DETAILED SYLLABUS FOR THE POST OF SCIENTIFIC ASSISTANT (PHYSIOTHERAPY) IN MEDICAL EDUCATION SERVICE (Cat.No. : 214/2021)

(Total Marks – 100)

MUSCULOSKELETAL ANATOMY (10 marks)

a) Anatomical positions of body, axes, planes, common anatomical terminologies (Groove, tuberosity, trochanters etc) c) Bones Composition & functions, classification and types according to morphology and development. d) Joints-definition-classification, structure of fibrous, cartilaginous joints, synorial joints blood supply and nerve supply of joints. e) Muscles - origin, insertion, nerve supply and actions. f) Applied clinical anatomy related to the above topics. g) Anatomy of the fascial layers of human body

b) Upper Extremity

Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges,Ossification of individual bones 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. Superficial & Deep palmer arches of hand, skin of the palm and dorsum of hand e. Applied/Clinical anatomy related to the above topics.

c) Lower Extremity

a. Osteology : Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.Ossification of individual bones.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. d. Applied/Clinical anatomy related to the above topics.7. Head, Neck and Spine a. Osteology: Mandible and bones of the skull, paranasal sinuses (Brief outline) 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 (Brief outline). d. Spine. Structure and function, Lumbo Pelvic Rhythm 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, Inter-vertebral disc & joints. e. Applied/ Clinical related to Anatomy above topics.

d) 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 (II,V,VII,XI) (I,III,IV,VI,VIII,IX,X,XII)c. Peripheral nervous system 1. Peripheral nerves 2. Neuromuscular junction 3. Sensory end organs d) Central Nervous System 1. Spinal segments and areas 2. Brain Stem 3. Cerebellum 4. Inferior colliculi 5. Superior olliculi 6. Thalamus 7. Hypothalamus 8. Corpus striatum 9. Cerebral hemisphere 10. Lateral ventricles 11. Blood supply to brain 12. Basal Ganglia 13. The pyramidal system 14. Pons, medulla, extra pyramidal systems 15. Anatomical integration. 16. Applied /Clinical Anatomy related to the above topics.

e) 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.Intercostals muscles and Accessory muscles of respiration: Origin, insertion, nerve supply and action

PHYSIOLOGY (5 marks)

a) Nerve Muscle Physiology

• Introduction: 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. Rigormortis. Motor unit. Properties of skeletal muscles,

Strength- Duration curve, Length-tension relationship, fatigue, load. • Smooth muscle: Structure, types, mechanism of contraction. Plasticity.

b) Respiratory System

• Introduction: 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-hemoglobin 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

c) Nervous System

• Introduction: Organization 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, rnidbrain and cerebralreflexes• 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.

d) Physiology of Exercise

A. Effects of exercise and physical activities on 1) O2 transport 2) Muscle strength/power/endurance 3) Basal Metabolic Rate / Respiratory Quotient 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. Energy expenditure and fatigue D. Body Composition E. Physical Activity for Health and Fitness F. Physiology of Exercise in various age groups and diseases. G. Criteria for prescription of exercises

B. Applied Physiology

C. More detailed study of the physiology and practical applications of the following selected topics with emphasis on aspects, which should help in understanding the nature and treatment of common clinical situations of interest in Physiotherapy

D. Pulmonary Functions 1. Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application

E. 2. Respiratory adjustments in exercises. 3. Artificial respiration 4. Breath sounds. b. Cardio vascular Functions 1. Blood flow through arteries, arterioles, capillaries, veins and venules. 2. Circulation of Lymph, Oedema 3. Factors affecting cardiac Output 4. Circulatory adjustment in exercise and in postural and gravitational changes, 5. Patho physiology of fainting and heart failure

F. Muscles and Nervous System Functions 1. Peripheral nervous system, Neuromuscular transmission, Types of nerve fibres2. Action potential, Strength-duration curve, ECG, EMG, VEP, NCV 3. Degeneration and regeneration of nerve, Reactions of denervations. 4. Synaptic transmission, Stretch reflex-Mechanism and factors affecting it. 5. Posture, Balance and Equilibrium/Coordination of voluntary movement 6. Voluntary motor action, clonus, Rigidity, incoordination, 7. Special senses- Vision, taste, hearing, vestibular, Olfaction 8. Sympathetic and Parasympathetic regulation, Thermoregulation

BIOMECHANICS (10 marks)

1. Basic Concepts in Biomechanics: Kinematics and Kinetics

   a) Types of Motion b) Location of Motion c) Direction of Motion

   d) Magnitude of Motion e) Definition of Forces f) Force of Gravity g) Reaction forces h) Equilibrium i) Objects in Motion j) Force of friction k) Concurrent force systems l) Parallel force systems m) Work n) Moment arm of force o) Force components p) 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

   a) General structure and function b) Rib cage and the muscles associated with the rib cage c) Ventilatory motions: its coordination and integration d) Developmental aspects of structure and function e) Changes in normal structure and function - relation to pregnancy, scoliosis and COPD

   5. The Temparomandibular Joint

   a) General features, structure, function and dysfunction

6. Biomechanics and kinesiology of the vertebral column

a) General structure and function b) Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region c) Muscles of the vertebral column d) General effects of injury and aging

7. Biomechanics and kinesiology of the peripheral joints

2. 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 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

3. Biomechanics and kinesiology of Posture, ADL and Gait

4. 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 malalignment in gait; Movement Analysis : ADL activities like sitting – to standing, lifting, various grips , pinches

