

Program	Institutes
All Master of Physiotherapy (MPT) Programs	Manipal College of Health Professions (MCHP), Manipal Kasturba Medical College (KMC), Mangaluru Manipal Hospital, Bengaluru

### MET 2024 Test Details

- Test Duration: **120** minutes
- Total Questions: **200**
  - Anatomy (10 Qs), Physiology (10 Qs), Biomechanics (10 Qs), Electrotherapy (10 Qs), Kinesiotherapeutics (25 Qs), Physiotherapy in Orthopaedics (30 Qs), Physiotherapy in Neurology (30 Qs), Physiotherapy in Cardio Pulmonary conditions (30 Qs), Physiotherapy in Community Health (10 Qs), Physiotherapy in Paediatrics & OBG (10 Qs), Physiotherapy in Geriatrics (5 Qs), Exercise Physiology (5 Qs), Electro-diagnosis (5 Qs), Ergonomics and Occupational Health (5 Qs) and Basics of Research & Administration (5 Qs)
- Max Marks: **800**
- Marking Scheme: **+4** for every correct answer, **-1** for every wrong answer, **0** for every unanswered question
- No. of Attempts: **1**
- Schedule & Mode: Refer <https://manipal.edu/met> for updates

### Anatomy

**General Anatomy:** Anatomical position and Anatomical terms, Epithelium - Types and functions, Connective tissue -Fibers and cells, Cartilage - Types, structure and function, Bone - Types, structure and blood supply, Muscle - Classification, structure and function, Neurons - Types and structure, typical spinal nerve, Blood vessels- Arteries, veins, lymph vessels, lymph nodes, structure of lymph node, Joints - Classification, examples, structure of a typical synovial joint, Classification of synovial joints

**Systemic Anatomy:** Respiratory system, Nasal cavity: Boundaries, Lateral wall-features, blood supply, nerve supply and lymphatic drainage, Nasal septum: Formation, blood supply, nerve supply, lymphatic drainage and applied anatomy, Para nasal air sinuses and their function; Larynx: Cartilaginous framework and ligaments, Cavity of larynx, blood supply, nerve supply, Vocal cords and their movements, Rima glottides, Names of the intrinsic muscles of the larynx, their nerve supply and actions; Trachea - Extent, structure and nerve supply, Thoracic cage - Thoracic wall, intercostals spaces and their contents, Diaphragm - attachments, nerve supply and actions, Pleura - Parts, pleural cavity, pleural recesses, pulmonary ligament, Lungs - gross anatomy, roots of the lungs, surface marking of pleura and lungs,

**Cardiovascular System:** Mediastinum-boundaries and contents, Pericardium-parts, blood supply, nerve supply and function, Heart-position, external features, chambers-right and left atria, right and left ventricles and their internal features, Blood supply and nerve supply of the heart, Blood vessels in the thorax – Arteries – pulmonary trunk, ascending aorta, arch of aorta, and descending thoracic aorta – extent course and branches, Veins - brachiocephalic veins, superior vena cava, azygos, System of veins (formation, course and termination), Thoracic duct - formation, course and termination, Major arteries and veins of head and neck (name and positions), Major arteries and veins of abdomen and pelvis

**Gastrointestinal System:** Tongue - Gross anatomy, blood supply and nerve supply, Salivary glands, Pharynx - Extent, parts (nasopharynx, oropharynx and laryngopharynx), internal features, Oesophagus - Extent, parts, constrictions, blood supply, nerve supply and lymphatic drainage, Stomach – Position, relations, blood supply, nerve supply and lymphatic drainage, Parts of small intestine - duodenum, jejunum and ileum, blood supply and nerve supply, Parts of large intestine, Position of each of the parts, extent, blood supply and nerve supply, Rectum and anal canal- Position, blood supply, nerve supply and lymphatic drainage, Differences between jejunum and ileum, Differences between small intestine and large intestine, Liver- Position, anatomical and physiological lobes, surfaces, relations, porta hepatis, blood supply and nerve supply, Extrahepatic biliary apparatus- Gall bladder and bile duct, Pancreas - Position, parts, important relations blood supply and nerve supply

**Urinary System:** Kidneys - Position, external features, capsules, relations, macroscopic structure, blood supply and nerve supply, Ureter – Length, constrictions and blood supply, Urinary bladder- Position, external features, blood supply and nerve supply, Urethra - Parts of female and male urethra,

**Male Reproductive System:** Testes - Position, coverings, gross structure, blood supply, nerve supply and lymphatic drainage, Spermatic cord- Constituents and coverings, Vas deferens - Commencement, course and termination, Prostate - Position, external features, lobes and structure, Seminal vesicles and ejaculatory ducts

Female Reproductive System: Uterus - Position, parts, external features, relations, blood supply and lymphatic drainage, Uterine tube - Parts, blood supply and nerve supply, Ovary - Position and structure,

Endocrine Glands: Pituitary gland (Hypophysis cerebri) - Position, parts, blood supply, Thyroid gland - Position, parts, blood supply and lymphatic drainage, Parathyroids - Position and blood supply, Suprarenal glands - Position, parts, relations, blood supply and lymphatic drainage

Nervous System (CNS): Spinal cord - Position, external features, internal structure, brief note on important ascending and descending tracts, Brain – Parts of the hind brain, External features of medulla oblongata, pons (internal structure - briefly), Cerebellum - functional lobes of the cerebellum and its functions, Attachments of cranial nerves to the brain stem, Mid brain - External features and internal structure - in brief, Diencephalon-Thalamus and hypothalamus- position and functions, Corpus striatum - Parts and functions, Cerebral hemisphere - Lobes, important sulci and functional areas, Fiber system of the brain- Corpus callosum and internal capsule, Blood supply of the brain, Ventricles - Lateral, third and fourth ventricles, position and communications, CSF production and circulation

Special Senses: Gross anatomy of the eye, Gross anatomy of external, middle and internal ear, Skin

