PRACTICE SET
End Semester Examination, Spring- 2026

Program: B.P.T
Semester: IV
Subject: Biomechanics-II
Subject Code: 23A402

Course Outcome:

Course Outcomes	Description
CO1	Describe and analyze the regional structure and functional biomechanics of major joints.
CO2	Recall and apply anatomical knowledge to explain the biomechanics of spine, major joints of upper and lower extremities.
CO3	Differentiate normal and abnormal human gait and perform comprehensive gait analysis.
CO4	Apply ergonomics principle to assess risk factors and develop strategies for preventing injuries.

UNIT I

Section A (10 marks)

1. List and describe the various joints involved in the shoulder complex. (CO1) (Remember LOT)
2. Apply anatomical knowledge to describe the force distribution during cubitus valgus and cubitus varus when wrist and hand are in closed kinematic chain. (CO2) (Apply LOT)
3. Explain the flexor mechanism of wrist and hand. (CO1) (Understand LOT)
4. Describe the osteokinematics of scapulothoracic joint and ghenohumeral joint in detail. Add a short note on scapulohumeral rhythm. (CO1) (Understand LOT)
5. List the extrinsic and intrinsic ligaments of wrist and their role in its stability. Add a note on DISI and VISI. (CO1) (Remember LOT)
6. List the different precision grips along with the joint ROM involved and the muscles responsible for the grip. Add a note on ADL activities where the various grips are used. (CO1) (Remember LOT)

Section B (20 marks)

7. Analyze the role of various structures involved in providing static and dynamic stabilization in shoulder joint. (CO1) (Analyze HOT)
8. Create a list of various prehension activities explaining the range of motion at various joints and the muscles responsible for it. (CO2) (Create HOT)

UNIT II

Section-A (10 marks)

9. List key ligaments stabilizing the shoulder girdle. (CO2) (Remember LOT)
10. Recall the carpal bones and their articulations in the wrist complex. (CO2) (Remember LOT)
11. Describe in detail about the hip joint emphasizing its kinematics and kinetics. (CO2) (Understand LOT)
12. Recall the curvatures of the vertebral column and their biomechanical roles. (CO2) (Remember LOT)
13. Explain the degenerative changes that can be seen in vertebral column. (CO2) (Understand LOT)
14. Explain about the angle of inclination and angle of torsion with respect to humerus and their significance in joint formation. Add a short note on its applied anatomy. (CO2) (Apply LOT)
15. Write in detail about the ligaments of spine along with their respective function. (CO2) (Remember LOT)
16. Explain about foot arches in detail along with their significance during weight bearing. (CO2) (Understand LOT)
17. Apply your knowledge of clinical anatomy and explain what will happen if a football player gets injured on field due to the application of valgus force. (CO2) (Apply LOT)

Section B (20 marks)

18. Evaluate spinal biomechanics during lifting, recalling anatomy and assessing injury risks. (CO2) (Evaluate HOT)
19. Create a comparative chart of upper vs. lower extremity girdle biomechanics, applying anatomical principles. (CO2) (Create HOT)

UNIT III

Section-A (10 marks)

20. Explain the basics of force distribution through a vertebral body and the mechanism behind disc herniation. (CO1) (Apply LOT)
21. Explain the mechanism behind the kinematics of vertebral column and the structures involved in it. (CO1) (Understand LOT)

22. Explain the locking and unlocking mechanism of knee. Add a short note on Q-angle. (CO1) (Understand LOT)
23. Create a list of various spinal pathologies along with its mechanism. (CO2) (Create HOT)
24. Explain in detail about the various hip joint pathologies. (CO1) (Understand LOT)
25. Explain in detail about the kinematics of sacrum and pelvis. Add a note on the difference between stoop vs Squat lift. (CO1) (Understand LOT)
26. Describe the Pronation and supination twist along with its diagram. (CO1) (Understand LOT)

Section B (20 marks)

27. Analyze the hip joint compression force if an individual has right knee pain and he holds the cane i) Ipsilateral ii) Contralateral. (CO1) (Analyze HOT)
28. Analyze knee complex biomechanics in squatting, integrating anatomy. Add a note on the degenerative changes seen in knee with prolonged sitting or standing. (CO2) (Analyze HOT)
29. Design a biomechanical flowchart for ankle-foot complex during stance, with justifications. (CO1) (Create HOT)

UNIT IV

Section-A (10 marks)

30. List the determinants of normal gait. (CO3) (Remember LOT)
31. Differentiate normal vs. Trendelenburg gait pattern. (CO3) (Analyze LOT)
32. Analyze causes of antalgic gait. (CO3) (Evaluate LOT)
33. Define ergonomics. Explain the biomechanical risks in a student. (CO4) (Understand LOT)
34. Suggest workstation modifications for neck strain prevention. (CO4) (Apply LOT)
35. Perform basic analysis of abnormalities that can be seen during swing phase of normal walking gait. (CO3) (Apply LOT)
36. Assess work-related injury prevention strategies for a construction worker. (CO4) (Evaluate LOT)
37. Describe the spatial and temporal variables of gait. (CO3) (Remember LOT)

Section B (20 marks)

38. Evaluate the gait cycle of an individual with right common peroneal nerve injury including gait determinants and features. (CO3) (Evaluate HOT)
39. Analyze various types of pathological gait with their causative factors and interventions. (CO3) (Analyze HOT)
40. Create an ergonomics strategy for individuals with desk job specifying the postural risk factors and its impact. (CO4) (Create HOT)

Summary Sheet

CO Wise

CO	Q. No	Marks
CO1	1,3-7,20-22,24-27,29	170
CO2	2,8,9-19,23,28	190
CO3	30,31,32,35,37,38,39	90
CO4	33,34,36,40	50
Total		**500**

Unit Wise

Unit	Q. No	Marks
Unit 1	1-8	100
Unit 2	9-19	130
Unit 3	20-29	130
Unit 4	30-40	140
Total		**500**

Blooms Taxonomy Level (BTL) Wise

BTL	Q. No	Marks
LOT	1-6,9-17,30-37	300
HOT	7,8,18,19,27,28,29,38,39,40	200
Total		**500**

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Disclaimer: -This is a Practice set. The Question in End term examination will differ from the Practice set. This Practice set is meant for practice only.