ELECTROTHERAPY (10 marks)

Introductory Physics and Electrotherapy

1. History of Electrical Modalities and Electrotherapy 2. Electricity definition, types, Static electricity a. Production of electrical charges. b. Characteristics of charged

body. c. Characteristics of lines of force. d. Potential difference and EMG. 3. Current Electricity a. Units of Electricity, Faraday, volt, ampere, coulomb, watt. b. Resistance in series and parallel. c. Ohms law and its application to DC/AC. d. Fuse. e. Shock: Micro/Macro shocks, safety precaution and management, earthing techniques & precautions. f. Burns: electrical & chemical burns, prevention and management. g. Condensors Valves, transformers: types, principles, construction and working. 4. Magnetism: Definition, properties, electromagnetic induction, electromagnetic spectrum. 5. Ionization: Principles, effects of various technique of medical ionization.

Therapeutic Electricity – 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 DC- Faradic , Galvanic Current, Modified AC- Sinusoidal Current, Diadynamic Current 3. Faradic Current: Definition, Modifications, Techniques of application of individual, muscle stimulation, Physiological & Therapeutics effects of faradic Current, Precautions, Indications, & Contra indications, Dangers. 4. Galvanic Currents: Definition, Modifications, Physiological & Therapeutics effects of Galvanic Current, Indications, & Contraindications, Dangers. Effects 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 / lontophoresis : Techniques of Application of lontophoresis, Indications ,Selection of Current, Commonly used ions (drugs) for pain, hyperhydrosis, wound healing, calcium deposits, sclerolytic action, fungal infection, edema reduction, inflammation & plantar warts. Current Amplitude and Treatment duration iontophoresis 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 lmpedance. 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 & lntense TENS, Modulated TENS. Types of Electrodes &

Placement of Electrodes, Dosage parameters, Physiological & Therapeutic, effects, lndications & 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

l. lnterferential Therapy: Define IFT. Principle of Production of Interferential current, Static lnterference System, Dynamic lnterference system. Dosage Parameters for IFT, Electrode placement in IFT. Physiological & Therapeutic effects, lndications & Contraindications. 2. Russian Current 3. Rebox type Current

Thermo & Actinotherapy (High Frequency Currents)

1. Physical Principles of Thermal energy: Specific heat, Modes of heat transfer, Effects, contraindications, precautions & adverse effects of Thermotherapy 2. Electro Magnetic Spectrum. 3. 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, lndications & Contraindications, Dangers, Dosage parameters. 4. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME. Uses of PEME. 5. Micro Wave Diathermy: Define Microwave, Wavelength & Frequency, Production ofMW Applicators, Dosage Parameters. Physiological Therapeutic effects. Indications & Contraindications. Dangers of MWD. 6. 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 VaIue 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. 7. IRR: Define IRR, wavelength & parameters Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration frequency of treatment. lndication & Contraindications 8. UVR: Define UVR- Types of UVR, UVR generators: Types of lamps, Therakatin tunnel. Psoralen Photochemotherapy, Mechanism of action, PUVA apparatus, PUVA regimen. Physiological & Therapeutic Effects. 9. 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. Section IV - Superficial heating Modalities. [15 Hrs] 1. Wax Therapy: Principle of Wax Therapy application - latent Heat. Composition of Wax Bath Therapy unit Methods of application of Wax, Physiological & Therapeutic effects lndications & Contraindications. Dangers. 2. Contrast Bath: Methods of application. Therapeutic uses, lndications & Contraindications. 3. Moist Heat Therapy: Hydro collator packs - in brief, Methods of applications Therapeutic: uses. lndications & Contraindications. 4. Fluidotherapy: Construction, Method of application. Therapeutic uses, lndications & Contraindications 5. Whirl Pool Bath: Construction Method of Application, Therpeutic Uses. lndications & Contraindications. 6. Magnetic Stimulation. Principles Therapeutic uses. lndications & contraindications. 7. Cryotherapy: Define Cryotherapy. Principle- Latent heat of fusion. Physiological Therapeutic effects, Techniques of Applications, lndications Contraindications & Dangers. Methods of application with dosages.

MEDICAL INSTRUMENTATION

1. Micro & Macro shock, source of shock, monitoring & interrupting circuit from shock 2. Calibration 3. Maintenance of equipments – Preventive maintenance, break down maintenance 4. Short wave diathermy 5. Muscle and nerve stimulator 6. IR and UV Rays 7. Stimulators including FES 8. Lasers 9. Ultrasound Conventional and Combination varieties 10. ECG EMG and EEG Equipment & Technique 11. Pacemakers, Defibrillators, Ventilators

12. Common machines in ICU

Prescription and Criteria of selection of modalities

EXERCISE THERAPY (10 marks)

1. Mechanical Principles:

   Force, Mechanics of Positions – gravity, COG, LOG, base, equilibrium, fixation, stabilization. Mechanics of movement – axis, plane, speed, velocity, work, energy, power, acceleration, momentum, inertia, friction. Simple machines, Pendulums & Elasticity – levers, pulleys, elasticity

2. Introduction to Exercise Therapy

   History and evolution of Exercise therapy The aims of exercise therapy , The techniques of exercise therapy, Approach to patients problems, Assessment of patient's condition Measurements of vital parameters, Starting positions- Fundamental positions & derived positions,Planning of treatment

