

**DETAILED SYLLABUS FOR THE POST OF ASSISTANT
PROFESSOR IN PHYSICAL MEDICINE & REHABILITATION
(MEDICAL EDUCATION**

CAT NO: 314/2024

TOTAL : 100 MARKS

Module I (10 marks)

Basic Sciences as applied to PMR

1. Anatomy

- a. Musculoskeletal system- Osteology and Myology, Functional Anatomy, Kinesiology and Anthropology, types of joints
- b. Neuroanatomy- Brain, Spinal Cord, Peripheral Nerves, Autonomic Nervous System
- c. Special Senses
- d. Cardiovascular System
- e. Respiratory System
- f. Histology of bone, cartilage, muscles, nerves and skin
- g. Urinary Tract
- h. Gastrointestinal system

2. Physiology

- a. Muscle-Ultrastructure and chemical composition, contraction, fatigue, changes in denervated muscle
- b. Synovial fluid
- c. Nerve-properties of peripheral nerve, membrane potential and depolarization, nerve impulse, nerve conduction, neuromuscular transmission, motor unit, muscle spindle, electrodiagnosis
- d. Central Nervous System- volition, sensations, coordination of movement, regulation of posture, special senses, language and speech
- e. Autonomic Nervous System
- f. Cardiovascular system

- g. Respiratory System including assessment of pulmonary function
- h. Endocrine System
- i. Renal functions, control of micturition
- j. Temperature regulation
- k. Physiology of exercise
- l. Physiology of pain

3. Biochemistry

- a. General metabolism and nutrition
- b. Acid base balance
- c. Calcium and Phosphorus metabolism

4. Biophysics

- a. Biomechanics of joint movement
- b. Properties of physical agents- heat, cold, light, electromagnetic spectrum, electricity, ultrasound, magnetism

5. Pathology

- a. Degeneration and repair
- b. Inflammation, healing
- c. Necrosis
- d. Inflammatory disorders of musculoskeletal system
- e. Metabolic bone and joint disorders
- f. Infections of bones and joints
- g. Neuropathology- trauma to the central and peripheral nervous systems, degenerative disorders, infections, metabolic disorders, cerebrovascular accidents, critical illness neuropathy
- h. Cardiovascular diseases including hypertension, coronary artery disease, atherosclerosis, peripheral vascular disease, valvular heart disease, congenital heart disease, cardiomyopathy
- i. Metabolic and endocrine disorders including dyslipidemia, thyroid disease, diabetes mellitus, obesity
- j. Respiratory diseases including infections, restrictive and obstructive lung diseases

- k. Diseases of the kidneys and urinary tract
- l. Nutritional deficiencies
- m. Diseases of muscles
- n. Common Genetic disorders
- o. Pathology of aging

6. Pharmacology

- a. Autocoids
- b. Hormones
- c. Drugs acting on the adrenergic system
- d. Drugs acting on the peripheral nervous system
- e. Muscle relaxants and antispasticity agents
- f. Cholinergics and Anticholinergics, drugs acting on the bladder.
- g. Local Anaesthetics
- h. NSAIDS and analgesics
- i. Steroids
- j. Opioids
- k. Antihypertensives
- l. Antilipidaemic agents
- m. Antiarrhythmic agents
- n. Antianginals
- o. Antiplatelet agents
- p. Anticoagulants
- q. Antibiotics and antiviral agents
- r. Drugs acting on the gastrointestinal tract
- s. Drugs acting on the respiratory system
- t. Drugs in cardiac failure
- u. Vitamins and minerals
- v. Antidepressants and anxiolytics
- w. Antipsychotics

- x. Immunosuppressants
- y. Plasminogen activators
- z. Antiseptics
- aa. Plasma expanders
 - bb. Anticancer agents
- ac. Antidiabetic agents
- ad. Disease Modifying Agents and Biologics in Rheumatology
- ae. Natural supplements

Module II (10 marks)