Musculoskeletal System: Upper extremity: Detailed study of the muscles of the pectoral region, shoulder region, front and back of the arm, front and back of the forearm and hand, Detailed study of the joints, Nerves of the upper limb - in detail, Blood vessels of the upper limb, Lymph nodes and lymph vessels of the upper limb, Bone of the upper limb; Lower extremity: Muscles of the front, medial side and back of the thigh and gluteal region, Muscles of the Leg (Extensor, peroneal and flexor compartments) and Foot, Joints of the lower limb-in detail, Arches of the foot, Nerves of the lower limb-in detail, Blood vessels, lymph nodes and lymph vessels of the lower limb, Bones of the lower limb, Vertebrae and the vertebral column

Embryology: Ovum, spermatozoon, Fertilization and formation of the germ layers and their derivatives, Development of skin, fascia blood vessels and lymphatics-general, Development of bones-axial skeleton and appendicular skeleton and muscles, Neural tube, brain vesicles and spinal cord

### Physiology

Basic Concepts and Nerve Physiology: Transport across cell membrane- Passive transport: diffusion, facilitated diffusion, osmosis, Active transport - Primary and secondary active transport, Body fluids: Distribution of total body water, ionic composition of body fluids, Neuron - Differences in structure and function of myelinated and unmyelinated nerve fibers, Resting membrane potential and Action potential

Muscle Physiology: Muscle - Classification, characteristic features of skeletal, cardiac and smooth muscles, Skeletal muscle - Structure, types of muscle fibers, Neuromuscular transmission, excitation contraction, coupling, rigor mortis, Smooth Muscle – Types

Blood: Composition and functions of blood, Plasma Proteins and their functions, Red Blood cells - Erythropoiesis:stages and regulation, Hemoglobin - Normal values, variations and functions, White blood cells - Types, Normal values and functions, Platelets - Normal range, functions, purpura, Coagulation or clotting of blood - Clotting factors, Intrinsic and extrinsic mechanisms, hemophilia, Anticoagulants - Classification and examples, Blood groups - ABO and Rh systems, importance of blood grouping, hazards and blood transfusion, Erythroblastosis fetalis, Functions of lymph

Cardiovascular System: Structure and innervations of heart and blood vessels, Properties of Cardiac muscle, Cardiac cycle, Heart sounds - Differences between first and second heart sounds, Electrocardiogram (ECG) - Waves, intervals and uses, Heart rate - Normal value, variations, regulation, Cardiac Output - Definition, Normal value, variations, regulation, role of heart rate, stroke volume and myocardial contractility, muscular exercise and cardiac output, Blood Pressure - Definition, Normal value, factors influencing BP, short-term regulation

Respiratory System: Organization - Air passages, lungs, respiratory membrane, Mechanics of breathing: Inspiration, expiration, pulmonary ventilation, alveolar ventilation, Graphical representation of pressure changes during respiration, Spirogram, Oxygen transport - Forms, oxygen dissociation curve, Carbon dioxide transport - Forms of transport, mechanism, Regulation of respiration - Neural and chemical regulation, Cyanosis, hypoxia - Types, types of hypoxia in which cyanosis occurs, Definitions of Apnea, Dyspnea, Asphyxia

Special Senses: Vision - Cross-section of eye, Functions of aqueous humor, Visual pathway, visual field defects, Accommodation to near vision, light reflex, refractory errors of the eye, Visual acuity; Hearing - Structure and functions of external, middle and inner ear, Mechanism of hearing, Vestibular apparatus - Parts and functions, Receptors for taste and smell sensations

Gastrointestinal Physiology: Salivary secretion - Composition, functions and regulation, Deglutition - Definition, stages, dysphagia, achalasia, cardia, Stomach - Functions, gastric juice-composition, mechanism and regulation of secretion, gastric motility and emptying, Pancreatic secretion - Daily secretion and pH, regulation, Functions of Liver, Composition of Bile, Functions of Gall Bladder, Digestion and absorption of carbohydrates, proteins and fats, Small intestine - types of movements, Functions of large intestine

Endocrinology: Major endocrine glands, regulation of Secretion of hormones, Hormones secreted by pituitary, thyroid, parathyroid, adrenal

glands and pancreas functions, regulation and applied aspects

Reproductive System: Male reproductive system - Parts, testis-structure and functions, spermatogenesis, endocrine functions of testis, actions of testosterone, regulation of secretion of testosterone, Female reproductive system - Parts, menstrual cycle-ovarian and uterine cycles, hormonal control, Indicators of ovulation, Physiology of pregnancy and lactation: functions of placenta and milk ejection reflex, Contraception

Renal Physiology: Functions of kidneys, structure of nephron, renal blood flow, Glomerular filtration - Glomerular filtration Rate (GFR)- Factors affecting, determination of GFR, Definition of renal threshold, tubular/transport maximum, Reabsorption and secretion in renal tubules, Concentration of urine - Counter-current multiplier and counter-current exchanger, Juxtaglomerular apparatus, Micturition reflex, Functions of skin

C N S (Details): Organisation of nervous system, Sensory receptors - classification and properties, Synapse - Mechanism of synaptic transmission, Reflex - Definition, component of basic reflex arc, stretch reflex, withdrawal reflex, Ascending tracts - Dorsal column tracts, lateral spinothalamic tracts and anterior spinothalamic tracts, Descending tracts - Pyramidal/corticospinal tract-functions, effects of lesion, Differences between upper motor neuron and lower motor neuron lesion, Cerebellum - Functional divisions, functions, feature of cerebellar lesion, Basal ganglia - Components, functions, Parkinson's disease, Functions of Thalamus, Functions of Hypothalamus, Cerebrospinal Fluid-Formation, circulation, absorption and functions, lumbar puncture, Functional areas of Cerebral Cortex, Autonomic nervous system - Organisation, functions

Physiology of Exercise - Effects of acute and Chronic Exercise on: O<sub>2</sub> transport, Muscle strength / power / endurance, BMR / RQ, Hormonal and metabolic effect, Cardiovascular system, Respiratory system, Body fluids and electrolytes, Effect of gravity / Altitude / Acceleration / Pressure on Physical parameters, Physiology of Age