3. Methods of testing

   a) Functional tests b) Measurement of joint range: ROM-Definition. Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses measurements of ROM for all peripheral joints c) Test for neuromuscular deficiency , Manual muscle testing: introduction to MMT principles and aims. Indications and limitation. Techniques of MMT for group and 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 d) Test for co-ordination e) Tests for sensations f) Pulmonary function tests g) Measurement of Limb Length: True limb length, apparent limb length, segmental limb length. h) Measurement of the angle of pelvic inclination

4. Relaxation

   Definitions: Muscle tone, postural tone, voluntary movement, degrees of relaxations, pathological tension in muscle, stress mechanics, types of stresses, effect of stress on the body mechanism, Indications of Relaxations, methods and techniques of relaxationprinciples and uses, General, local, Jacobson's, Mitchell's. Traditional Indian methods of Meditation as per Yoga.

5. 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. Dosage and progression of Passive movements

6. Active movements

   Definition of strength, power and work, endurance, muscle actions. Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction and relaxation, muscle fiber type, motor unit, force gradation. Causes of decreased muscle performance Physiologic adaptations to training: strength and power, endurance Facilitation and Inhibition Techniques

   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: techniques, effect and uses. Graded re-education technique on different groups of muscle .Types of resisted exercise: 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 exercises. Delayed onset muscle soreness. Breathing Exercises: definition, types, indications &contraindications Forced Expiratory Techniques Postural Drainage: Types, Positions, indications, contraindications, modifications & manual techniques Specific exercise Regimens: Isotonic- de Lormes, oxford, Macqueen, circuit weight training, Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple ankle isometric. Isokinetic regimens, Repetition maximum (RM) method, Delorme & Watkins, Macqueen Zinovieff (oxford technique), Plyometric Exercises, Concepts of Mckenzie exercise protocol.

7. Proprioceptive Neuromuscular Facilitation

   Definitions and goals, Basic neurophysiologic principles of PNF: Muscular activity, diagonal patterns of movement: upper limb lower limb Procedure: coTechniques 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

8. 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

9. 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.

10. 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.

11. 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 Dosage and progression of stretching. Facilitated stretching

12. Manual Therapy, Soft tissue & Neural tissue Mobilization and Massage

    Definition of Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses - Maitland, Kaltenborn, Mulligan Biomechanical basis for mobilization, Effects of joint mobilization. Indications and contraindications, Principles of mobilization. Barrier Concept, Movement Diagrams, Grades of mobilization, Techniques of mobilization for upper limb, lower limb. Precautions. Introduction to Muscle Energy Technique. Basics of Neurodynamics, Nerve tension testing & Neural tissue Mobilization, Basics of Myofascial Release & Trigger Point Release- Indications, Contraindications, Precautions & Protocol History and Classification of Massage-Technique,

Principles, Indications and Contraindications. Technique of Massage Manipulations ,Physiological and Therapeutic Uses of Specific manipulations

13. Traction

    – Definition, Principles, Types, Methods of application. Therapeutic uses, lndications & Contraindications.

14. 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.

15. Co-ordination Exercise

    Anatomy & Physiology of cerebellum with its pathways Definitions: Co-ordination, Incoordination Causes for Inco-ordination, Test for co-ordination: equilibrium test, non equilibrium test, Principles of co-ordination exercise, Frenkel's Exercise, Tai Chi etc progression, home exercise.

16. Posture

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

17. Walking Aids

    Types, Measurements, Prescription, Training & Evaluation: Crutches, Canes, Frames

18. Hydrotherapy

    Definitions, Goals and indications. Precautions and Contraindications, Properties of water. Use of special equipments, techniques. Effects and uses, merits and demerits. Limitations and scope of practice.

19. Individual and Group Exercises

Advantages and Disadvantages, Organisation of Group exercises. Recreational Activities and Sports for groups and mass gathering

20. Introduction to Yoga

Philosophy of Yoga, Use of Yoga in Medical care and Physiotherapy, Asanas - Classification Principles methods and Techniques, Pranayamas – Classification Principles. Methods and Techniques Meditation - Classification Principles. Methods and Techniques

GENERAL MEDICINE & SURGERY (10 marks)

Pediatrics: Problems and management of LBW infants, Perinatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood, Cerebral Palsy – causes, complications, clinical manifestations, treatment ; Spina Bifida – management and treatment, Epilepsies – types, diagnosis and treatment; Recognizing developmental delay, common causes of delay ; Orthopedic and Neuromuscular disorders in childhood, clinical features and management ; Sensory disorders – problems resulting from loss of vision and hearing ; Learning and behavioural problems – Hyperactivity, Autism, Challenging behavior, The Clumsy Child.

Burn: Definition, Classification, Causes, Prevention, Pathological changes, Complications, Clinical Features and Management. Skin Grafts – Types, Grafting Procedures, Survival of Skin Graft ; Flaps – Types and uses of Flaps.

Women's Health

Maternal physiology in pregnancy. Musculo skeletal disorders during pregnancy.Incontinence – Types, Causes, Assessment and Management.

ENT

facial palsy- classification, medical and surgical management of lower motor neuron type of facial palsy.

