

DETAILED SYLLABUS FOR THE POST OF GENERAL PHYSIOTHERAPIST IN HEALTH SERVICES

(Category Number : 524/2023)

Total :100 Marks

Module I (a) - (15 Marks)

1. Histology

General Histology, study of the basic tissues of the body;
Microscope, Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS & LS, Circulatory system – large sized artery, medium sized artery, large sized vein, lymphoid tissue, Skin and its appendages.

2. Embryology

- a) Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations.
- b) Development of skin, Fascia, blood vessels, lymphatic,
- c) Development of bones, axial and appendicular skeleton and muscles,
- d) Neural tube, brain vessels and spinal cord,
- e) Development of brain and brain stem structures

3. Regional Anatomy

Thorax:

- a) Cardio – Vascular System

Mediastinum: Divisions and contents

Pericardium: Thoracic Wall: position, shape and parts of the heart; conducting System; blood Supply and nerve supply of the heart; names of the blood vessels and their distribution in the body – region wise.

- b) Respiratory system

Outline of respiratory passages

Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on broncho-pulmonary segments

Diaphragm: Origin, insertion, nerve supply and action, openings in the diaphragm.

Intercostal muscles and Accessory muscles of respiration: Origin, insertion, nerve supply and action.

Abdomen:

- c) Peritoneum: Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum.
- d) Large blood vessels of the gut
- e) Location, size, shape, features, blood supply, nerve supply and functions of the following: stomach, liver, spleen, pancreas, kidney, urinary bladder, intestines, gall bladder.

Pelvis:

- f) Position, shape, size, features, blood supply and nerve supply of the male and female reproductive system.

4. Musculo Skeletal Anatomy

- a) Anatomical positions of body, axes, planes, common anatomical terminologies (Groove, tuberosity, trochanters etc)
- b) Connective tissue classification.
- c) Bones- Composition & functions, classification and types according to morphology and development.

- d) Joints-definition-classification, structure of fibrous, cartilaginous joints, blood supply and nerve supply of joints.
- e) Muscles – origin, insertion, nerve supply and actions
- f) Upper Extremity :
 - a. Osteology : Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
 - b. Soft parts: Breast, pectoral region, axilla, front of arm, back of arm, cubital fossa, front of fore arm, back of fore arm, palm, dorsum of hand, muscles, nerves, blood vessels and lymphatic drainage of upper extremity.
 - c. Joints : Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
 - d. Arches of hand, skin of the palm and dorsum of hand.
- g) Lower Extremity
 - a. Osteology : Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.
 - b. Soft parts: Gluteal region, front and back of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of the thigh, popliteal fossa, anterior and posterior compartment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.
 - c. Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.
- h) Trunk & Pelvis:
 - a. Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs
 - b. Soft tissue: Pre and Para vertebral muscles, intercostals muscles, anterior abdominal wall muscles, Intervertebral disc.
 - c. Pelvic girdle and muscles of the pelvic floor
- i) Head and Neck:
 - a. Osteology : Mandible and bones of the skull.
 - b. Soft parts : Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck,
 - c. Gross anatomy of eyeball, nose, ears and tongue.

5. Neuro Anatomy

- a) Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system
- b) Cranial nerves
- c) Peripheral nervous system
 - a. Peripheral nerve
 - b. Neuromuscular junction
 - c. Sensory end organs
- d) Central Nervous System
 - a. Spinal segments and areas
 - b. Brain Stem
 - c. Cerebellum
 - d. Inferior colliculi
 - e. Superior Colliculi
 - f. Thalamus
 - g. Hypothalamus
 - h. Corpus striatum
 - i. Cerebral hemisphere
 - j. Lateral ventricles
 - k. Blood supply to brain
 - l. Basal Ganglia
 - m. The pyramidal system
 - n. Pons, medulla, extra pyramidal systems
 - o. Anatomical integration

Module I (b) - (15 Marks)

General Physiology

- Cell: Morphology. Organelles: their structure and functions
- Transport Mechanisms across the cell membrane
- Body fluids: Distribution, composition. Tissue fluid – formation.

Blood

- Introduction: Composition and functions of blood.
- Plasma: Composition, formation, functions. Plasma proteins.
- RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticulo-endothelial system (in brief) Haemoglobin - Anemia (in detail), types of Jaundice. Blood indices, PCV, ESR.
- WBC: Classification. Morphology, functions, count, its variation of each. Immunity
- Platelets: Morphology, functions, count, its variations
- Hemostatic mechanisms: Blood coagulation–factors, mechanisms. Their disorders. Anticoagulants.
- Blood Transfusion: Cross matching. Indications and complications.
- Lymph: Composition, formation, circulation and functions.