Clinical Physical Medicine & Rehabilitation- part 1

1. History and scope of the specialty, definitions and terminology
2. Diagnostic applications of physical agents
3. Treatment modalities used in Physical Medicine- general properties and detailed clinical use of each
 - a. Heat- general physiological properties and mode of action as a treatment agent, indications and contraindications, forms of heat therapy- superficial and deep heating including treatment techniques, with emphasis on infrared, hydrocollator, paraffin wax bath, convection heating devices, shortwave diathermy, microwave diathermy and ultrasonic therapy
 - b. Cold as a therapeutic agent
 - c. Ultraviolet radiation- physiological properties of UVR, mode of application in clinical use with indications, contraindications and side effects
 - d. Therapeutic Electricity- low voltage currents, low and high frequency currents, TENS, Interferential current, electroacupuncture, FES
 - e. Hydrotherapy
 - f. Prescription of physical modalities and their applications in medical, surgical and gynaecological disorders
4. Clinical use of massage, manipulation, stretching and traction
5. General principles of therapeutic exercises for muscle strength, endurance, power, motor reeducation, coordination and joint mobility; maintenance of physical fitness through optimum exercise

6. Prescription of exercise therapy and other supportive measures
7. Setting up a physiotherapy section
8. Chest physiotherapy

Module III (10 marks)

Clinical Physical Medicine & Rehabilitation- part 2

1. Analysis of gait- kinetics, kinematics, normal and pathological gait, gait analysis and gait lab
2. Energy costs of functional activities in health and disease, experimental and clinical use of ergometry in Physical Medicine

Module IV (10 marks)

Clinical Physical Medicine & Rehabilitation- part 3

1. Principles of occupational therapy, training in Activities of Daily Living for rehabilitation, self-help devices, Instrumental Activities of Daily Living, Environmental Control Units, setting up an Occupational Therapy section
2. Rehabilitation Aids including walking aids, wheelchairs of different types, tricycles, modified vehicles
3. Transfer and transfer techniques in mobility

Module V (10 marks)

Clinical Physical Medicine & Rehabilitation- part 4

1. Assessment Tools and Outcome Measures in Rehabilitation Medicine such as the Ashworth and Modified Ashworth Scales, Penn Spasm Frequency Scale, Functional Independence Measure, Barthel Index, , Modified Rankin Scale, Glasgow Coma Scale, Glasgow Outcome Scale, Mini Mental Status Examination, Rancho Los Amigos Scale, Kellgren and Lawrence system, WOMAC Index, , Chronic Disability Index of Waddell and Main, Oswestry Disability Index, VAS, Bath Index, Bryce Ragnarrson Taxonomy of pain following SCI, Foot and Ankle Disability Index ,QOL assessment, GMFCS etc.
2. International Classification of Diseases (ICD)
3. International Classification of Functioning, Disability and Health(ICF)

Module VI (10 marks)

Clinical Physical Medicine & Rehabilitation- part 5

Electrodiagnosis- electrophysiological testing of nerves and muscles- principles and practice

Module VII (10 marks)

Clinical Physical Medicine & Rehabilitation- part 6

Sports Medicine-

- a. Physical fitness training for sports personnel
- b. Rehabilitation of the injured athlete
- c. Sports for the differently-abled
- d. Nutrition in Sports
- e. Use and abuse of drugs in sports
- f. Rational and safe use of medications in sports
- g. Fluid and electrolyte changes in exercise
- h. Safety management and prevention of sporting trauma, principles of safety equipment
- i. Knowledge of contact and non-contact sports
- j. Sudden death in sports
- k. Chronic and overuse injuries in sports
- l. Medical and psychological problems of athletes
- m. The growing athlete
- n. The female athlete
- o. Performance below par
- p. Ethics of sports medicine and rehabilitation
- q. Managing medical issues at stadiums
- r. Non-competitive and competitive sports

Module VIII (10 marks)

Clinical Physical Medicine & Rehabilitation- part 7

Rehabilitation Management of persons with various systemic disorders

1. Neuromuscular disability caused by various neurological diseases with particular emphasis on strokes, traumatic and non-traumatic

spinal cord injury, cerebral palsy, traumatic brain injury, anterior horn cell disease, peripheral neuropathies, myopathies, diseases of the neuromuscular junction, problems with posture and balance, disorders of deglutition, speech and communication

2. Orthopaedic and musculoskeletal disability caused by various orthopaedic conditions with emphasis on arthritides, limb amputations, joint deformities, skeletal trauma, various soft tissue syndromes, congenital limb deficiencies, spinal deformities, problems with posture and balance, upper and low back pain, trunk, neck, shoulder, elbow, wrist, hand, hip, knee, ankle and foot pain
3. Cardiovascular impairment and disability
4. Pulmonary impairment and disability
5. Urological impairment and disability
6. Bowel dysfunction and disability
7. Sexuality issues in Rehabilitation Medicine
8. Disability from cancer
9. Burns rehabilitation
10. Obesity, Diabetes Mellitus, Dyslipidaemia and other lifestyle disorders
11. Medical emergencies in Rehabilitation Medicine
12. Multiple disabilities
13. Geriatric disability