Physiotherapy in General Medicine & Surgery

1. Management of wound ulcers- Care of ulcers and wounds - Care of surgical scars using electro therapeutics for healing of wounds, prevention of Hyper granulated Scars Keloids

2. 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 Hyperhydrosis. Massage maneuvers for cosmetic purpose of skin Care of anesthetic hand and foot

3. Leprosy: Evaluation, planning and management of leprosy-prescription, fitting and training of devices and prevention of disability

4. Burns management: Role of Physiotherapy in the management of burns, post grafted cases - Mobilization and Musculo-skeletal restorative exercises following burns

5. PVD: Physiotherapy management following PVD

6. Abdominal Surgeries: Management of Pulmonary Restorative function following surgical procedures on Abdomen and Thorax

7. Amputations: Management of Amputations following Diabetes, PVD - Prosthesis in amputations of lower limbs following ulcers and gangrenes

8. Oncology: Physiotherapy intervention in the management of Medical, Surgical and Radiation Oncology Cases

9. Physiotherapy for Plastic surgery and Organ transplantations

10. Home program and education of family members in patient care

11. Physiotherapy in Obstetrics: Physiotherapy in pregnancy. Electrotherapy and Exercise Therapy measures for the Women‘s health issues

12. Treatment, Response to exercise and Implications of Physiotherapy in the following disease conditions: Hypertension, Diabetes, Renal Failure and Obesity.

13. .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.

14. Geriatrics: Role of P.T in management of age related diseases and disorders such as – Osteoporosis, Dementia, Fall prevention and fitness programmes.

15. Outcome measurement in General surgical and medical Physiotherapy care

CARDIO-RESPIRATORY DISORDERS & SURGERY (10 marks)

Respiratory Diseases: Examination of the Respiratory System –Investigations: Chest Radiographs, Pulmonary Function Testing, Arterial Blood Gas Analysis ; Clinical manifestations of Lung disease ; Patterns of lung disease – Chronic Obstructive Lung Disease and Restrictive Lung Disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following lung diseases : Chronic Bronchitis, Emphysema, Asthma, Bronchiectasis, Cystic Fibrosis, Upper Respiratory Tract Infections, Pneumonia, Tuberculosis, Fungal Diseases, Interstitial Lung Diseases, Diseases of the pleura, diaphragm and chest wall, ARDS ; Respiratory failure – Definition, types, causes, clinical features, diagnosis and management.

Paediatrics: Respiratory conditions of childhood – causes, complications, clinical manifestations, diagnosis and treatment.

Disorders of the Chest Wall, Lung and Mediastinum: Definition, Clinical features, diagnosis and choice of management for the following disorders – chest wall deformities, chest wall tumors, Pleural Effusion, Empyema Thoracis, Lung abscess, Bronchiectasis, Tuberculosis, Bronchogenic Carcinoma, Bronchial Adenomas, Metastatic tumors of the Lung, tracheal Stenosis, Congenital tracheomalacia, Neoplasms of the trachea, Lesions of the Mediastinum. Carcinoma of the female breast.

Thoracic Trauma: Causes, Clinical Presentation, Diagnosis and treatment of the following Thoracic Trauma situations – Airway obstruction, Pneumothorax, Hemothorax, Cardiac Tamponade, Tracheobronchial disruption, Aortic disruption, Diaphragmatic disruption, Esophageal disruption, Cardiac and Pulmonary Contusions

PHYSIOTHERAPY IN CARDIO-RESPIRATORY DISORDERS & INTENSIVE CARE MANAGEMENT

Physiotherapy techniques to increase lung volume – Controlled mobilization, Positioning, Breathing exercise, Neurophysiological Facilitation of Respiration, Mechanical AIDS – Incentive Spirometry, CPAP, IPPB

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

Physiotherapy techniques to clear secretions – Hydration, Humidification & Nebulisation, Mobilisation and Breathing exercise, Postural Drainage, Manual techniques – Percussion, Vibration and Shaking, Rib Springing, ACBT, Autogenic Drainage, Mechanical aids – PEP, Flutter, IPPB, Facilitation of Cough and Huff, Suctioning

Neonatal and Paediatric Physiotherapy – Chest Physiotherapy for children, The neonatal unit, Modifications chest Physiotherapy for specific neonatal disorders, Emergencies in the neonatal unit

Physiotherapy in Obstructive lung conditions

Physiotherapy in Restrictive lung conditions

Pulmonary Rehabilitation

Physiotherapy following Lung surgeries

Respiratory failure – Oxygen Therapy and Mechanical Ventilation

Introduction to ICU : ICU monitoring – Apparatus including Mechanical Ventilators, 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 emergency situation in the ICU

Physiotherapy management following cardiac surgeries

Cardiac Rehabilitation

Home program and education of family members in patient care

Cardio Pulmonary Resuscitation

Applied Yoga in Cardio-respiratory conditions

NEUROLOGY AND NEURO SURGERY (15 marks)

1. Basic Neuro Anatomy and Neurophysiology including Development of nervous system. 2. Clinical symptomatology in Neurology a. Pain and Sensory symptoms b. Motor c. Symptoms from the special organs d. Higher brain functions e.