Nerve Muscle Physiology

- Resting membrane potential. Action potential – ionic basis and properties.
- Nerve: Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibres. Nerve injury – degeneration and regeneration.
- Neuroglia: Types and functions.
- Muscle: Classification. Skeletal muscle: Structure. Neuromuscular junction : Structure. Neuromuscular transmission, myasthenia gravis. Excitation- Contraction coupling. Rigor mortis. Motor unit. Properties of skeletal muscles, Strength- Duration curve, Length-tension relationship, fatigue, load.
- Smooth muscle: Structure, types, mechanism of contraction. Plasticity.

Cardiovascular System

- Physiological anatomy and nerve supply of the heart and blood vessels. Organisation of CVS. Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential. Properties.
- Conducting system: Components. Impulse conduction Cardiac Cycle: Definition. Phases of cardiac cycle. Pressure and volume curves. Heart sounds – causes, character. ECG: Definition. Different types of leads. Waves and their causes. P-R interval. Heart block.
- Cardiac Output: Definition. Normal value. Determinants. Stroke volume and its regulation. Heart rate and its regulation. Their variations
- Arterial Blood Pressure: Definition. Normal values and its variations. Determinants. Peripheral resistance. Regulation of BP.
- Arterial pulse.
- Shock – Definition. Classification–causes and features
- Regional Circulation: Coronary, Cerebral and Cutaneous circulation.
- Cardiovascular changes during exercise.

Respiratory System

- Physiological anatomy – Pleura, tracheo-bronchial tree, alveolus, respiratory membrane and their nerve supply. Functions of respiratory system. Respiratory muscles.
- Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration. Chest expansion. Lung compliance: Normal value, pressure-volume curve, factors affecting compliance and its variations. Surfactant – Composition, production, functions. RDS
- Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance. Maximum ventilation volume. Respiratory minute volume.
- Dead Space: Types and their definition.
- Pulmonary Circulation. Ventilation-perfusion ratio and its importance.

- Transport of respiratory gases: Diffusion across the respiratory membrane. Oxygen transport – Different forms, oxygen-haemoglobin dissociation curve. Factors affecting it. P50, Haldane and Bohr effect. Carbon dioxide transport: Different forms, chloride shift.
- Regulation of Respiration: Neural Regulation. Hering-breuer's reflex. Voluntary control. Chemical Regulation.
- Hypoxia: Effects of hypoxia. Types of hypoxia. Hyperbaric oxygen therapy. Acclimatization Hypercapnoea. Asphyxia. Cyanosis – types and features. Dysbarism
- Disorders of Respiration: Dyspnoea. Orthopnoea. Hyperpnoea, hyperventilation, apnoea, tachypnoea. periodic breathing – types
- Artificial respiration
- Respiratory changes during exercise.

Digestive System

- Physiological anatomy and nerve supply of alimentary canal. Enteric nervous system
- Salivary Secretion: Saliva: Composition. Functions. Regulation. Mastication (in brief)
- Swallowing: Definition. Different stages. Functions.
- Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Peptic ulcer. Gastric motility. Gastric emptying. Vomiting.
- Pancreatic Secretion: Composition, production, function. Regulation.
- Liver: Functions of liver. Bile secretion: Composition, functions and regulation. Gall bladder: Functions.
- Intestine: Succus entericus: Composition, function and regulation of secretion. Intestinal motility and its function and regulation.
- Mechanism of Defaecation.

Renal System

- Physiological anatomy. Nephrons – cortical and juxtamedullary. Juxta-glomerular apparatus. Glomerular membrane. Renal blood flow and its regulation. Functions of kidneys.
- Mechanism of Urine Formation: Glomerular Filtration: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Renal clearance. Inulin clearance. Creatinine clearance.
- Tubular Reabsorption: Reabsorption of Na^+ , glucose, HCO_3^- , urea and water. Filtered load. Renal tubular transport maximum. Glucose clearance: T_mG . Renal threshold for glucose.
- Tubular Secretion: Secretion of H^+ and K^+ . PAH clearance.
- Mechanism of concentrating and diluting the Urine: Counter-current mechanism. Regulation of water excretion. Diuresis. Diuretics.
- Micturition: Mechanism of micturition. Cystometrogram. Atonic bladder, automatic bladder.
- Acid-Base balance (very brief)
- Artificial Kidney: Principle of haemodialysis.
- Skin and temperature regulation.

Endocrine System

- Major endocrine glands. Hormone: classification, mechanism of action. Functions of hormones
- Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: Secretory cells, action on target cells, regulation of secretion of each hormone. Disorders: Gigantism, Acromegaly, Dwarfism, Diabetes insipidus. Physiology of growth and development: hormonal and other influences.
- Pituitary-Hypothalamic Relationship.
- Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, synthesis, storage, action and regulation of secretion. Disorders: Myxoedema, Cretinism, Grave's disease.
- Parathyroid hormones: secretory cell, action, regulation of secretion. Disorders: Hypoparathyroidism. Hyperthyroidism. Calcium metabolism and its regulation.
- Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, regulation of secretion of Aldosterone, Cortisol, Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome. Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline. Disorders: Pheochromocytoma.
- Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon. Glucose metabolism and its regulation. Disorder: Diabetes mellitus.
- Calcitriol, Thymus and Pineal gland (very brief).
- Local Hormones. (briefly).