## Biomechanics

Biophysics: General Principles, Description of motion, Introduction to forces, Newton's Laws (statics & dynamics), Linear and concurrent force systems, Rotatory and translator forces and motion (Torque/ movement of force), Deriving muscle forces and components, Levers and classification, Kinematics & Kinetics, Kinetic chains, Specific Tissues: Connective tissues structures ( General & specific), Mechanical behavior, Viscoclasticity, Time dependent and rate dependent Properties, Properties of specific tissues including bones, cartilage, ligament, tendon, capsule, muscle, nerve & meniscus, Classification of joints: Individual joints as in syllabus paper

Kinetics & Kinematics & Patho - Kinesiology (including joint anatomy): Spine & Pelvis, Hip, Knee, Ankle and Foot, Shoulder complex, Elbow complex, Wrist and Hand, Basic Anatomy, closed / loose part positions, Kinetics & Kinematics & Patho – Kinesiology (including joint anatomy), Kinetics & Kinematics & Patho – Kinesiology of spine & pelvis, Kinetics & Kinematics & Patho – Kinesiology of hip, Kinetics & Kinematics & Patho – Kinesiology of knee, Kinetics & Kinematics & Patho – Kinesiology of ankle & foot, Kinetics & Kinematics & Patho – Kinesiology shoulder complex, Kinetics & Kinematics & Patho – Kinesiology of elbow complex, Kinetics & Kinematics & Patho – Kinesiology of wrist and hand

Posture: Definition, Terms, Types, Postural development, Posture control mechanism, Perturbations, Synergies / Strategies, Kinetics, Kinematics - optimal / ideal position, Analysis - lateral view (sagittal plan optional), AP view frontal, Deviations from optimal alignment

Gait: Definition, Determinants, Analysis - Phases, Parameters, Kinematics, Kinetics, Deviations (Abnormal gaits), Causes, Types, Analysis, Treatment / Management, Kinetics and Kinematics of – Staircase climbing, running, squatting, kneeling, cross leg sitting

## Electrotherapy

Low Frequency Therapeutic Currents: Physiology of muscle & Nerve: Type of muscle and nerve fibers and their characteristics, Resting membrane potential, Action potential, Stimulation of the nerve, Muscle contraction, Duration of stimulus, Frequency of stimulus

Low Frequency Currents: Definition, Types, AC & DC: Faradic / Modified Faradic, Galvanic / Interrupted DC, Sinusoidal currents, Production, Physiological & Therapeutic effects, Techniques & Methods of application, Indications & Contraindications, Merits & Demerits, Transcutaneous Electrical Nerve Stimulation (TENS) - Electrodes types, effects and uses, Principles and production, Techniques/modes of application, Indications & contraindications, merits & demerits

Electrodiagnosis / Diagnostic currents (including Interpretation) Electrical Reaction –Type of nerve & muscle lesions, Reaction of complete & partial denervation, Reaction of absolute degeneration: Faradic - Galvanic (FG) Test, Strength-Duration (SD) Curve

Constant DC: Galvanism: Physiological effects, Types - Anodal & Cathodal, Therapeutic effects & Uses, Techniques & Methods of application, Dangers & Precautions, Ionisation / Iontophoresis: Theory of medical Ionisation, Effects & uses of various ions, Techniques ( includes Current parameters & Dosage)

Medium Frequency Currents: Interferential Currents / Therapy (IFT): Principle & Production, Techniques / Modes of application, Electrode

types, Effects & Uses, Indications & Contraindications, Merits & Demerits,

Thermo & Actinotherapeutics: Therapeutic Heat & Cold: Biophysics, Physiological Effects, Indication, Contraindication, precaution, methods of application, Techniques, Merits & Demerits, Conductive Heating – Dry heat, Moist Heat, Paraffin Wax Bath, Convective heating - Fluidotherapy, Contrast Bath, Introduction to radiative Heating- IRR, UVR, LASER, Cryotherapy: Indication, contraindication, precaution

High Frequency Currents: Types, Principles; SWD: Introduction, Production, Transmission of high frequency current to the tissues, Therapeutic uses of SWD, Indications and contraindications, Dangers, Methods of application, Principles of application, Dosage, Technique of application; Micro Wave Diathermy: Introduction, Production, Physiological effects, Indications and contraindications, Dangers, Dosage, Technique of application; Pulsed SWD: Introduction, Effects / Therapeutic mechanism, Physiological effects, Therapeutic uses, Contraindications, Technique of application

Ultrasonic Therapy (US): Principles, Production, Biophysics, Physiological & Therapeutic effects, Techniques / Mode / Dosage of application, Indications, contraindications, dangers & precautions, Phonophoresis - Indications, Precautions, Application of various drugs used

Radiation: UVR: Types, Principles, Production, Test Dose, Techniques of Application, Effects & Uses, indications, contraindications, dangers & precautions, IRR: Types, Principles, Production, Techniques of Application, Effects & Uses, indications, contraindications, dangers & precautions; Laser: Types, Principles, Production, Techniques of Application, Effects & Uses, indications, contraindications, dangers & precautions, Introduction to EMG NCV & Biofeedback, Pain: Physiology & Management, Extracorporeal shock wave therapy, Combination therapy

## **Kinesiotherapeutics**

Mobilization: Effects of immobilisation & injury, Arthrokinematics – concave, convex rule, Definitions, Indications, contraindications, precautions, Causes and limitations and its prevention, Principles, Assessment methods, Techniques, Individual mobilization, Upper limb, lower limb and spine

Stretching: Definitions of terms related to mobility and stretching, Properties of soft tissue - response to immobilization and stretch, Determinants, types and effects of stretching interventions, Procedural principles and guidelines for application of stretching interventions, Precautions / contraindications, Adjuncts to stretching interventions, Techniques for stretching

Manual Muscle Testing (MMT): Principle, Technique, Trick movements possible, Group Muscle testing, Individual muscle testing (Practical), Upper Limb, Lower Limb & Spine