Autonomic Nervous System f. Neurogenic Bladder and Bowel 3. Application of Neuro Physiology in clinical evaluation, investigations, differential diagnosis of Neurological conditions. 4. Definitions, Etiology, Pathology, Clinical Presentations, Diagnostic approaches including radio diagnosis, Differential Diagnosis, Complication and Medico – Surgical Management of Pediatric Neurological Disorders a. Cerebral Palsy b. Mental Retardation c. Developmental Delay d. Autism Spectrum Disorders e. Down's syndrome f. Spina Bifida g. Hydrocephalus h. Infantile Hemiplegic i. Epilepsy j. Poliomyelitis k. Muscular Dystrophies 5. Definitions, Etiology, Pathology, Clinical Presentations, Diagnostic approaches including radio diagnosis, Differential Diagnosis, Complication and Medico – Surgical Management of Infections and Inflammation of the Nervous System a. Meningitis b. Encephalitis c. Neuro Syphilis d. Poliomyelitis e. Peripheral Neuritis f. Tetanus g. Infective and Post Infective Neuropathies h. Infective Myelopathies i. Spinal Arachonditis j. Tabes Dosrsalis k. Transverse Myelitis 6. Definitions, Etiology, Pathology, Clinical Presentations, Diagnostic approaches including radio diagnosis, Differential Diagnosis, Complication and Medico – Surgical Management of Degenerative and Demyelination of CNS a. Basal ganglia: Parkinsonism, Huntington Disease, Associated Dyskinesia, Dystonia, Rett's Syndrome etc b. Cerebellar: Friedrich's and Cerebellar ataxia c. Cerebrum: Alziemers Disease, Demetia, Multiple sclerosis d. Spinal Cord: Non compressive Myelopathy e. Peripheral Nerve: Diabetic, Metabolic Neuropathies, NMJ disorders, Motor Neuron Disease 7. Definitions, Etiology, Pathology, Clinical Presentations, Diagnostic approaches including radio diagnosis, Differential Diagnosis, Complication and Medico – Surgical Management of Trauma of Nervous System a. Head Injury b. Spinal Cord Injury c. Peripheral Nerve Injury 8. Definitions, Etiology, Pathology, Clinical Presentations, Diagnostic approaches including radio diagnosis, Differential Diagnosis, Complication and Medico – Surgical Management of Compression of Nervous System a. Brain Tumor b. Cranio Vertebral Junction anomalies c. Spinal Cord Tumor d. Syringomyelia e. Inter Vertebral Disc Prolapse f. Tumors on the peripheral nervous system g. Entrapment Neuropathies 9. Definitions, Etiology, Pathology, Clinical Presentations, Diagnostic approaches including radio diagnosis, Differential Diagnosis, Complication and Medico – Surgical Management of Vascular Insult to Nervous System (8 Hours) a. CVA b. Vertebral Stroke c. Moya Moya Disease d. VBI 10. Definitions, Etiology, Pathology, Clinical Presentations, Diagnostic approaches including radio diagnosis, Differential Diagnosis, Complication and Medico – Surgical Management of

Nervous system due to Toxic, Metabolic injuries and Nutritional disorders a. Metabolic encephalopathies b. B12 Deficiency c. Alcohol related disorders d. Nutritional Polyneuropathies e. Neurolathyrism

PHYSIOTHERAPY IN NEUROLOGY & NEURO SURGERY

1. Introduction to Motor Control & Motor Learning, Introduction to Neural Plasticity 2. Introduction to various Neuro Developmental Approaches: Bobath, Roods, PNF, Brunnstorm, MRP, CIMT, Muscle Strengthening Approach, Virtual Reality, Mental Imagery, Robotics, Body Weight Supported Treadmill Training Techniques, Sensory Integration, Biofeedback in Neuro Rehabilitation, FNMS, Sensory Reeducation 3. Physiotherapy Evaluation including Neuro developmental Screening, differential diagnosis of Pediatric Nervous system and Practical application of various motor control theories in 1. Cerebral Palsy 2. Mental Retardation 3. Autism Spectrum Disorders 4. Down‘s syndrome 5. Spina Bifida 6. Hydrocephalus 7. Infantile Hemiplegic 8. Epilepsy 9. Poliomyelitis 10. Muscular Dystrophies 4. Physiotherapy Evaluation, outcome measurements, differential diagnosis, Investigations (including Radiodiagnosis, electro physiology, lab studies, non invasive procedures) of Nervous system Practical application of Physiotherapeutics in : Inflammation of the Nervous System 1. Meningitis 2. Encephalitis 3. Neuro Syphilis 4. Poliomyelitis 5. Peripheral Neuritis 6. Tetanus 7. Infective and Post Infective Neuropathies 8. Infective Myelopathies 9. Spinal Arachnoiditis 10. Tabes Dorsalis 11. Transverse Myelitis
2. Degenerative and Demyelination of CNS

   Basal ganglia: Parkinsonism, Huntington Disease, Associated Dyskinesia, Dystonia, Rett‘s Syndrome etc 2. Cerebellar: Friedrich‘s and Cerebellar ataxia 3. Cerebrum: Alzheimer’s Disease, Dementia, Multiple Sclerosis 4. Spinal Cord: Non compressive Myelopathy 5. Peripheral Nerve: Diabetic, Metabolic Neuropathies, NMJ disorders, Motor Neuron Disease

3. Trauma of Nervous System

   1. Head Injury 2. Spinal Cord Injury 3. Peripheral Nerve Injury

4.Compression of Nervous System

1. Brain Tumor 2. Cranio Vertebral Junction anomalies 3. Spinal Cord Tumor 4. Syringomyelia 5. Inter Vertebral Disc Prolapse 6. Tumors on the peripheral nervous system 7. Entrapment Neuropathies

5. Vascular Insult to Nervous System

1. CVA 2. Vertebral Stroke 3. Moya Moya Disease 4. VBI

6. Toxic, Metabolic injuries and Nutritional disorders

1. Metabolic encephalopathies 2. B12 Deficiency 3. Alcohol related disorders 4. Nutritional Polyneuropathies 5. Neurolathyrism

Practical application of Physiotherapeutics in Neurogenic Bowl and Bladder disorders

ORTHOPEDICS & SPORTS MEDICINE (15 marks)

1. Introduction to orthopaedics

   Clinical examination in an Orthopedic patient. Common investigative procedures. Radiological and Imaging techniques in Orthopeadics. Inflammation and repair, Soft tissue healing.