Reproductive System

- Physiological anatomy reproductive organs. Sex determination. Sex differentiation. Disorder
- Male Reproductive System: Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Regulation of secretion. Semen.
- Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Oogenesis. Hormones: oestrogen and progesterone-action. regulation of secretion. Menstrual Cycle: Phases. Ovarian cycle. Uterine cycle. Hormonal basis. Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Lactation. Contraception methods

Special Senses

- Vision: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic vision.
- Visual Pathway and the effects of lesions.
- Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism.
- Visual Reflexes: Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation. Color vision – color blindness. Nyctalopia.
- Audition: Physiological anatomy of the ear. Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of corti. Auditory pathway. Types of Deafness. Tests for hearing. Audiometry.
- Taste: Taste buds. Primary tastes. Gustatory pathway.
- Smell: Olfactory membrane. Olfactory pathway.
- Vestibular Apparatus: Crista ampullaris and macula. Functions. Disorders

Nervous System

- Organisation of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission. Properties.
- Sensory Mechanism: Sensory receptors: function, classification and properties. Sensory pathway: The ascending tracts – Posterior column tracts, lateral spinothalamic tract and the anterior spinothalamic tract – their origin, course, termination and functions. The trigeminal pathway. Sensory cortex. Somatic sensations: crude touch, fine touch, tactile localization, tactile discrimination, stereognosis, vibration sense, kinesthetic sensations. Pain sensation: mechanism of pain. Cutaneous pain – slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Gate control theory of pain. tabes dorsalis, sensory ataxia.
- Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia.
- Reflex Action: components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes. Stretch reflex – structure of muscle spindle, pathway, higher control and functions. Inverse stretch reflex. Muscle tone – definition, and properties hypotonia, atonia and hypertonia. UMNL and LMNL
- Spinal cord Lesions: Complete transection and Hemisection of the spinal cord.
- Cerebellum: Functions. Cerebellar ataxia.
- Posture and Equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.
- Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome
- Reticular Formation and Limbic System: Components and Functions.
- Basal Ganglia: Structures included and functions. Parkinson's disease.
- Cerebral Cortex: Lobes. Brodmann's areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.
- EEG : Waves and features. Sleep: REM and NREM sleep.
- CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier. Hydrocephalus.
- ANS: Features and actions of parasympathetic and sympathetic nervous system.

Physiology of Exercise

- A. Effects of acute and chronic exercise on
 - 1) O₂ transport
 - 2) Muscle strength/power/endurance

- 3) B.M.R./R.Q.
- 4) Hormonal and metabolic effect
- 5) Cardiovascular system
- 6) Respiratory system
- 7) Body fluids and electrolyte

B. Effect of gravity / altitude / acceleration / pressure on physical parameters

C. Physiology of Age

FIRST AID in Physiotherapy

1. Examination of Vital Signs
2. First Aid in cardiac arrest.
3. First Aid in Respiratory failure.
4. First Aid in Burns.
5. First Aid in Electric shock.
6. First Aid in Drowning.
7. First Aid in Spinal cord injuries.
8. First Aid in Hypovolemic Shock.
9. Instrumentation used in First Aid (First Aid kit).
10. First Aid in RTA.
11. CPR.
12. Artificial ventilation.

Module II - (10 Marks)

1. Basic Concepts in Biomechanics: Kinematics and Kinetics

- α) Types of Motion
- β) Location of Motion
- χ) Direction of Motion
- δ) Magnitude of Motion
- ε) Definition of Forces
- φ) Force of Gravity
- γ) Reaction forces
- η) Equilibrium
- ι) Objects in Motion
- φ) Force of friction
- κ) Concurrent force systems
- λ) Parallel force systems
- μ) Work
- ν) Moment arm of force
- ο) Force components
- π) Equilibrium of levers

2. Joint structure and Function

- a) Joint design
- b) Materials used in human joints
- c) General properties of connective tissues
- d) Human joint design
- e) Joint function
- f) Joint motion
- g) General effects of disease, injury and immobilization.