Prosthetics and Orthotics

1. General definitions- evolution of the field with emphasis on the Indian scene
2. Indications for amputations, classical amputations, influence of prosthetic technology on amputation techniques, ideal residual limb, residual limb complications and management
3. Clinical examination of amputees and prescription of prosthesis
4. Types of lower limb prosthesis, biomechanical considerations, hip, knee and foot mechanics, alignment and fit, check out
5. Prosthetic gait and prosthetic gait deviations

6. Recent advances in amputation surgery and prosthetic science and technology, myoelectric control, computer aided design and manufacture, intelligent prostheses
7. Immediate postoperative fitting of prosthesis
8. Types of upper extremity prosthesis- functional considerations, cosmetic considerations
9. Bracing -indications and preliminary considerations on pre-orthotic preparation and post-orthotic training
10. Types of common braces and corrective shoes – prescription criteria and check out procedures in fitting- lower extremity, upper extremity and spinal orthoses
11. Materials used in prosthetic and orthotic manufacture
12. Equipment necessary for prosthetic and orthotic fabrication, organization of prosthetic and orthotic workshop, minimum requirements for setting up an artificial limb fitting centre

Interventional Physiatry

1. Various injections and injection techniques used in physiatry
2. Musculoskeletal ultrasonography and ultrasound guided techniques

Pain

Evaluation and management of acute and chronic musculoskeletal and neurological pain, chronic pain and chronic pain behaviour, cancer pain

Social health and Disability

Epidemiology of disability, health seeking behaviour, social planning and development, socialization, peer support, environment and health, social groups and leadership, family, community, social psychology, QOL, NGOs in the field of disability, vocational counseling, Sustainable Development Goals and Disability, medical and social work as relevant to Rehabilitation Medicine, urbanization and disability, accessibility, barriers to rehabilitation, Community Based Rehabilitation

Research and Development in Rehabilitation Medicine, computers and AI in rehabilitation, Evidence Based Rehabilitation Medicine

Recent Advances in Physical Medicine & Rehabilitation

Module IX (10 marks)

The Law and Disability

Law in relation to disability- the PWD Act 1995, the RPWD Act 2016, the RCI Act, the National Trust Act, the rights of persons with disabilities, the GOI guidelines on the evaluation of Permanent Physical Impairment, disability caused by visual impairment, hearing impairment, intellectual disability, mental illness, disability caused by chronic neurological conditions, disability caused by blood disorders, the leprosy cured persons with disabilities, short stature or dwarfism, multiple disabilities, the Mental Health Acts, the Rehabilitation Council of India

Module X (10 marks)

Allied Disciplines

Medicine including Neurology and Rheumatology

- a. General metabolic and endocrine disorders
- b. Common communicable diseases prevalent in India
- c. Disorders of nutrition
- d. Degenerative diseases and special problems in the elderly
- e. Genetics and genetic counselling
- f. Common cardiovascular disorders
- g. Common respiratory disorders
- h. Congenital disorders of the nervous system
- i. Hereditary disorders of the nervous system
- j. Progressive disorders of the nervous system
- k. Language disorders
- l. Epilepsy
- m. Stroke
- n. Traumatic Brain Injury

- o. Spinal cord injury
- p. Disorders of peripheral nerves
- q. Extraparamidal disorders
- r. Multiple sclerosis
- s. Infectious and Toxic Encephalopathy
- t. Disorders of frontal lobe function, dementias
- u. Apraxia, Agnosia, Aphasia
- v. HIV and AIDS
- w. Corona virus and covid infection, other viral infections of epidemiologic interest

Surgery including Orthopaedic surgery

- a. Shock
- b. Burns
- c. Wound infections and their management
- d. Pressure Injuries
- e. Neurogenic dysfunction of the bowel and its rehabilitation
- f. Life Support
- g. Common orthopedic injuries and principles of management, plaster techniques, complications of fractures, postsurgical patient, joint replacements, spinal stabilization
- h. Paediatric orthopedic problems including congenital limb deficiencies
- i. Congenital, infective, inflammatory, metabolic, degenerative and neoplastic disorders of bones and joints
- j. Scoliosis
- k. Amputations
- l. Rehabilitative surgery for the hand
- m. Hip, knee and foot disorders

