods Basal metabolic rate(BMR) - respiratory quotient(RQ) Specific dynamic action(SDA) - Balanced diet - Marasmus - Kwasoirkar. **Hormones**: Classification - Mechanism of action - Hypothalamic hormones - Pituitary - Anterior, posterior - Thyroid - Adrenal cortex, Adrenal medulla - Gonadal hormones - Menstrual cycle - GI hormones. **Acids and bases**: Definition, pH, Henderson - Hasselbalch equation, Buffers, Indicators, Normality, Molarity, Molality.

IV PATHOLOGY: 40 marks

(1)Cellular adaptation, Cell injury & cell death. Introduction to pathology _Overview: Cellular response to stress and noxious stimuli. Cellular adaptations growth and differentiation. Overview of cell injury and cell death. Causes of cell injury. Mechanisms of cell injury. Reversible and irreversible cell injury. Morphology of cell injury and necrosis. Examples of cell injury and necrosis Apoptosis. Sub cellular responses to injury Inter cellular accumulations Pathologic

calcification Cellular aging.(2) Inflammation. General features of inflammation Historical highlights. Acute inflammation. Chemical mediators of inflammation Outcomes of acute inflammation Morphologic patterns of acute inflammation Summary of acute inflammation. Chronic inflammation. Systemic effects of inflammation. Consequences of defective or excessive inflammation. (3) Genetic disorders. Mutations Mendelian disorders. Disorders with multifactorial inheritance Normal karyotype.Cytogenetic disorders. Single-gene disorders with non-classic inheritance Molecular diagnosis. Diagnosis of genetic diseases. (4) Immunity disorders. General features of the immune system. Disorders of the immune system. (5) Infectious diseases. General principles of microbial pathogenesis Viral infections.Bacterial infections-Rheumatic heart disease. Fungal infections. Parasitic infections. (6) Neoplasia. Definitions Nomenclature. Biology of tumor growth benign and malignant neoplasmsEpidemiology. Molecular basis of cancer. Molecular basis of multistep carcinogenesis Carcinogenic agents and their cellular interactions. Host defense against tumors-Tumor immunity Clinical features of tumors. (7) Environmental and nutritional disorders. Environmental and disease. Common environmental and occupational exposures Nutrition and disease. Coronary artery disease. (8) Congenital abnormalities of urinary system. Classification of renal diseases. Glomerular diseases-causes,types & pathology._Tubulointerstitial diseases. Renal vascular disorders. End stage renal diseases - causes & pathology. Pathology of kidney in hypertension, diabetes mellitus, pregnancy. Pathology of peritoneum - peritonitis - bacterial, tubular & sclerosing peritonitis. Pathology of urinary tract infections. Pyelonephritis & tuberculous pyelonephritis.

V MICROBIOLOGY: 20 marks

Hepatotrophic viruses in detail - mode of transfusion, universal precautions, Vaccinations, Human immunodeficiency virus (HIV), mode of transfusion, universal Precautions, Opportunistic infections, Microbiology of vascular access infection (femoral, jugular, subclavian catheters). Microbiology of urinary tract infections_ Sampling methodologies for culture & sensitivity. Candida infection.

VI PHARMACOLOGY: 20 marks

IV fluid therapy with special emphasis in renal diseases. Diuretics - classification, actions, dosage, side effects & contraindications. Anti hypertensives - classification, actions, dosage, side effects & Contraindications, special reference during dialysis, vasopressors, drugs used in Hypotension. Drugs & dialysis - dose & duration of administration of drugs. Dialyzable drugs- phenobarbitone, lithium, methanol etc. Vitamin d & its analogues, phosphate binders, iron, folic acid & other vitaminsOf therapeutic value. Erythropoientin in detail. Heparin including low molecular weight heparin. Protamine sulphate. Fomalin, sodium hypochlorite, hydrogen peroxide - role as disinfectants &adverse effects of residual particles applicable too formalin.

Haemodialysis concentrates - composition & dilution (acetate & bicarbonates). Peritoneal dialysis fluid in particular hypertonic solutions-composition. Potassium exchange resins with special emphasis on mode of administration.