3. Muscle structure and function

- a) Mobility and stability functions of muscles
- b) Elements of muscle structure
- c) Muscle function
- d) Effects of immobilization, injury and aging

4. Biomechanics of the Thorax and Chest wall

- α) General structure and function

- β) Rib cage and the muscles associated with the rib cage
 - χ) Ventilatory motions: its coordination and integration
 - δ) Developmental aspects of structure and function
 - ε) Changes in normal structure and function I relation to pregnancy, scoliosis and COPD
5. The Temporomandibular Joint
 - α) General features, structure , function and dysfunction
 6. Biomechanics of the vertebral column
 - α) General structure and function
 - β) Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region
 - χ) Muscles of the vertebral column
 - δ) General effects of injury and aging
 7. Biomechanics of the peripheral joints
 - a) The shoulder complex: Structure and components of the shoulder complex and their integrated function
 - b) The elbow complex: Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex; the effects of immobilization and injury.
 - c) The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; prehension; functional position of the the wrist and hand.
 - d) The hip complex: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur:
 - e) The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease.
 - f) The ankle and foot complex.: structure and function of the ankle joint, subtalar joint, talocalcaneonavicular joint, transverse tarsal joint, tarsometatarsal joints, metatarsophalangeal joints, interphalangeal joints, structure and function of the plantar arches, muscles of the ankle and foot, deviations from normal structure and function – Pes Planus and Pes Cavus
 8. Analysis of Posture and Gait:

Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture, effects of posture on age, pregnancy, occupation and recreation; general features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running, effects of age, gender, assistive devices, disease, muscle weakness, paralysis, asymmetries of the lower extremities, injuries and malalignments in gait; Movement Analysis : ADL activities like sitting – to standing, lifting, various grips , pinches.

Module - III - (10 Marks)

Low frequency Currents

1. Basic types of current
 - a. Direct Current: types, physiological & therapeutic effects.
 - b. Alternating Current
2. Types of Current used in Therapeutics

Modified D.C

 - Faradic Current
 - Galvanic Current

Modified A.C

 - Sinusoidal Current
 - Diadynamic Current.
3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers.

4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles.
5. Sinusoidal Current & Diadynamic Current in Brief.
6. HVPGS – Parameters & its uses
7. Ionization / Iontophoresis : Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, wound healing.
8. Cathodal / Anodal galvanism.
9. Micro Current & Macro Current
10. Types of Electrical Stimulators
 - NMES- Construction component.
 - Neuro muscular diagnostic stimulator- construction component.
 - Components and working Principles
11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance.
12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, Stimulation for Tissue Repair.
13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications.
14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail.

Electro-diagnosis

1. FG Test
2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase.
3. Nerve conduction velocity studies
4. EMG: Construction of EMG equipment.
5. Bio-feed back.

Medium Frequency

1. Interferential Therapy: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications.
2. Russian Current
3. Rebox type Current

Thermo & Actinotherapy (High Frequency Currents)

1. Electro Magnetic Spectrum.

2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters
3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME.
4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD.
5. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous & Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Non-thermal effects, Principles & Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, Commonly used drugs, Uses. Dosages of US.
6. IRR: Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication.
7. UVR: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel, PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers. Dosages for different therapeutic effects, Distance in UVR lamp
8. LASER: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density

Superficial heating Modalities

1. Wax Therapy: Principle of Wax Therapy application – latent Heat, Composition of Wax Bath Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers.
2. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications.
3. Moist Heat Therapy: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications
4. Whirl Pool Bath: Construction, Method of Application, Therapeutic Uses, Indications & Contraindications.
5. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages.

Module IV - (10 Marks)

1. PT assessment for Orthopedic conditions - SOAP format. Subjective - history taking, informed consent, personal, past, medical and socioeconomic history, chief complaints, history of present illness. Pain assessment-intensity, character, aggravating and relieving factors, site and location. Objective- on observation - body built swelling, muscle atrophy, deformities, posture and gait. On palpation- tenderness-grades, muscle spasm, swelling-methods of swelling assessment, bony prominences, soft tissue texture and integrity, warmth and vasomotor disturbances. On examination – ROM – active and passive, resisted isometric tests, limb length-apparent, true and segmental, girth measurement, muscle length testing-tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination-dermatomes, myotomes and reflexes, special tests and functional tests. Prescription of home program. Documentation of case records, and follow up.
2. Fractures - types, classification, signs and symptoms, complications. Fracture healing - factors affecting fracture healing. Principles of fracture management - reduction - open and closed, immobilization - sling, cast, brace, slab, traction - manual, mechanical, skin, skeletal, lumbar and Cervical traction, external fixation, functional cast bracing. PT management in complications - early and late - shock, compartment syndrome, VIC, fat

embolism, delayed and mal union, RSD, myositis ossificans, AVN, pressure sores etc. Physiotherapy assessment in fracture cases. Aims of PT management in fracture cases - short and long term goals. Principles of PT management in fractures - Guidelines for fracture treatment during period of immobilization and guidelines for treatment after immobilization period.