2. Traumatology

   Fracture: definition, types, signs and symptoms. Fracture healing. Complications of fractures. Conservative and surgical approaches. Principles of management – reduction (open/closed, immobilization etc). Subluxation/ dislocations – definition, signs and symptoms, management (conservative and operative).

3. Fractures and Dislocations of Upper Limb

   Fractures of Upper Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures: Fractures of clavicle and scapula. Fractures of greater tuberosity and neck of humerus. Fracture shaft of humerus. Supracondylar fracture of humerus. Fractures

of capitulum, radial head, olecranon, coronoid, and epicondyles. Side swipe injury of elbow. Both bone fractures of ulna and radius. Fracture of forearm – monteggia, galaezzi fracture – dislocation. Chauffer‘s fracture, Colle‘s fracture. Smith‘s fracture. Scaphoid fracture. Fracture of the metacarpals. Bennett‘s fracture. Fracture of the phalanges. (Proximal and middle.) Dislocations of Upper Limb - Anterior dislocation of shoulder – mechanism of injury, clinical feature, complications, conservative management (Kocher‘s and Hippocrates maneuver), surgical management (putti plat, bankart‘s) etc. Recurrent dislocation of shoulder. Posterior dislocation of shoulder – mechanism of injury, clinical features and management. Posterior dislocation of elbow – mechanism of injury, clinical feature, complications & management.

4. Fracture of Spine

Fracture of Cervical Spine - Mechanism of injury, clinical feature, complications (quadriplegia); Management- immobilization (collar, cast, brace and traction); Management for stabilization, management of complication (bladder and bowel, quadriplegia). Clay shoveller‘s fracture. Hangman‘s fracture. Fracture odontoid. Fracture of atlas. Fracture of Thoracic and Lumbar Regions - Mechanism of injury, clinical features, management —conservative and surgical of common fractures around thoracic and lumbar regions. Fracture of coccyx. Fracture of Rib Cage - Mechanism of injury, clinical features, management for Fracture Ribs, Fracture of sternum.

5. Fractures and Dislocations of Lower Limb

Fracture of Pelvis and Lower Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures: Fracture of pelvis. Fracture neck of femur – classification, clinical features, complications, management - conservative and surgical. Fractures of trochanters. Fracture shaft femur—clinical features, mechanism of injury, complications, management-conservative and surgical. Supracondylar fracture of femur. Fractures of the condyles of femur. Fracture patella. Fractures of tibial condyles. Both bones fracture of tibia and fibula. Dupuytren‘s fracture. Pott‘s

fracture – mechanism of injury, management. Bimalleolar fracture Trimalleolar fracture Fracture calcaneum – mechanism of injury, complications and management. Fracture of talus. Fracture of metatarsals—stress fractures jone‘s fracture. Fracture of phalanges. Dislocations of Lower Limb - mechanism of injury, clinical features, complications, management of the following dislocations of lower limb. Anterior dislocation of hip. Posterior dislocation of hip. Central dislocation of hip. Dislocation of patella. Recurrent dislocation of patella.

6. Soft Tissue Injuries

   Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, tendinosis, bursitis. Mechanism of injury of each, clinical features, managements-conservative and surgical of the following soft tissue injuries: Meniscal injuries of knee. Cruciate injuries of knee. Medial and lateral collateral injuries of knee. Lateral ligament of ankle. Wrist sprains. Strains-quadriceps, hamstrings, calf, biceps, triceps etc. Contusions- quadriceps, gluteal, calf, deltoid etc. Tendon ruptures-Achilles, rotator cuff muscles, biceps, pectorals etc.

7. Hand Injuries - mechanism of injury, clinical features, and management of the following - Crush injuries. Flexor and extensor injuries. Burn injuries of hand.

8. Amputations

   Definition, levels of amputation of both lower and upper limbs, indications, complications.

9. Traumatic Spinal Cord Injuries

   Clinical features, complications, medical and surgical management of Paraplegia and Quadriplegia.

10. Deformities

    Clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities. Congenital Deformities - CTEV. CDH. Torticollis. Scoliosis. Flat foot. Vertical talus. Hand anomaliessyndactyly, polydactyly and ectrodactly. Arthrogryposis multiplex congenita(amyoplasia congenita). Limb deficiencies- Amelia and Phocomelia. Klippel feil syndrome. Osteogenesis imperfecta(fragile ossium). Cervical rib. Acquired Deformities - Acquired Torticollis. Scoliosis. Kyphosis. Lordosis. Genu varum. Genu valgum.

Genu recurvatum Coxa vara. Pes cavus. Hallux rigidus. Hallux valgus. Hammer toe. Metatarsalgia.

