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Total Number of Pages: (02)

Course: MPT

SUBJECT NAME: Biomechanics and Therapeutics

SUB_CODE: 23MPT103

Q. CODE: A081

(1st Year MPT) Examination: 2023-24 (Admitted Batch)

Max Time: 3 Hours

Max Marks: 80

Sitting: 1st, 10.00 AM to 12.30 PM

Any Question having parts should be answered as whole at one place only.

Illustrate answer with diagrams wherever relevant / required if any)

The figures in the right-hand margin indicate marks.

Q 1 Long Answer questions (any four out of six) (4 x 15 Marks)

- Explain the biomechanical properties of soft tissues (muscles, tendons, ligaments, and cartilage) and their role in human movement. Discuss how injuries to these structures affect movement patterns and rehabilitation.
- Provide a detailed explanation of the concept of energetics in human movement. Discuss the relationship between energy, power, and efficiency during different physical activities, and how metabolic energy consumption is impacted during low-intensity vs. high-intensity activities.
- Analyze the changes in the biomechanics of gait across the lifespan. Discuss the growth and development of the musculoskeletal system in children, the maturation of mobility and gait, and the changes that occur in older adults.
- Explain the concepts of kinetics and kinematics in biomechanics. Discuss their application in analyzing human movement, with a focus on the joint motions of the upper and lower limbs during walking.
- Discuss the concept of degrees of freedom and the moment of force. How do these concepts relate to human movement and stability in everyday functional activities, such as sitting, standing, and walking?
- Describe the various types of force systems (internal and external forces) acting on the human body during different activities. How do these forces influence the stability and movement of joints such as the knee, hip, and ankle?

Q 2 Short answer questions (any five out of eight) (5 x 4 Marks)

- Describe the differences between acute pain and chronic pain. What are the key factors contributing to the transition from acute to chronic pain, and how does this affect rehabilitation?
- Discuss the principles of body composition analysis and anthropometric measurements. How do these tools help in assessing a patient's physical health and tailoring physiotherapy interventions?

- c) Discuss the concept of equilibrium in biomechanics. How does static equilibrium differ from dynamic equilibrium, and how does it apply to postural control in different age groups?
- d) Briefly describe the impact of aging on gait mechanics. What are the common biomechanical changes in gait observed in older adults, and how can physiotherapy address these issues?
- e) What is the significance of the degrees of freedom in human biomechanics? How do they influence the range of motion and stability of the shoulder joint?
- f) Explain the concept of pain pathways in the human body. How do nociceptors, spinal cord transmission, and brain processing contribute to the perception of pain?
- g) Explain the role of electrodiagnostic tests such as NCV (Nerve Conduction Velocity) in assessing neuromuscular function. How do these tests contribute to treatment planning in physiotherapy?
- h) What is the role of electromyography (EMG) in assessing muscle activity? Explain how EMG is used in the evaluation of muscle function in patients with neurological or musculoskeletal disorders.