3. Specific fractures and dislocations : PT assessment and management of upper limb fractures and dislocations. PT assessment and management of lower limb fractures and dislocations including pelvis. PT assessment and management spinal fractures.
4. Selection and application of physiotherapeutic techniques, maneuver's, modalities for preventive, curative and rehabilitative means in all conditions.
5. Principles of various schools of thought in manual therapy. (Briefly Maitland and McKenzie).
6. Degenerative and Inflammatory conditions: Definition, signs and symptoms, clinical features, pathophysiology, radiological features, deformities, medical, surgical management. Describe the PT assessment and management and home program for the following conditions – Osteoarthritis - emphasis mainly on knee, hip and hand, Rheumatoid Arthritis, Ankylosing spondylitis, Gout, Perthes disease, Periarthritic shoulder.
7. Infective conditions: Definition, signs and symptoms, clinical features, pathophysiology, radiological features, medical, surgical management. Describe PT assessment and management for following conditions – Osteomyelitis – acute and chronic, Septic arthritis, Pyogenic arthritis, TB spine and major joints - knee and hip.
8. Define, review the postural abnormalities of spinal column, clinical features, deformities, medical and surgical management. Describe PT assessment and management and home program.
9. Deformities: Review in detail the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT. assessment and management of the following conditions : Congenital : CTEV, CDH, Torticollis, pes planus, pes cavus and other common deformities. Acquired: scoliosis, kyphosis, coxa vara, genu varum, valgum and recurvatum.
10. Cerebral palsy: Definition, etiology, classification, clinical features, complications, deformities, medical and surgical management and home program with special emphasis on carrying techniques. PT management after surgical corrections.
11. Poliomyelitis: Definition, etiology, types, pathophysiology, clinical features, deformities, medical and surgical management. PT. assessment and management after surgical corrections and reconstructive surgeries - emphasis on tendon transfer and home program.
12. Leprosy: Definition, cause, clinical features, medical and surgical management. PT assessment, aims, and management after surgical procedures such as tendon transfer both pre and post operatively.
13. Amputations: Definition, levels, indications, types, PT assessment, aims, management pre and post operatively. PT management with emphasis on stump care and bandaging. Pre and post prosthetic training, checking out prosthesis, complications of amputations and its management.
14. Spinal conditions: Review the causes, signs and symptoms, investigations, radiological features, neurological signs. PT assessment, aims, and management and home program of the following conditions: Cervical spondylosis, Lumbar spondylosis, Spondylolisthesis, Spinal canal stenosis, Spondylolysis, Sacro-iliac joint dysfunction, Sacralisation, Lumbarisation, Intervertebral disc prolapse, Coccydynia, Spina bifida occulta.
15. Effects of spinal traction, types of traction, modes of application, indications for spinal traction, contraindications, precautions, limitations of traction.
16. Osteoporosis- causes, predisposing factors, investigations and treatment.
17. Orthopedic surgeries: Pre and post operative PT assessment, goals, precautions and PT management of following surgeries such as : Arthrodesis, Osteotomy, Arthroplasty-partial and total - Excision arthroplasty, excision arthroplasty with implant, interpositional arthroplasty and total replacement; Tendon transplant, Soft tissue release- tenotomy, myotomy, lengthening; Arthroscopy, Spinal stabilization, Re-attachment of limbs, External fixators, Synovectomy.

18. Shoulder joint : Shoulder instabilities, TOS, RSD, Impingement syndrome - conservative and Post operative PT management. Total shoulder replacement and Hemi replacement. - Post operative PT management. AC joint injuries - rehabilitation. Rotator cuff tears- conservative and surgical repair. Subacromial decompression - Post operative PT management.
19. Elbow and forearm: Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management.
20. Wrist and Hand: Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management.
21. Hip: Joint surgeries - hemi and total hip replacement - Post operative PT management Tendonitis and bursitis. - management.
22. Knee: Lateral retinacular release, chondroplasty- Post operative management. Realignment of extensor mechanism. ACL and PCL reconstruction surgeries - Post operative rehabilitation. Meniscectomy and meniscal repair - Post operative management. Plica syndrome, patellar dysfunction and Hoffa's syndrome- conservative management. TKR- rehabilitation protocol. Patellar tendon ruptures and Patellectomy- rehabilitation.
23. Ankle and foot: Ankle instability. Ligamentous tears- Post operative management.
24. Introduction to Bio-Engineering; Classification of Orthoses and prostheses; Biomechanical principles of orthotic and prosthetic application.
 - I. The principles involved in prescribing orthotic devices for different parts of the body. Outline the purpose of upper, lower and spinal orthotics and list major indications & contra-indications & demonstrate methods of training in their use.
 - II. Prosthetic devices
Explain the principles involved in prescribing prosthesis for upper, lower limb & spinal, describe types and their function & demonstrate methods of training in their use.
 - III. Mobility Aids : The principles involved in prescribing mobility aids, describe the types and the indications for the different types of mobility aids and demonstrate methods of training in their use
25. Sports Physiotherapy : Physical fitness. Stages of soft tissue healing. Treatment guidelines for soft tissue injuries- Acute, Sub acute and chronic stages. Repair of soft tissues- rupture of muscle, tendon and Ligamentous tears. Soft tissue injuries- prevention and rehabilitation of, Lateral ligament sprain of ankle. Rotator cuff injuries. Collateral and Cruciate injuries of knee. Meniscal injuries of knee. Supraspinatus and Bicipital tendonitis . Pre patellar and Subacromial bursitis. Tennis and Golfer's elbow. Hamstring strains, Quadriceps contusion, TA rupture. Dequervain's tenosynovitis. Trigger and Mallet finger. Plantar fasciitis. Wrist sprains. [5 Hours]
26. Applied Yoga in orthopedic conditions