Trick Movements: Definition & types

Muscle Strengthening: Introduction to performance, strength, power and endurance, Types of muscle fibers, Range of muscle work, Types of muscle work, Principles of strengthening, Determinants of tension generation in normal skeletal muscle, Physiological adaptations to resistance exercises / training, Determinants of resistance training, Alignment, stabilization, Intensity Repetitive maximum, volume frequency, duration, recovery period, Mode of resistant training, Weight bearing and non-weight bearing, Concept of periodization, Integration of function into resistance program, Selecting the type, initiation and progression of resistance training ( Progressive resistance exercises), Protocols for resistance training, Iso kinetics, single joint multi-joint (closed or open kinetic chain) exercise and multiangle, Muscle reeducation, Precautions and contraindications

Spinal traction: Anatomy (vertebrae, discs, facet joints, ligaments- structure and function), Definition, Effects of spinal traction, Indications, Contraindications and precautions, Modes of application, Mechanical traction, Manual traction, Positional traction, Self-traction

Walking aids: Types, Advantages / Disadvantages, Indications, Selection / Prescription, Complications, Method of using Measurement

Functional Reeducation / Mat Exercises: Principle and Indications, Effects & Uses of Individual Exercises, Transfers & Locomotion, Techniques Proprioceptive Neuromuscular Reeducation (PNF): Definition, Principle, Technique & Application

Neuromuscular co-ordination: Definition of co-ordination, Normal physiology, Inco-ordination, causes, tests and principles of management, Frenkel's exercises

Transfer techniques Wheelchair techniques

## **Physiotherapy in Orthopaedics**

General Orthopaedic Examination Protocol

Examination of Individual Joints: Shoulder, Elbow, Wrist and Hand, TMJ, Spine & Pelvis, Hip, Knee, Ankle and Foot

Manipulative Therapy: Introduction, Principles of various schools of thoughts, McKenzie's, Neural tissue mobilization, Maitland approach, Combined movements, Cyriax, Mulligans', Neuromuscular techniques, Kaltenborne, Muscle energy techniques, Myofascial release, Trigger

point therapy, Position release, Strain counter strain

Fractures (in general): Definitions, Fracture Healing, Classifications, Clinical Features, Diagnosis, Principle of Management – Reduction – Open / Closed; Immobilization – Sling, Brace, Splint, Slab, Cast, and Traction (Types), External fixation, Internal fixation, Functional cast bracing; Rehabilitation/ Physiotherapy Management (including Continuous Passive Movement), Complications – early and late, their Orthopedic and Physiotherapy Management, Emphasis on Shock, Compartmental syndrome / Volkmann’s Ischemic Contracture (VIC), Fat Embolism, Malunion, Non-union, Reflex Sympathetic Dystrophy (RSD)/ Complex Regional Pain Syndrome (CRPS), Myositis Ossification, Avascular Necrosis, Fracture disease, Pressure Sore

Fractures of the Upper Limb: Classifications, clinical management, complications and physiotherapy management, Fractures of Clavicle, Scapula, Fractures of Around the shoulder (Neck of Humerus, Head), Fractures of Shaft of Humerus, Supra Condylar fractures, Around the elbow (Condylar, Olecranon, Capitulum, Coronoid), Fractures of Forearm (Monteggia, Galeazzi fracture-dislocation), Fracture of Ulna and radius, Fracture of Wrist and Hand

Fractures of the Lower Limb: Classifications, clinical management, complications and physiotherapy management, Fracture of Pelvis, Fracture of Neck of femur, Trochanter and Sub-trochanter, Fracture of Shaft of femur, Fracture around the Knee (Patella, Supracondylar fracture; Condylar fracture of Femur and Tibia), Fracture of Shaft of Tibia and fibula, Fracture of around the Ankle (Pott’s fracture, Malleolar fracture), Fracture of Foot (Talus, Calcaneum, Metatarsus),

Fractures of the Spine: Mechanism, classifications, clinical management, complications and physiotherapy management – cervical, thoracic, lumbar spine, Atlas, Odontoid etc.

Dislocation: Definition, Classification, Clinical Features, Diagnosis, Orthopedic and Physiotherapy Management, Complications and their Management, Emphasis on Dislocation of Shoulder, Elbow, Hip, Knee and Patella

Soft Tissue conditions and Sports Injury Rehabilitation: Role of the physiotherapist in sports rehabilitation, Common soft tissue and skeletal injuries in sports, Classification: Meniscal Injuries, Sprains, Strains, Capsulitis, tendinitis, Tenosynovitis, Bursitis, Fat Pad Inflammation, Fasciitis, Cartilage lesions, Bony lesions, Shoulder and arm Region: Adhesive capsulitis, Scapular dyskinesia, Impingement syndrome, Rotator cuff tendinopathy (emphasis on Supraspinatus tendinitis) and tears, Labral injuries, Shoulder instabilities, Bursitis around shoulder, Acromio - clavicular joint sprains and dislocations, biceps brachii and pectoralis major tendinitis and muscle ruptures, Elbow region: Tennis elbow, Golfer’s elbow, Triceps tendinitis and Bursitis, Forearm, wrist and Hand region: Trigger finger, Dupuytren’s contracture, Dequervain’s disease, Intersection syndrome, game keeper’s thumb (Ulnar collateral injury of thumb), Pelvis, Hip, Thigh and Knee region: Piriformis syndrome, trochanteric bursitis

Ligament injuries – Knee - Tibial / Fibular Collateral, Cruciate ligaments, IT band friction syndrome, Jumper’s knee, Patelofemoral pain syndrome, Hoffa syndrome, Popleteal (Baker’s) Cyst, Quadriceps muscle strain, Bursitis: Supra-, Infra-(Superficial and Deep) Patellar, Pes anserinus bursitis, Leg, ankle and foot region: Plantar Fasciitis, Metatarsalgia, ligament injuries around ankle, Muscle and tendon lesions around ankle including Tendo Achillis and peroneal tendon, shin splints (medial tibial stress syndrome)

Wrist & Hand conditions: Crush Injuries, Flexor and Extensor Tendon Injury, Arthritic, Paralytic, Burn Hand, Traumatic Spinal Cord Injuries: Quadriplegic and Paraplegia, Clinical Presentation, Complications, Medical and Surgical Management, Physiotherapeutic Management

