

MASTER OF PHYSIOTHERAPY (MPT)
SEMESTER -II EXAMINATION, JUNE-2026

(MPT202) BIOMECHANICS & CLINICAL KINESIOLOGY

[Time allotted: Three Hours]

[Max Marks: 100]

Note: Read all the instructions carefully

Answer all questions in serial order, Draw suitable diagrams wherever necessary

Q. 1. Objective type questions: (Attempt All)**(10 x 02 = 20)**

(Very short/ Short answer/ MCQ/ One liners/ Fill in the blanks/ True/False)

- a. In the 90 degree abduction of arm, if the pull of abductors muscles is equal to the force of gravity, the arm.....
 - i. Falls toward gravity
 - ii. Further abducts
 - iii. Remains stationary
 - iv. Moves in the gravity eliminated plane
- b. In coxa vara, the angle of
 - i. Torsion increases
 - ii. Torsion decreases
 - iii. Inclination increases
 - iv. Inclination decreases
- c. All of the following ligaments are present around the sternoclavicular joint except:
 - i. Coracoclavicular
 - ii. Interclavicular
 - iii. Sternoclavicular
 - iv. Costoclavicular
- d. The normal lumbosacral angle is
 - i. 10 degree
 - ii. 20 degree
 - iii. 30 degree
 - iv. 40 degree
- e. During running or with increased velocity,.....
 - i. Double unsupported phase occurs
 - ii. Double support appears
 - iii. Single leg stance appears
 - iv. Double stance appears
- f. Which of the following is the most commonly weakened muscle in forward head posture?
 - i. Upper trapezius
 - ii. Middle trapezius
 - iii. Lower trapezius
 - iv. Rhomboid Major
- g. During inspiration, in thoracic size and in intrathoracic pressure occurs.
 - i. Increase, Decrease
 - ii. Decrease, Increase
 - iii. Increase, Increase
 - iv. Decrease, Decrease
- h. In the wrist joint, i.e. radiocarpal joint, ulnar deviation is more than radial deviation
(True/False)
- i. During flexion of the knee joint, the amount of tension generated by the pull of the quadriceps muscle is than the patellar tendon.
 - i. Equal
 - ii. More
 - iii. Less
 - iv. Zero
- j. During lateral flexion of spine from erect standing, the force of gravity will continue the motion then, the contralateral muscle helps to control the movement by contracting eccentrically.
 - i. Quadratus lumborum
 - ii. Erector spinae
 - iii. Multifidus
 - iv. Gluteus maximus

Q. 2. Short notes/ Short answer type questions (Attempt any Five)**(05 x 04 = 20)**

- a. Discuss the biomechanics difference involved in the precision grip and power grip. PO1,PO5
- b. Describe the normal biomechanics of the shoulder joint during overhead reaching. PO4
- c. How abnormal posture can affect spinal biomechanics leading to musculoskeletal dysfunction. PO1,PO5
- d. Describe the kinetics and kinematics of a sit-to-stand. PO4
- e. Discuss the biomechanical principles involved in lifting techniques. PO1,PO2
- f. Discuss bucket handle and pump handle movement. PO1,PO5
- g. Explain the relationship between joint structure and function using the hip joint as an example. PO1,PO5

P.T.O.....

Q. 3. Structured questions (Attempt any Three)

(03 x 10 = 30)

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| a. i) Explain the role of ground reaction forces during walking | PO4 |
| ii) Describe the biomechanics of the knee joint during walking | PO5. |
| iii) Describe the biomechanical changes seen in antalgic gait | PO6. |
| b. i) Define spinal stability | PO1. |
| ii) Discuss the coupling motion in the cervical and lumbar spine | PO5. |
| iii) Describe the role of facet joints in spinal movement. | PO6 |
| c. i) What is a motion capture system? | PO1 |
| ii) Discuss the role of wearable sensors in motion analysis. | PO5 |
| iii) Describe how video analysis can be used to study kinematics. | PO4,PO5 |
| d. i) Describe the mechanical properties of bone. | PO1, PO5 |
| ii) Discuss the viscoelastic properties of muscles | PO5,PO6. |
| iii) Explain the effects of immobilization and aging on connective tissue biomechanics | PO1 |

Q. 4. Long Answer/ Essay type questions (Attempt any Two)

(02 x 15 = 30)

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| a. i) Describe normal scapulohumeral rhythm | PO1 |
| ii) Discuss the biomechanics of the elbow joint during flexion and extension. | PO4,PO5 |
| b. i) Describe the biomechanical principles involved in patient positioning. | PO6 |
| ii) Explain the process of performing a safe and effective transfer technique from a wheelchair to a bed. | PO1, PO5 |
| c. A 32-year-old factory worker presents with chronic low back pain. He frequently lifts heavy objects from floor level and twists while placing them onto a conveyor belt. | |
| d. i) Identify the biomechanical risk factors in his work tasks. | PO5 |
| ii) Propose modifications to his working technique and environment using principles of body mechanics. | PO1,PO2 |