Paper-IV (Technical Subject) (MCQ) - 200 marks (2 hours)

I PRINCIPLES OF NURSING:20 marks

Bed making. Bladder catherization. Injections - intravenous, intramuscular, subcutaneous. Insertion of intravenous canulae. Cleaning and dressing of wounds and vascular access sites and peritoneal catheter exit site. Assisting the physician in procedures like minor surgery, vascular access, etc. Removal of sutures. Care of bed ridden patients. Documentation. Collection of blood, urine and stool specimens and their transfer aseptic precautions to the laboratory. CAPD EXCHANGES. Introduction of vascular dialysis independently. Minor suturing.

II NUTRITION: 50 marks

Introduction to science of nutrition. Food pattern and its relation to health. Factors influencing food habits, selection and food stuffs. Food selection, storage & preservation. Classification of nutrients - macronutrients and micronutrients. Proteins - types, sources requirements and deficiencies of proteins. Carbohydrates sources, requirements & efficiency. Fats - types, sources, requirements, deficiency and excess of fats. Water - sources of drinking water, requirements, preservation of water. Minerals - types, sources, requirements deficiencies of minerals. Vitamins - types, sources, requirements deficiencies of vitamins. Planning diets including renal diets. Introduction to cookery + and demonstrate to patients preparation of renal diet.

III CONCEPTS OF DISEASE AND OUTLINES OF CLINICAL EVALUATION: 50 marks

Acute renal failure. Nephrotic syndrome - primary & secondary. Nephritic syndrome. Urinary Track Infection - urinary track infections. Asymptomatic urinary abnormalities. Chronic Kidney Disease. Renal stone diseases. Obstructive nephropathies. Congenital & inherited renal diseases. Pregnancy associated renal diseases. Renal vascular disorders & hypertension associated renal diseases.

IV DIALYSIS TECHNOLOGY: 80 marks

PART-I History,types of Dialysis. Principles of Dialysis, quantification of adequacy. Dialysis Team-rights-responsibilities-patient doctor relationship. Dialysisreuse. Dialyser Membranes. Vascular Access - Temporary & Permanent. Equipment - Accessories -Function. Computer applications in Dialysis. Dialysate delivery system. Composition of dialysate. High flux/high efficiency dialysis. Continuous Renal Replacement Therapy/Slow Low Efficiency Dialysis.Complications in dialysis patients. Water treatment-pre treatment, deionizer, Reverse Osmosis.Dialysis in Neonates, infants & children. Renal data maintenance.

PART II Machine and patient monitoring during hemodialysis. Patient Assessment - Pre, intra 8e post dialysis. Lab data analysis. Acute and chronic dialysis prescription. Medications in dialysis patients. Nutrition management in dialysis patients. Anticoagulation. Infection control and universal precautions. Phychosocial aspects & patient education. Quality assurance in dialysis. Complications of hemodialysis - Acute & chronic. Acute and Chronic Peritoneal Dialysis. History, access, physiology of Peritoneal Dialysis. PD - Transport kinetics, ultrafiltration, UF, Intermittent PD, Continuous Ambulatory Peritoneal Dialysis, Automated Peritoneal Dialysis, Dialysis Solutions, Novel uses of PD. Infectious and non infectious complications of PD. Renal transplant co-ordination (Recipient and donor workup, psychosocial and legal aspects, cadaver donor Maintenance, principles of post operative management and follow-up). Principles of Intensive care (Monitoring and diagnostic procedures in ICU, General care of patient in ICU, Fluid management and parenteral nutrition, Infectious diseases in ICU, Respiratory Failure, Acid-base and electrolytes disorders, cardio vascular failure, liver failure, Head injury, principles of transfusion therapy). Principles of Extracorporeal Short Wave Lithotripsy. Ventilator maintenance. An introduction to common Urosurgical procedures & instruments and their maintenance. Preparation of dialysis patients for various surgical procedure and post operative Dialysis support. Basic and advanced cardiac life support.

Notes:

1) Questions shall be set and answered in English only and of multiple choice questions pattern only except for précis writing, essay writing, and English comprehension under Paper –I. The answer for each of the questions shall be marked using blue or black ball point pen. In other word, there shall be multiple probable answers (at least four) wherein the candidate has to choose the correct answer for every objective type questions.
2) Questions for Technical Paper III and IV shall be set in Multiple Choice Question format.