Community Medicine

- a. Identification of community needs for health services, including rehabilitation services, utilization of the epidemiological approach and statistical methodology

- b. Principles of comprehensive health care, integrating rehabilitation services with general health services
- c. Preventive rehabilitative approach in medical care at the grassroot and intermediate community levels
- d. Immunization
- e. Health education

Pediatrics

- a. Growth and development
- b. IQ
- c. Developmental delay and cerebral palsy
- d. Mental retardation
- e. Behavioural disorders in children
- f. Special education
- g. Common congenital and hereditary disorders in children
- h. Nutritional concerns in children
- i. Childhood disability
- j. Autistic disorders
- k. Blood dyscrasias- hemophilia, sickle cell disease, thalassemia

Psychiatry and Clinical Psychology

- a. Mental status, intelligence and personality assessment
- b. Behavioural disturbances due to organic brain damage
- c. Overt psychopathologic reactions- neurotic, psychotic and sociopathic states
- d. Anxiety, Depression
- e. Psychological responses to illness and disability
- f. Introduction to counseling, counseling in individuals and organizations, roles and responsibilities of counselors, methods of counseling, application in PMR
- g. Memory and disorders of memory

Cardiology

- a. Common disorders of the cardiovascular system with particular emphasis on the congenital, rheumatic, hypertensive and ischaemic diseases
- b. Assessment and classification of the functional status of the heart and work capacity, application of data for rehabilitation, recent advances
- c. Rehabilitation of the patient with cardiomyopathy, valvular heart disease, coronary artery disease, after myocardial infarction, after coronary artery bypass graft, after cardiac transplantation
- d. Exercise testing protocols (Bruce, Naughton and others)

Pulmonology

- a. Allergic, infective neoplastic, obstructive and restrictive disorders of the respiratory system
- b. Oxygen Therapy and Long Term Oxygen Therapy
- c. Hyperbaric Oxygen Therapy
- d. Mechanical Ventilation
- e. Care of the patient on mechanical ventilation

Radiology and Nuclear Medicine

- a. Interpretation of radiological findings in common diseases
- b. Common diagnostic radiological procedures- Xray, CT, MRI, PET
- c. Ultrasonography with emphasis on Musculoskeletal ultrasonography
- d. Contrast studies and their significance
- e. Principles of Nuclear Medicine, applications in PMR

Radiotherapy and Palliative Medicine

- a. Principles of radiation therapy
- b. Principles and practice of palliative care
- c. Cancer care in Rehabilitation Medicine
- d. Principles of anti-cancer chemotherapy

Neurosurgery

- a. Neurosurgical management of trauma to the central nervous system
- b. Neurosurgical management of infections of the central nervous system
- c. Neurosurgical management of neoplasms of the central nervous system
- d. Neurosurgery in Parkinson's Disease and Parkinsonian Syndrome
- e. Nerve repairs and transfers
- f. Intrathecal Baclofen pump

Plastic Surgery

- a. Principles and methods of skin grafting, myofascial flap surgery, pedicle grafts
- b. Principles of reconstructive surgery for correction of deformities
- c. Hand surgery in Hansen's Disease, Cerebral Palsy, hand contractures
- d. Plastic procedures in post-burns contractures
- e. Plastic procedures in obesity
- f. Tendon transfers and repairs in upper and lower limbs

Urology

- a. Evaluation and management of neurogenic dysfunction of the bladder
- b. Sexual dysfunction and rehabilitation
- c. Upper and lower urinary tract infections and management
- d. Renal transplantation and rehabilitation

Otorhinolaryngology

- a. Assessment of hearing and hearing impairment, management of hearing impairment
- b. Assessment of vertigo and disequilibrium and management
- c. Assessment of speech disorders and management
- d. Assessment of disorders of deglutition and their management
- e. Cochlear implant
- f. Hearing aids
- g. Artificial larynx
- h. Care of tracheostomy, nasogastric tube
- i. Special education in the field of hearing impairment

Ophthalmology

- a. Assessment of visual impairment and management
- b. Low vision aids
- c. Causes of blindness and prevention of blindness
- d. Disability evaluation and rehabilitation of visual impairment
- e. Special education for the visually impaired

Obstetrics and Gynaecology

- a. Women's issues in rehabilitation
- b. Pelvic infections
- c. Urogenital prolapse
- d. Exercises and their role in Obstetrics and Gynaecology practice

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.

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