Arthritis: Clinical features, diagnosis, physiotherapy management (Includes Secondary Deformities), Synovitis, Osteoarthritis (Primary / Secondary OA), Rheumatoid Arthritis (RA), Sero-ve arthritis–Ankylosing Spondylitis, Psoriatic arthritis, Gout / Pseudo Gout, Haemophilic, Neuropathic arthritis (Charcot’s Joint)

Infections: Clinical features, diagnosis, clinical & physiotherapy management, Osteomyelitis (acute / chronic), Septic arthritis (emphasis on Knee), Tubercular (TB) Arthritis (Spine, Hip and Knee), Hansen’s disease, Poliomyelitis

Conditions of neck and back: Classification, Causes, Patho-physiology, Clinical Features, Investigations, Physiotherapy Management, Prolapsed Intervertebral Disc (PID), Spinal Canal Stenosis (SCS), Spondylosis, Spondylosis/Spondylolisthesis, Lumbo-Sacral Sprain, Sacro-Iliac sprain, Sacralisation, Lumbarisation, Coccydynia, Spinal stabilization exercises, Mechanical back pain/Postural Backache- due to Pregnancy, Obesity, Limb length discrepancy, Mechanical neck pain / Postural neck pain, Cervico-Brachial Syndrome and Thoracic Outlet Syndrome (TOS), (Cervical Rib Syndrome, Scalenus anticus syndrome, Costo-clavicular syndrome), Vertebro-Basilar Syndrome, Spinal stabilization exercises

Congenital Anomalies and developmental anomalies: Club Foot, Club Hand and other Hand Anomalies, DDH and Congenital Dislocation of Patella, spinal dysraphism / spina bifida, Perthe’s disease, Slipped -Femoral Capital Epiphysis and Avascular Necrosis (AVN)

Cerebral Palsy: Definition, Etiology, Classification, Clinical features, Complications and Management, Medical and Surgical (Multidisciplinary approach), Physical Therapy Management, Aims, Principles, Management

Peripheral Nerve Injuries: Traumatic: mechanism of injury, clinical features, diagnosis, clinical & physiotherapy management, Traumatic: Median, Radial, Ulnar, Axillary, Musculo cutaneous, Sciatic, femoral, Common peroneal, Obturator, Entrapment: Carpal Tunnel, Cubital Tunnel, Tarsal Tunnel, Supinator, Pronator teres Syndromes; Meralgia paresthetica, Brachial Plexus – Obstetric palsy, Orthopedic Surgeries

& post-surgical rehabilitation: Arthroplasty: Excision, Replacement (partial, Total) of Hip, Knee shoulder and other regions, Arthrodesis: Hip, Knee, Triple arthrodesis etc, Osteotomy

Amputations: Definition, Types, Levels, Indications, Complications, Ideal stump, Management – Pre and Post-operative, Physiotherapy Management –Pre and Post-operative (includes Stump management, Prosthetic prescription and training)

Principles of Bioengineering: Biomechanical requirements for aids and appliances, Classification of aids and appliances, Designs and technology of material handling / processing, Measurement and P.O.P. Cast techniques, Simple splint techniques, Check out procedure for static and dynamic alignment, Spinal Orthotics, L.L. Orthotic and Prosthetic and training, U.E. Orthotics and training, Principles of U.E. prosthetics, Knowledge of preparing following splints using POP, Orthoplast, Aluminum stripes and Rexene material, Short cock-up /long cock-up, Knuckle bender hand splints, Opponens, Phase I and II casts, Anterior guard, Post guard lower limb orthosis, Foot drop splint, Facial splint, Identification of the type of collegian / brace / prosthesis -used for spine and lower limb, Metabolic disorders - Osteoporosis and Osteomalacia

### Physiotherapy in Neurology

Neurological Examination: Principles of assessment, Chief complaints, History taking, Observation, Higher Mental Functions- Level of consciousness, Cognitive and perceptual assessment, Cranial nerves, Sensory assessment, Motor assessment (Muscle tone, power and voluntary control), Reflexes, Balance assessment, Coordination and Gait assessment, Functional evaluation, Problem list, clinical reasoning and goals, Pediatric neurological examination including development and reflexes

Cerebrovascular Accident: Definition, Causes, Classification, Pathophysiology, Risk factors, Clinical features, Stroke syndromes emphasis on MCA syndrome, ACA syndrome, PCA syndrome, locked in syndrome, Lateral Medullary Syndrome and Medial Medullary Syndrome, Aims and principles of physical therapy assessment and treatment of stroke patients (Prevention of secondary complications, improving motor control and function)

Traumatic Brain Injuries: Mechanisms, types, clinical features, medical and surgical management. Sequelae and complications following head injury, Aims and principles of physiotherapy assessment and treatment (Management according to RLA stages with emphasis on coma stimulation), Traumatic Brain Injuries in Infants

Physiotherapy in Cerebellar Disorders: Neuroanatomy and neurophysiology of cerebellum, Causes and Clinical features of Cerebellar dysfunction, Aims and principles of physiotherapy assessment and management (emphasis on improving stability, coordination, posture and gait)

Principles of conventional and modern treatment approaches: Conventional approaches: Roods, Vojta, Bobath, Neuro Developmental Techniques (NDT), Sensory Integration, Proprioceptive Neuromuscular Facilitation (PNF), Motor Re-learning program (MRP), Brunnstorm movement therapy, Modern treatment techniques/ approaches: FES, Body Weight Support Treadmill Training, CIMT, Mirror therapy, Mental imagery, Virtual reality

Normal Neuromotor and Cognitive Development in Children, Reflex Maturation

Cerebral Palsy: Definition, Etiology, Classification, Clinical features of individual types according to topographical classification, physiological classification, Early diagnosis of CP, Aims and principles of assessment and treatment and various approaches in physiotherapy management (emphasis on Holding, Feeding, Posture, Balance and Gait)

Down's Syndrome and Mental Retardation: Definition, Etiology, Clinical features, Aims and principles of physiotherapy assessment and treatment, Brachial Plexus Palsy: Obstetric and traumatic: Definition, Etiology, Clinical features, Medical and Surgical Management. Aims and Principles of Physiotherapy Assessment and Treatment

Infections of Nervous System: Clinical features and Physiotherapy management with emphasis on Meningitis and Encephalitis