11. Disease of Bones and Joints

Causes, Clinical features, Complications, Management- medical and surgical of the following conditions Infective conditions: Osteomyelitis (Acute / chronic). Brodie‘s abscess. TB spine and major joints like shoulder, elbow, hip, knee, ankle etc. Arthritic conditions: Pyogenic arthritis, Septic arthritis, Syphilitc infection of joints. Bone tumours: classification, clinical features, management - medical and surgical of the following tumors : Osteoma. Osteosarcoma, Osteochondroma. Enchondroma. Ewing‘s sarcoma. Gaint cell tumor. Multiple myeloma. Metastatic tumors. Perthe’s disease, Slipped Capital Femoral Epiphysis and Avascular Necrosis. Metabolic Bone Diseases: Rickets. Osteomalacia, Osteopenia, Osteoporosis.

12. InfIammatory and Degenerative Conditions : Causes, clinical feature, complications, deformities, radiological features, management- conservative and surgical for the following conditions :Osteoarthritis. Rheumatoid arthritis. Ankylosing spondylitis Gouty arthritis. Psoriatic arthritis. Hemophilic arthritis. Still‘s disease (juvenile rheumatoid arthritis). Charcot‘s joints. Connective Tissue Disorders- Systemic Lupus Erythematosis, Scleroderma, Dermatomyositis, Poliomyelitis, Mixed connective tissue Disease (MCTD)

13. Syndromes : Causes, Clinical features, complications, managementconservative and surgical of the following : Cervico brachial syndrome. Thoracic outlet syndrome. Vertebro- basilar syndrome. Scalenus syndrome. Costo clavicular syndrome. Levator scapulae syndrome. Piriformis syndrome

14. Neuromuscular Disorders : Definition, causes, clinical feature, complications, management. (Multidisciplinary approach) medical and surgical of the following conditions : Cerebral palsy. Poliomyelitis. Spinal Dysraphism. Leprosy.

15. Cervical and Lumbar Pathology : Causes, clinical feature, pathophysiology, investigations, management-Medical and surgical for the following : Prolapsed interverbral disc (PID), Spinal Canal Stenosis. Spondylosis (cervical and lumbar) Spondylolysis. Spondylolisthesis. Lumbago/ Lumbosacral strain. Sacralisation. Lumbarisation. Coccydynia. Hemivertebra.

16. Orthopedic Surgeries : Indications, Classification, Types, Principles of management of the following Surgeries :Arthrodesis. Arthroplasty (partial and total replacement). Osteotomy , External fixators. Spinal stabilization surgeries (Harrington‘s, Luque‘s, Steffi plating) etc , Limb re-attachments.

17. Regional Conditions

Definition, Clinical features and management of the following regional conditions a. Shoulder: Periarthritic shoulder (adhesive capsulitis). Rotator cuff tendinitis. Supraspinatus Tendinitis. Infraspinatus Tendinitis. Bicipital Tendinitis. Subacromial Bursitis. b. Elbow: Tennis Elbow. Golfer‘s Elbow. Olecranon Bursitis (student‘s elbow). Triceps Tendinitis. c. Wrist and Hand: De Quervain‘s Tenosynovitis. Ganglion. Trigger Finger/ Thumb. Mallet Finger, Carpal Tunnel Syndrome, Dupuytren‘s Contracture. d. Pelvis and Hip: IT Band Syndrome. Piriformis Syndrome. Trochanteric Bursitis. e. Knee: Osteochondritis Dissecans. Prepatellar and Suprapatellar Bursitis. Popliteal Tendinitis. Patellar Tendinitis. Chondromalacia Patella. Plica Syndrome. Fat Pad Syndrome (Hoffa‘s syndrome). f. Ankle and Foot: Ankle Sprains. Plantar Fasciitis / Calcaneal Spur. Tarsal Tunnel Syndrome. Achilles Tendinitis. Metatarsalgia. Morton‘s Neuroma.

PHYSIOTHERAPY IN ORTHOPEDICS & SPORTS

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 imbalance and muscle length testing-tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination dermatomes, myotomes and reflexes, special tests and functional tests. Physical diagnosis and differential diagnosis, Prescription of home program. Documentation of case records, and follow up. Various methods of Measurement of outcomes

2. Fractures - 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. PT management in complications - early and late - shock, compartment syndrome, VIC, fat embolism, delayed and mal union, RSD, myositis ossificans, AVN, pressure sores etc.

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 application of various schools of thought in manual therapy. (Briefly Maitland and Mc kenzie).

6. Degenerative and Inflammatory conditions: Definition, signs and symptoms,clinical features, patho physiology, 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. 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.

11. 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.

12. 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.

13. 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.

14. Traction: Effects of spinal traction, types of traction, modes of application, indications for spinal traction, contraindications, precautions, limitations of traction

15. Osteoporosis- Causes, predisposing factors, investigations and treatment.

16. Orthopedic surgeries: Pre and post operative PT assessment, goals, precautions and PT management of following surgeries such as : Arthrodesis, Osteotomy, Arthroplastypartial and total - Excision arthroplasty, excision arthroplasty with implant, interpositional arthroplasty and total replacement; Tendon transplant, Soft tissue release- tenotomy, myotomy, lengthening; Arthroscopy, Spinal stabilization, Reattachment of limbs, External fixators, Synovectomy.

17. 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 tearsconservative and surgical repair. Subacromial decompression - Post operative PT management.

18. Elbow and forearm: Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management.

19. Wrist and Hand: Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management.

20. Hip: Joint surgeries - hemi and total hip replacement - Post operative PT management Tendonitis and bursitis. - Management.