Module - V - (10 Marks)

1. Neurological Assessment: Required materials for examination, Chief complaints, History taking – Present, Past, medical, familial, personal histories, Observation, Palpation, Higher mental function – Consciousness, Orientation, Wakefulness, memory, Speech, Reading, Language, Writing, Calculations, Perception, Left right confusion, Reasoning, and Judgment, Motor Examination – Muscle power, Muscle tone, Spasticity, Flaccidity, Reflexes – Developmental reflexes, deep tendon reflexes, Superficial reflexes, Sensory examination – Superficial, Deep and Cortical sensations, Special tests – Romberg's, Kernig's sign, Brudzki sign, Tinels's sign, Slum test, Lehermitte's sign, Bells Phenomenon, Gower's sign, Sun set sign, Battle's sign, Glabellar tap sign, etc, Balance examination, coordination examination, Gait analysis – Kinetics & Kinematics (Quantitative & Qualitative analysis), Functional Analysis, Assessment tools & Scales – Modified Ashworth scale, Berg balance scale, FIM, Barthel index, Glasgow coma scale, Mini mental state examination, Rancho Los Amigos Scale for Head injury, APGAR score, ASIA scale, Reflex Grading. Differential diagnosis.
2. Neuro physiological Techniques – Concepts, Principles, Techniques, Effects of following Neurophysiological techniques: NDT, PNF, Vojta therapy, Rood's Sensory motor Approach, Sensory Integration Approach,

Brunnstrom movement therapy, Motor relearning program, Contemporary task oriented approach, Muscle re-education approach and Constraint induced movement therapy.

3. Paediatric Neurology: Paediatric Examination, Developmental milestones, developmental reflexes, Neuro developmental screening tests. Evaluation & Management - History, Observation, Palpation, Milestone Examination, developmental reflex Examination, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches & Modalities in Risk babies, Minimum brain damage, Developmental disorders, Cerebral palsy, Autism, Down's Syndrome, Hydrocephalus, Chorea, Spina bifida, and syringomyelia.
4. Evaluation and Management of Brain and Spinal Cord Disorders : History, Observation, Palpation, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Cerebro vascular Accident, Meningitis, Encephalitis, Head Injury, Brain Tumors, Perceptual disorders, Amyotrophic lateral sclerosis, and Multiple sclerosis.
5. Evaluation and Management of Cerebellar, Spinal Cord and Muscle Disorders : History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Ataxia, Sensory Ataxia, Parkinson's disease, Muscular dystrophy (DMD), Myasthenia Gravis, Eaton-Lambert Syndrome, Spinal tumors, Spinal cord injury, Transverse myelitis, Bladder & Bowel Dysfunction, Spinal muscular atrophies, Poliomyelitis, Post Polio Syndrome
6. Evaluation and Management of Peripheral Nerve Injuries and Disorders : History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Hereditary motor sensory neuropathy, Guillain-Barre syndrome, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & intercostals nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, and Pudental nerve palsy.
7. Assessment and management of Neurological gaits: Quantitative and Qualitative (Kinetic & Kinematics) analysis, List of Problems, short & Long Term goals, Management of following Neurological Gaits - Hemiplegic gait, Parkinson gait, High step gait, Hyperkinetic gait, Hypokinetic gait, Waddling gait, Scissoring gait, Spastic gait, Choreaform Gait, Diplegic Gait, and Myopathic Gait.
8. Pre and Post surgical assessment and treatment following conditions - Spinal disc herniation, Spinal stenosis, Spinal cord trauma, Head trauma, Brain tumors, Tumors of the spine, Spinal cord and peripheral nerves, Cerebral aneurysms, Subarachnoid hemorrhages, epilepsy, Parkinson's disease, Chorea, Hemiballism, Psychiatric disorders, Malformations of the nervous system, Carotid artery stenosis , Arteriovenous malformations, and Spina bifida.