Spinal Cord Injury: Causes, Mechanism of injury, Complete, Incomplete injuries Spinal cord syndromes and Clinical features. Aims and principles of Physiotherapy assessment (ASIA) and Management (Emphasis on prevention of complication, mat activities and functional training). Spinal orthosis, lower limb orthosis and gait training. Wheelchair prescription and training, Diseases of the Spinal Cord: Transverse myelitis, Syringomyelia and Compressive myelopathies. (Laminectomy), Aims, Principles and PT Management

Extra Pyramidal Syndromes: Parkinsonism: Classification, Pathology, Clinical features, Medical management, Physiotherapy assessment and management in Parkinson's disease, Clinical features and principles of physiotherapy management in Progressive supranuclear palsy, Wilson's disease, Huntington chorea, Multisystem Atrophy and Dystonia Hallervorden Spatz disease

Polyneuropathy: Types, etiology, pathology, clinical features and management of polyneuropathy, Gullaine Barre Syndrome: Clinical features, medical management, Physiotherapy assessment and Management in acute phase and recovery phase, Diabetic polyneuropathy: Clinical features, medical and PT management

Post-polio Syndrome: Etiopathogenesis, clinical features, complications and management. Aims, Principles and Physiotherapy assessment and Management

Motor System Disorders: Motor Neuron Disease and Spinal Muscular Atrophy, Types, Etiopathogenesis, Clinical Features, Management -Aims, Principles and Physiotherapy assessment and management

Muscular Dystrophy: Duchenne (DMD), Becker's (BMD), Facio-scapulo-humeral and Peroneal Muscular Dystrophy, Types, Etiopathogenesis Clinical features; Management-Aims, Principles and Physiotherapy assessment and management

Myopathies: Types, etiopathogenesis and clinical features; Management- Aims, principles and Physiotherapy assessment and management

Multiple Sclerosis: Types, etiopathogenesis, clinical features; Management-Aims, principles and Physiotherapy assessment and Management

Myasthenia Gravis: Neuromuscular junction: anatomy and physiology, Definition, classification (Osseman's), clinical features of myasthenia gravis, Aims, Principles and Physiotherapy management, Energy conservation techniques

Peripheral Nerve Injuries: Causes, Clinical features, Complications, Aims, Principles and Physiotherapy Management

Developmental Disorders of the Nervous System: Emphasis on Spinal dysraphism (types, definition, clinical features, complications and management)

Brain Tumor Rehabilitation, Introduction to Vestibular Rehabilitation, Lower Cranial Nerve Palsies Emphasis on Facial Paralysis, Neurogenic Bladder and its Management

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### Physiotherapy in Cardio Pulmonary conditions

Pulmonary Anatomy, Pulmonary Physiology, Cardiac Anatomy, Cardiac Vascular Physiology, Cardiac and Respiratory Pharmacology, Bio-mechanics of the Thorax, Evaluation of Cardiovascular and Respiratory system

Investigations: Radiographs, Pulmonary Function Test, Arterial Blood Gas, Electro Cardiogram, Stress Testing (Bicycle, Treadmill, Step test, 6 min walk Test, Shuttle walk test)

Physiotherapy Techniques: Bronchial Hygiene Therapy: Postural Drainage, Coughing and Huffing, Assisted Coughing Tech, Active Cycle of Breathing Technique, Autogenic Drainage, Forced Expiratory Technique, Flutter, High Frequency Chest wall Compression technique, Nebulization and Humidification, Lung Expansion Therapy: Relaxation, Breathing exercises, Incentive Spirometry, Intermittent Positive Pressure Breathing, Neurophysiologic facilitation of breathing, Positioning and early mobilization: Physiological effects of different body position, Emphasis on rationale of early mobilization

Physiotherapy in Obstructive pulmonary diseases: COPD, Bronchial Asthma, Bronchiectasis, Cystic Fibrosis

Physiotherapy in Restrictive pulmonary diseases: Interstitial Lung Disease, Occupational Lung disorders, Pleural Diseases, Neuromuscular Disorders, Skeletal disorders / trauma

Physiotherapy in Infectious Lung diseases: Pulmonary Tuberculosis, Pneumonia, Lung Abscess

Physiotherapy Management of Peripheral Vascular Diseases, Management of Amputations following Diabetes, Peripheral Vascular Diseases etc, Physiotherapy Management in Abdominal surgeries – Types of Anesthesia, Effects of Anesthesia and Surgery On the Respiratory System, Hernia Management, Immediate and Long Term Management

ICU: Introduction to Intensive Care Unit, ICU Set-up, Team, Assessment, Intensive Care Monitoring, Intensive Care Management, Pharmacology, Artificial Ventilators, Oxygen Therapy, Basic Life Support, Conditions in ICU: Tetanus, Head Injury, Pulmonary Edema, Acute Respiratory Distress syndrome, Neuromuscular Diseases, Poisoning, Respiratory failure, Shock, Physiotherapy management

Physiotherapy in Pulmonary Surgeries: Care of Inter Costal Drainage, Physiotherapy Management after Thoracic incisions, Pulmonary Rehabilitation, Physiotherapy in Cardiac surgeries, Cardiac Rehabilitation

Paediatric Respiratory Care: Differences in Adult and Paediatric, Anatomy and Physiology of Respiratory System, Physiotherapy in Paediatric Respiratory Care, Respiratory Home Care

Physiotherapy in Dermatology: Vitiligo, Alopecia, Pigmentation, Hypo/Hyper-Hydrosis, Psoralen Ultraviolet Radiation Therapy, Management of Wounds, Ulcers, Hyper Granulated Scars

Burns: Causes, Types, Evaluation, Clinical features, Complications, Management, Physiotherapy Management in Conservatively and Surgically (excision, grafts, contracture releases, re-constructions) managed acute, sub-acute and chronic conditions, Physiotherapy management in Medical, Radiation and Surgical Oncology

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### Physiotherapy in Community Health

Community Based Rehabilitation: Community Based Rehabilitation: Definition, Aims, Principles, Guidelines for formation of CBR program, limitations, present Structure using World Health Organization, Community Based Rehabilitation matrix, Outreach vs. Community Based

Rehabilitation, Approaches in rehabilitation: Multidisciplinary, Interdisciplinary and Trans disciplinary approach and its comparisons, Evaluation of patients and programs in Community Based Rehabilitation, Legislation for disabled: Persons with Disabilities act onwards, Barriers: types, guidelines for modification, Evaluation of permanent physical impairment: guidelines, Models of disability: medical, social – International Classification for Functioning disability & health, Rehabilitation in the community using the principles of assistive technology, home modification, caregiver management, self-care etc. for conditions like degenerative arthritis, osteoporosis, amputation, stroke, spinal cord injury, Parkinson’s disease, peripheral vascular disease, Chronic Obstructive Pulmonary Disease, etc.

