



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF REHABILITATION MEDICINE
BACHELOR OF SCIENCE IN PHYSIOTHERAPY**

END OF TRIMESTER EXAMINATIONS SEPTEMBER TO DECEMBER 2025

UNIT CODE: PHT 132

UNIT NAME: MOVEMENT SCIENCE - Main Exam

DATE: 3rd DECEMBER 2025

TIME: 9-11am

INSTRUCTIONS

- 1. All students will have two (2) hours to complete the examination**
- 2. This is an online exam, Attempt all questions as per the instruction**
- 3. It is the student's responsibility to report any page and number missing in this paper.**
- 4. Check that the paper is complete**
- 5. Total number of pages is 5 including the cover.**
- 6. Read through the paper quickly before you start.**

SECTION A (30Marks):
Multiple Choice Questions (1 mark each)

1. The study of motion without considering the forces causing it is called:
 - a) Kinetics
 - b) Kinematics
 - c) Statics
 - d) Dynamics
2. Which of the following best describes linear motion?
 - a) Movement around an axis
 - b) Movement in a straight line
 - c) Rotational movement
 - d) Angular displacement
3. The perpendicular distance between the line of action of force and the axis of rotation is called:
 - a) Lever arm
 - b) Moment arm
 - c) Torque angle
 - d) Resistance arm
4. A lever where the axis lies between the force and resistance is known as a:
 - a) First-class lever
 - b) Second-class lever
 - c) Third-class lever
 - d) Fourth-class lever
5. The force that resists the motion of two surfaces sliding over each other is:
 - a) Reaction force
 - b) Frictional force
 - c) Gravitational force
 - d) Inertial force
6. The equilibrium condition exists when:
 - a) Forces are balanced
 - b) Acceleration is maximum
 - c) Velocity is zero
 - d) Only one force acts
7. The force of gravity acting on a body is known as:
 - a) Inertia
 - b) Weight
 - c) Momentum
 - d) Mass
8. Which connective tissue has the greatest tensile strength?
 - a) Tendon
 - b) Ligament
 - c) Cartilage
 - d) Fascia
9. The joint allowing free movement in all directions is classified as:
 - a) Synarthrosis
 - b) Amphiarthros
 - c) Diarthrosis
 - d) Fibrous joint

10. The temporomandibular joint is functionally classified as:
 - a) Hinge joint
 - b) Gliding joint
 - c) Modified hinge joint
 - d) Pivot joint
11. Which of the following muscles is primarily responsible for thoracic expansion during inspiration?
 - a) Rectus abdominis
 - b) External intercostals
 - c) Internal intercostals
 - d) Serratus posterior inferior
12. The thoracic cage functions mainly to:
 - a) Protect the brain
 - b) Assist in respiration
 - c) Support the pelvis
 - d) Aid in balance
13. In the vertebral column, the greatest range of rotation occurs in the:
 - a) Cervical region
 - b) Thoracic region
 - c) Lumbar region
 - d) Sacral region
14. Which structure provides stability to synovial joints?
 - a) Synovial fluid
 - b) Ligaments
 - c) Bursa
 - d) Cartilage
15. The line of gravity in a standing human normally passes:
 - a) Behind the ankle
 - b) Through the knee
 - c) Anterior to the sacrum
 - d) Through the center of the body
16. Which muscle type has the highest resistance to fatigue?
 - a) Type I (slow-twitch) fibers
 - b) Type IIa fibers
 - c) Type IIb fibers
 - d) Fast-twitch glycolytic fibers
17. The term “mobility-stability continuum” in muscle function refers to:
 - a) Muscles that move joints only
 - b) Balance between motion and support
 - c) Stabilizers being weaker than movers
 - d) Inactive muscles at rest
18. Which of the following increases during pregnancy, affecting spinal biomechanics?
 - a) Lumbar lordosis
 - b) Thoracic kyphosis decrease
 - c) Cervical flexion
 - d) Pelvic narrowing
19. The mechanical advantage of a lever depends on:
 - a) Force direction
 - b) Ratio of force arm to resistance arm

- c) Gravity
 - d) Motion type
20. When two or more forces act at a common point but in different directions, they form
- a) Parallel force system
 - b) Concurrent force system
 - c) Rotational system
 - d) Shear force system
21. Muscle atrophy due to immobilization is mainly caused by:
- a) Decreased protein synthesis
 - b) Increased actin production
 - c) Neural hyperactivity
 - d) Elevated metabolism
22. Which part of the vertebral column bears the greatest compressive load?
- a) Cervical
 - b) Thoracic
 - c) Lumbar
 - d) Sacral
23. The main function of cartilage in joints is to:
- a) Produce synovial fluid
 - b) Prevent friction and absorb shock
 - c) Act as a ligament substitute
 - d) Provide muscle attachment
24. The primary joint motion in breathing is:
- a) Flexion-extension
 - b) Elevation-depression
 - c) Protraction-retraction
 - d) Rotation
25. The temporomandibular joint dysfunction commonly presents with:
- a) Hip pain
 - b) Clicking and jaw deviation
 - c) Shoulder stiffness
 - d) Visual disturbance
26. Moment of force is calculated as:
- a) Force \times Acceleration
 - b) Force \times Distance
 - c) Force \div Time
 - d) Mass \times Gravity
27. In scoliosis, the rib cage shows:
- a) Symmetric expansion
 - b) Rotation and asymmetry
 - c) Increased elasticity
 - d) Reduced joint motion
28. Parallel force systems in the body include:
- a) Spinal muscles on opposite sides
 - b) Biceps and triceps
 - c) Quadriceps and patellar tendon
 - d) Both b and c
29. Work done by a muscle is measured in:
- a) Joules
 - b) Newtons

- c) Watts
 - d) Meters
30. The primary stabilizing muscle group of the spine is:
- a) Rectus abdominis
 - b) Erector spinae
 - c) Transversus abdominis
 - d) Latissimus dorsi

SECTION B (20 MARKS)

SHORT ANSWER QUESTIONS (5 marks each)

- 31. Analyze the three planes and axes of motion in human joints, providing examples and their clinical relevance to physiotherapy assessment.
- 32. Evaluate the biomechanics of ventilation, discussing muscle coordination and thoracic mobility during inspiration and expiration.
- 33. Discuss the structural and functional adaptations of the temporomandibular joint and their implications for physiotherapy management.
- 34. Explain the pathophysiological effects of immobilization on joint structures, including cartilage, capsule, and periarticular tissues.

SECTION C (20 Marks): LONG ANSWER QUESTIONS (10 Marks Each)

Answer Any TWO Questions.

- 35. Critically discuss the biomechanics of the vertebral column, highlighting regional variations, muscle functions, and the impact of injury or aging on spinal stability and mobility.
- 36. Explain and apply the concept of levers in the human body — include lever types, components, and examples illustrating mechanical advantage and clinical implications.
- 37. Examine joint design and function with respect to the structural properties of connective tissues, their biomechanical behavior, and how disease or injury alters these functions.