9. Applied Yoga in Neurological conditions

Module -VI - (10 Marks)

1. The techniques of Exercise Therapy, Approach to patient's problems, Assessment of patient's condition – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment
2. Methods of Testing
- α) Functional tests

- β) Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses., Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints
- χ) Tests for neuromuscular efficiency
 - Electrical tests
 - Manual Muscle Testing: Introduction to MMT, Principles & Aims, Indications & Limitations, Techniques of MMT for group & individual muscles : Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine
 - Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf
 - Static power Test
 - Dynamic power Test
 - Endurance test
 - Speed test
- δ) Tests for Co-ordination
- ε) Tests for sensation
- φ) Pulmonary Function tests
- γ) Measurement of Limb Length: true limb length, apparent limb length, segmental limb length
- η) Measurement of the angle of Pelvic Inclination

3. Relaxation

Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation, Pathological tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism, Indications of relaxation, Methods & techniques of relaxation-Principles & uses: General, Local, Jacobson's, Mitchel's, additional methods.

4. Passive Movements

Causes of immobility, Classification of Passive movements, Specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses , Techniques of giving passive movements.

5. Active Movements

Definition of strength, power & work, endurance, muscle actions.

Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction & relaxation, muscle fiber type, motor unit, force gradation.

Causes of decreased muscle performance

Physiologic adaptation to training: Strength & Power, Endurance.

Types of active movements

Free exercise: Classification, principles, techniques, indications, contraindications, effects and uses

Active Assisted Exercise: principles, techniques, indications, contraindications, effects and uses

Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects and uses

Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses

Types of resisted exercises: Manual and Mechanical resistance exercise, Isometric exercise, Dynamic exercise:

Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise.

Specific exercise regimens

Isotonic: de Lormes, Oxford, MacQueen, Circuit weight training

Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle Isometrics

Isokinetic regimens

6. Proprioceptive Neuromuscular Facilitation

Definitions & goals

Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb

Procedure: components of PNF

Techniques of facilitation

Mobility: Contract relax, Hold relax, Rhythmic initiation

Strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization

Stability: Alternating isometric, rhythmic stabilization

Skill: timing for emphasis, resisted progression

Endurance: slow reversals, agonist reversal

7. Suspension Therapy

Definition, principles, equipments & accessories, Indications & contraindications, Benefits of suspension therapy

Types of suspension therapy: axial, vertical, pendular

Techniques of suspension therapy for upper limb

Techniques of suspension therapy for lower limb

8. Functional Re-education

Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lowerlimb and Upperlimb activities.

9. Aerobic Exercise

Definition and key terms; Physiological response to aerobic exercise, Examination and evaluation of aerobic capacity – Exercise Testing, Determinants of an Exercise Program, The Exercise Program, Normal and abnormal response to acute aerobic exercise, Physiological changes that occur with training, Application of Principles of an Aerobic conditioning program for patients – types and phases of aerobic training.

10. Stretching

Definition of terms related to stretching; Tissue response towards immobilization and elongation, Determinants of stretching exercise, Effects of stretching, Inhibition and relaxation procedures, Precautions and contraindications of stretching, Techniques of stretching.

11. Manual Therapy & Peripheral Joint Mobilization

Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan

Biomechanical basis for mobilization, Effects of joint mobilisation, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.

12. Balance : Definition

Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output

Components of balance (sensory, musculoskeletal, biomechanical)

Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, Types

Balance retraining

13. Co-ordination Exercise

Anatomy & Physiology of cerebellum with its pathways

Definitions: Co-ordination, Inco-ordination

Causes for Inco-ordination, Test for co-ordination: equilibrium test, non equilibrium test

Principles of co-ordination exercise

Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise, progression, home exercise.

14. Posture

Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.

15. Walking Aids

Types: Crutches, Canes, Frames; Principles and training with walking aids

16. Hydrotherapy

Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Use of special equipments, techniques, Effects and uses, merits and demerits

Module – VII - (10 Marks)

1. Bedside assessment of the patient-Adult & Pediatric

2. Investigations and tests – Exercise tolerance Testing – Cardiac & Pulmonary, Radiographs, PFT, ABG, ECG, Hematological and Biochemical Tests

3. Physiotherapy techniques to increase lung volume – controlled mobilization, positioning, breathing exercises, Neurophysiological Facilitation of Respiration, Mechanical aids - Incentive Spirometry, CPAP, IPPB