Women’s Health (OBG): Anatomy of Abdominal wall (support) and Pelvic floor (sling), Physiological basis of exercise prescription in Adolescent, Pregnant and Menopausal women, Physiotherapy in pre, peri and postnatal period: Normal vaginal delivery, Caesarian section, Physiotherapy in post natal complications. (Including Urogenital dysfunction and Diastasis recti), Physiotherapy in Pelvic inflammatory diseases and pelvic cancer, Early intervention in high risk children 0-5 years, Health Promotion in lifestyle diseases like Diabetes mellitus, Obesity, hypertension, Sport for disabled people: types of sports, identification of sports potential, training, injury prevention etc.

### Physiotherapy in Paediatrics & OBG

Normal Development and Maturation, Factors affecting Neurodevelopment, Developmental Assessment and Early Intervention: Birth trauma, Pre-maturity, Intrauterine conditions: Intra uterine growth retardation, Intra-uterine hypoxia, Umbilical cord strangulation, Intra-uterine death, Early infancy conditions: Feeding disorders, Infant sleep problems, Infantile spasms and seizures, Neonatal hypoxia, Difficult infant behavior and impact on child development, Congenital and Hereditary Neuromuscular Diseases: Muscular Dystrophy, Down's Syndrome

Peripheral Neuromuscular Conditions: Brachial plexus injury, Mental Retardation: Aetiopathology, Management, Inborn errors of metabolism, Malnutrition and Vitamin deficiencies, eg: Rickets, CNS involvement in children eg: Meningitis, Infections of CNS e.g.: Poliomyelitis, Endocrinal disorders in children, Childhood Obesity and its Complications, Respiratory Conditions: Asthma, Tuberculosis, Bronchiectasis, Management, Acute Paediatric Respiratory Distress Syndrome, Intensive Neonatal Care: Paediatric surgical unit care-NICU and PICU, Indications for Paediatric surgery involving –Chest (Lung and Heart), Abdomen, Brain, Spinal cord, Respiratory care in NICU and PICU, Infectious diseases issues in NICU/PICU care, Complications of long term NICU/PICU course

Congenital Cardiovascular Problems and their management: Rheumatic fever, ASD, VSD, Tetralogy of Fallot, Juvenile Arthritis, Introduction: Terminologies in Obstetrics and Gynecology, Applied Anatomy: Abdominal wall, Pelvic floor, Pelvic organs, Displacements of Uterus including Prolapse, Genital tract infection including pelvic inflammatory disease, Gynecological Cancers, Common Gynecological and Obstetrics Surgeries including post-operative care, Polycystic ovarian Disease and other Endocrinopathies, Menopause, Physiology of Menstruation and Menstrual disorders and Dysmenorrhea, Physiological changes in Pregnancy, Antenatal Care, Intrapartum and Postpartum care, Contraception

### Physiotherapy in Geriatrics

Theories of Ageing, Physiological changes associated with ageing and its implications: Nervous system (Higher mental functions, Special Senses, Central Nervous System, Peripheral Nervous System and Autonomous Nervous System), Musculo-skeletal, Cardio-pulmonary, Thermo-regulatory changes, Skin, Gastro Intestinal Tract, Renal, Role of PT in community dwelling older adults (Evaluation and Management), Institutionalization: types, role of Physiotherapy, issues with exercise programs, Fitness evaluation and exercise prescription in older adults, Psychosocial implications in ageing in India: family break-up, Loneliness, cultural aspects, Physiotherapy client communication etc, Role of Physiotherapy in geriatric syndromes: Falls, Dementia, Osteoporosis, Incontinence etc, Acute response and chronic adaptation to exercise among older adults

### Exercise Physiology

Introduction to exercise physiology, Sports Nutrition, Bioenergetics: Energy currency, Energy value of food, Energy release from food, Energy transfer in body during rest and physical activity, Energy expenditure measurement, Definitions – Sedentary, Physical activity, Exercises, Physical work capacity, Exercise tolerance, VO2 MAX, Anaerobic threshold, Strength, Power, Endurance, Speed, Flexibility, Agility, Skill, Acute changes and chronic adaptations to exercise: Cardiovascular, Respiratory, Musculoskeletal, Neurological, Metabolic, Thermoregulatory, Renal, Endocrine and immune system, Muscular Fatigue: Causes, Management, Measurement of Physical fitness: Principles of testing, Methods and Testing protocols, Training of physical fitness: Principles of training, Exercise prescription guidelines, Exercise in: Medium and high altitudes, Hyperbaric environment, Microgravity, Exercise in special groups: Children, Adolescents, Females, elderly, Ergogenic aids in sports performance, Complications of prolonged bed rest/immobilization



## Electro-diagnosis

Classification and physiological properties of nerve and muscle, Muscle spindle – Reflex action, Motor units – definitions, components and physiological properties, Resting membrane potential – generation and propagation of action potential, Traditional diagnostic tests (overview): Strength Duration curve, Faradic Galvanic test, Chronaxie and Rheobase, Instrumentation for electro diagnostic testing: Panel diagram, Types of electrodes, Filter, Amplifier, Signal Averager, Gain, Sweep Speed, Display, Stimulator, Nerve Conduction Studies: Definition, Principles of Nerve Conduction Studies, Indications and disadvantages, Procedure for sensory and motor nerve conduction (Median, Radial, Ulnar, Common peroneal, Sural and Tibial Nerve), Factors affecting nerve conduction studies