21. 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 Patellectomyrehabilitation.

22. Ankle and foot: Ankle instability. Ligamentous tears- Post operative management.

23. Sports Physiotherapy: Physical fitness. Sports diet, 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 injuriesprevention 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. Prevention of sports injuries, Doping

PHYSIOTHERAPY IN COMMUNITY HEALTH (5 marks)

1] Concepts of community health [preventive, promotive, restorative and rehabilitative

2] (a) Introduction to rehabilitation

Philosophy and need of rehabilitation. Principles of Physical medicine. Role of members of rehabilitation team. Basic Principles of Administration and Organization (b) Disability Prevention and Rehabilitation: Concepts of impairment, disability and functional limitations or Handicap. Disability evaluation methods and purposes.

3] Principles of Community based Rehabilitation: WHO definition of health and disease, Health delivery system – strategies of 3tier health delivery system, Disability types (Physical & Psychological), evaluation, prevention & Legislation related to Persons with Disability (PWD)

4] Introduction to CBR : Definition, principles, types {institutional, reach out and community), concepts, WHO policies, principles of Team work of medical practitioner, Physiotherapist, Occupational Therapist, Speech & Audiology Therapist, Prosthetist & Orthotist, Clinical psychologist, vocational counsellor and social worker, Role of PT in team, concept of multi –purpose health worker.

5] Role of Physiotherapy in CBR: Screening for disabilities, Prescribing exercise programme, Prescribing and devising low cost locally available assistive aids, Modifications physical and architectural barriers for disabled, Disability prevention, Strategies to improve ADL, Rehabilitation programmes for various neuromusculoskeletal and cardiothoracic disabilities.

6] Disability prevention and rehabilitation: Concept of impairment, Disability and Handicap or Functional Limitation, Disability evaluation methods and purpose

7] Legal aspects of disability: Compensation and benefits. Government‘s policies and rehabilitation Council. Concept of Barrier free environment , Role of

voluntary Organizations in CBR: Charitable Organizations, Voluntary health agencies –National level and International NGO‘s, Multilateral and Bilateral agencies. International Health Organizations. National District Level Rehabilitation Programme: Primary rehabilitation unit, Regional training center, District rehabilitation center, Primary Health center, Village rehabilitation worker, Anganwadi worker [2 Hours] Vocational training in rehabilitation: Introduction, Need, Vocational evaluation, Vocational rehabilitation services

8] Role of Other Allied Therapies in Rehabilitation: (a)Occupational therapy: Introduction to Occupational therapy, Philosophy and principles of Occupational Therapy, Therapeutic Media and Modalities in O.T, Role of O.T in Mental Health Physical Function and well being. (b) Speech and Language disorders and rehabilitation: Brief description of Anatomy and physiology, Classification of the disorders and respective management strategies.

9] Principles of Othotics, Prosthetics, Mobility Aids and Assistive Devices. [8 Hours] (a) Principles of Orthotics: Indications Prescription and training in usage Lower Extremity Orthotic, Upper Extremity Orthotic Spinal Orthotic (b)Principles of Prosthetics: Indications Prescription and training in usage Lower Extremity Prosthetics and Upper Extremity Prosthetics (c)Mobility aids and assistive devices: Principles involved in prescribing, Classification, and Levels and Methods of training in use.

10] Community Health Care – Prevention, Promotion & Restoration a. In Peri Pubertal age group b. In women-pregnancy, menopause c. In neuromusculoskeletal, Cardiovascular, Pulmonary, metabolic and degenerative conditions d. In Obese / Over weight e. In Cardiovascular conditions f. In Diabetes g. In Sport Person (Identify risk factor & type of training) h. Health Promotion for All

11] Woman and child care – a. Antenatal exercises , Specific Breathing exercises, Relaxation, postural training, Pelvic floor stretching and strengthening exercises with clinical reasoning b. Physiotherapy during labour c. Postnatal exercises program after normal labor / labor with invasive procedures with clinical reasoning d. Menopause -Osteoporosis, Mental health , Physiotherapy management e. Preterm babies f. Adolescent age group g. Nutritional disorders in women and children

12] Geriatrics – Physiology of Aging, Environmental changes and adaptations, Balance and falls

Physiotherapy management, Role of Physiotherapy in prolonged bed rest and in home for aged. Active aging and Aging with disabilities – WHO, Care for People with Dementias.

13] Industrial health and Occupational Diseases– I. Ability Management – Job analysis: - Job description, Job demand Analysis, Task Analysis, Ergonomic Evaluation including Anthropometric data collection, Injury Prevention, Employee Fitness Programme Disability Management:- Acute care, Concept of Functional Capacity Assessment, Work Conditioning, Work Hardening II. Environmental stress in the industrial area – A. Physical agents e.g. heat / cold, light, noise, vibration, UV radiation, ionizing radiation B. Chemical agents-inhalation, local action and ingestion C. Mechanical hazards-overuse/fatigue injuries due to ergonomic alternation and Mechanical stresses. Mechanical stresses in – i. Sedentary table work – executives, clerks ii.Vehicle drivers - Inappropriate seats, Vibrations iii. Constant standing-watchmen, defense forces, surgeons etc. iv. Labourers- Overexertion D. Psychological hazards- monotonicity and dissatisfaction in job, anxiety of work completion with quality, Multi-task activities, III Preventive and Rehabilitative Role of PT in II A, B, C & D

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.