4. Physiotherapy techniques to decrease the work of breathing – Measures to optimize the balance between energy supply and demand, positioning, Breathing re-education – Breathing control techniques, mechanical aids – IPPB, CPAP, BiPAP
5. Physiotherapy techniques to clear secretions – Hydration, Humidification & Nebulisation, Mobilisation and Breathing exercises, Postural Drainage, Manual techniques – Percussion, Vibration and Shaking, Rib Springing, ACBT, Autogenic Drainage, Mechanical Aids – PEP, Flutter, IPPB, Facilitation of Cough and Huff, Nasopharyngeal Suctioning.
6. Management of wound ulcers- Care of ulcers and wounds - Care of surgical scars-U.V.R and other electrotherapeutics for healing of wounds, prevention of Hypergranulated Scars Keoloids, Electrotherapeutics measures for relief of pain during mobilization of scars tissues.
7. Physiotherapy in dermatology -Documentation of assessment, treatment and follow up skin conditions. U.V.R therapy in various skin conditions; Vitiligo; Hair loss; Pigmentation; Infected wounds ulcers. Faradic foot bath for Hyperhidrosis. Massage maneuvers for cosmetic purpose of skin; use of specific oil as medium; Care of anesthetic hand and foot; Evaluation, planning and management of leprosy-prescription, fitting and training with prosthetic and orthotic devices
8. Neonatal and Pediatric Physiotherapy – Chest physiotherapy for children, The neonatal unit, Modifications of chest physiotherapy for specific neonatal disorders, Emergencies in the neonatal unit
9. Physiotherapy in Obstructive lung conditions
10. Physiotherapy in Restrictive lung conditions
11. Management of breathlessness
12. Pulmonary Rehabilitation
13. Physiotherapy following Lung surgeries
14. Respiratory failure – Oxygen Therapy and Mechanical Ventilation
15. Introduction to ICU : ICU monitoring –Apparatus, Airways and Tubes used in the ICU - Physiotherapy in the ICU – Common conditions in the ICU – Tetanus, Head Injury, Lung Disease, Pulmonary Oedema, Multiple Organ Failure, Neuromuscular Disease, Smoke Inhalation, Poisoning, Aspiration, Near Drowning, ARDS, Shock; Dealing with an Emergency Situation in the ICU.
16. Burns management - Role of physiotherapy in the management of burns, post grafted cases- Mobilization and Musculo-skeletal restorative exercises following burns
17. Physiotherapy management following cardiac surgeries.
18. Cardiac Rehabilitation.
19. Physiotherapy management following PVD
20. Abdominal Surgeries - Management of Pulmonary Restorative Dysfunction following Surgical procedures on Abdomen and Thorax
21. Management of Amputations following Diabetes, PVD - Prosthesis in amputations of lower limbs following ulcers and gangrenes
22. Physiotherapy intervention in the management of Medical, Surgical and Radiation Oncology Cases.
23. Physiotherapy in Obstetrics – Antenatal Care, Antenatal Education, Postnatal Care. Electrotherapy and Exercise Therapy measures for the re-education of Ano-Urethral sphincters.

24. Physiotherapy in Geriatrics - Approach to the treatment – Interview, examination, aims of intervention , Role of physiotherapist
25. Treatment, Response to exercise and Implications of Physiotherapy in the following disease conditions: Hypertension, Diabetes, Renal Failure and Obesity.
26. Health Fitness and Promotion: Fitness Evaluation, Analysis of Body composition, Evaluation and prescription of Exercise, Factors affecting exercise Performance, Exercise Prescription for Specific groups : Elderly, Women and Children.
27. Applied Yoga in Cardio-respiratory conditions

Module - VIII (10 Marks)

1. Ethical principles in health care, Ethical principles related to physiotherapy, enforcing standards in health profession-promoting quality care, Professional ethics in patient care delivery, Informed consent issues.
2. Rules of professional conduct
 - Physiotherapy as a profession
 - Relationship with patients
 - Relationship with health care institutions
 - Relationship with colleagues and peers
 - Relationship with medical and other professional.
3. Confidentiality and Responsibility, Malpractice and negligence, Provision of services and, advertising, Legal aspects: Consumer protection act, Legal responsibility of physiotherapist for their action in professional context and understanding liability and obligations in case of medico-legal action

ADMINISTRATION AND SUPERVISION

1. Introduction: Branches of administration, Nature and scope of administration, How to be an effective administrator, Planning hospital administration as part of a balanced health care program.
2. Principles of hospital administration and its applications to physiotherapy.
3. Planning and organization: Planning cycle, Principles of organizational charts, Resource and quality management, Planning change -innovation
4. Financial issues including budget and income generation
5. Hospital administration: Organization, Staffing, Information, Communication, Coordination, Cost of services, Monitoring and evaluation.
6. National health policy and health care system in India
7. Organization of physiotherapy department: Planning, Space, Manpower, Other basic resources.
8. Organizing meetings, committees, and negotiations
9. Personnel management: Personnel performance appraisal system, Quality care delivery from the staff
10. Material management
 - Pharmacy
 - Hospital waste disposal
11. Quality assurance
 - Hospital acquired infection
 - Quality assurance through record review and medical audit.
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12. Public relations in hospital and human resource management.

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