Reflex studies: H Reflex, F wave, Blink reflex, Repetitive Nerve Stimulation, Introduction to Evoked potentials-Brainstem Auditory Evoked Response, Visual Evoked Potential, Somato Sensory Evoked potential, Electromyography: Introduction to Electromyography, Definition, Indications, Disadvantages, Stages of Electromyography Activity, Normal & Abnormal Potentials, Difference between neurogenic and myogenic potentials, Introduction to single fiber Electromyography (Basic), Electromyography Biofeedback: Definition, Mechanism, Uses and indications, Procedure and disadvantages, Classification of nerve lesions based on electro diagnostic studies (Neuropraxia, Axonotmesis, Neurotmesis), Analysis and interpretation of SD curve, FG test, Chronaxie, Rheobase, Nerve conduction velocity and Electromyography, Motor unit study parameters – Duration, Amplitude, Phases, Turns and Rise time

## Ergonomics and Occupational Health

Industrial Therapy - Introduction, Principles, Scope, Spectrum and Team, Ergonomics: definition, principles, evaluation and management - engineering, administrative and personal protective devices, Work related Musculoskeletal disorders: Definition, classification, risk factors, clinical presentation, evaluation and management, Evaluation: Preplacement - principles and components, Job evaluation- task, risk factors, tools, demands etc, Return to work evaluation - functional capacity evaluation, Return to work, Definition: Principles, Components: job analysis, Functional Capacity Evaluation, work hardening, work conditioning, job simulation, education, psychosocial behavioral therapy etc, Preventive and Restorative management of Work Related Musculoskeletal Disorders among employees with Sedentary nature, manual material handling, health care sector, Sports and ergonomics: designs for racquet, bats, shoes etc.

## Basics of Research & Administration

Introduction I: Biostatistics: Definition, Role of statistics in health science and health care delivery system

Introduction II: Research Methodology: Research process, Steps involved in research process, Research methods and methodology, Variables and scales of measurements: Definitions and examples of qualitative, quantitative, continuous discrete, dependent and independent variables, Definitions, properties and examples of nominal, ordinal, interval and ratio scales of measurements, Sampling: Definition of Population, What is a Sample, Why do we need sampling, Probability and non-probability sampling, Methods of probability sampling, Simple random sampling, Stratified sampling, Systematic- procedure, merits and demerits, Use of random number tables, Organization of data: Frequency table, Histogram, Frequency polygon, Frequency curve, Bar diagram, Pie chart, Measures of Central tendency: Arithmetic mean, Median, Mode, Quartiles and percentiles, Definition, Computation (for raw data), Merits and demerits, Applications

Measures of variation: Range, Inter-quartile range, Variance, Standard deviation, Coefficient of variation, Definition, computation (for raw data), merits, demerits and applications, Normal distribution: Concept, Graphical form and Properties, Concept of skewness and kurtosis, Correlation: Concept, Scatter diagram, Properties of correlation coefficient, Health Information System: Definition, Requirement, Component and uses of health information system, Sources of health information system, Census, registration of vital events, Sample Registration System (SRS), Notification of diseases, Hospital records, Disease registries, record linkage, Epidemiological surveillance, Population survey, Vital statistics and hospital statistics: Rate, ratio, Proportion, Incidence, Prevalence, Common morbidity, mortality and fertility statistics, Definition and computation, Hypothesis testing: What is hypothesis, Formulation of hypothesis, Characteristics of good hypothesis, Epidemiology: Concept of health and disease, Definition and aims of epidemiology, Descriptive epidemiology, Methods and uses, Concept of reliability and validity

Administration: Planning a PT department: Staff: Patient ratio, Supervising and delegating responsibilities, Charging, Methods of getting referrals/advertising, Facility planning, Risk Management, Equipment procurement – Assessing need, ordering etc, Equipment maintenance: Definition, activities, objectives, types

Department maintenance: Staff morale, Customer service, Time management/Department economics, Medical record / Filing / Document storage: Paper and paperless i.e., Electronic Medical Records (EMR), Documentation methods and its importance, Quality in data collection: Type of data collected and method of collection: Administrative data, clinical data, collection of data in specialist outpatient clinics, patient-

held health record, hospital census data, secondary health care data collection, Causes and sources of poor data collection, Examples of inaccuracies arising in data collection, Ways to overcome problems in data collection: Review of data collection forms, staff requirements and training, standards and checks, Why some data collected are not used by planners and managers, Managing professional and support personnel: Hiring the right people skill development through continuous training, Retaining and motivating staff, Importance of team work, Conflict resolution, Networking with other professionals, PT and others

Cosmetics of the department and consumer service, Importance of Public relations in Physiotherapy practice: Hospital public relations, Need for public relations-Internal and external environment, Methods to improve public relations, Public Education - Principles, methods, advantages, disadvantages and scope in Physiotherapy, Funding for research, Health care financing for the poor: Definition, Origin, Concept, Principles, Types of health insurance, Community based health insurance.

Delegation of work- Importance, advantages and disadvantages. Affiliation requirements for recognition of Physiotherapy courses. Consumer protection act, Independent practice issues in Physiotherapy, Hospital system: Definition, History, Classification of hospitals, Conceptual model of hospital system, Components of hospital, Functions of hospital, Emergence of hospitals in India, Hospital services, Organizational structure, Conclusion.

Administrative views in working and managing a teaching institution, large hospital, small clinic, and rural setup or home visits, Quality and compliance in Physiotherapy practice (e.g., Contributions of Physiotherapy to ISO and NABH accreditation to the hospitals), Hospital hygiene and infection control.

Legal issues: Liability, negligence, reporting abuse, Difficult/disgruntled patient, PT's right to refuse a physician's prescription in the patient's best interest

Ethics in running an independent for profit private clinic/home visits, Ethical issues in academics: Components of academic integrity, Ethical issues pertaining to: students, teachers and Administrators, Use of patients for teaching, Ethical issues in research: Principles, Guidelines (Nuremberg code, Helsinki Declaration), Institutional review board, conflict of interest, ICMR, Clinical trial registry in India

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♣ **Best of Luck** ♣

*Updated: 10:15 AM, Dec 23, 2023*