



AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF REHABILITATION MEDICINE
BACHELOR OF SCIENCE IN PHYSIOTHERAPY
END OF TRIMESTER EXAMINATIONS MAY TO AUGUST 2026
UNIT CODE: PHT 132
UNIT NAME: Movement science 1
DATE: 4th AUGUST 2026
TIME: 2 HOURS. START:11AM STOP:1PM
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 6 including the cover.
6. Read through the paper quickly before you start.

SECTION A: MULTIPLE CHOICE QUESTIONS (30 MARKS)

1. Kinematics is primarily concerned with:
 - A. The forces that produce movement
 - B. Description of motion without considering the forces causing it
 - C. Mechanical work performed during movement
 - D. Muscle torque acting about a joint
2. Which protein provides tensile strength to connective tissues?
 - A. Elastin
 - B. Actin
 - C. Collagen
 - D. Myosin
3. Which plane divides the body into right and left halves?
 - A. Frontal plane
 - B. Transverse plane
 - C. Oblique plane
 - D. Sagittal plane
4. Concurrent contraction of anterior and posterior deltoid fibers results in:
 - A. Pure arm abduction
 - B. Shoulder extension
 - C. Shoulder internal rotation
 - D. Elbow flexion
5. A lever consists of:
 - A. Force, velocity and acceleration
 - B. Fulcrum, effort and resistance
 - C. Mass, weight and density
 - D. Work, power and energy
6. Connective tissue primarily responsible for connecting muscle to bone is:
 - A. Cartilage
 - B. Ligament
 - C. Tendon
 - D. Fascia

7. The temporomandibular joint is classified as a:
- A. Hinge joint only
 - B. Pivot joint
 - C. Modified hinge synovial joint
 - D. Saddle joint
8. The cervical vertebral region contains:
- A. 5 vertebrae
 - B. 7 vertebrae
 - C. 12 vertebrae
 - D. 24 vertebrae
9. The muscles primarily responsible for inspiration are:
- A. Abdominals
 - B. Intercostals and diaphragm
 - C. Hamstrings
 - D. Trapezius
10. A body is in mechanical equilibrium when:
- A. The resultant force acting on it is zero
 - B. The moment arm is at its maximum
 - C. The body is moving at maximum velocity
 - D. Frictional forces are absent
11. A longer moment arm generally:
- A. Decreases torque production
 - B. Has no effect on torque
 - C. Increases torque production
 - D. Eliminates muscle effort
12. During immobilization, muscles commonly undergo:
- A. Hypertrophy
 - B. Atrophy
 - C. Hyperplasia
 - D. Ossification
13. Joint stability is primarily enhanced by:
- A. Articular congruency and soft tissues
 - B. Muscle strength and neuromuscular control
 - C. Joint capsule elasticity
 - D. Intra-articular pressure
14. Friction acts:
- A. In the direction of motion

- B. Independent of motion
 - C. Perpendicular to motion
 - D. Opposite to motion
15. Immobilization of a joint commonly results in:
- A. Increased flexibility
 - B. Increased muscle mass
 - C. Joint stiffness
 - D. Enhanced circulation
16. Parallel force systems are characterized by:
- A. Forces acting in parallel directions
 - B. Forces acting at right angles.
 - C. Forces acting through one point
 - D. Absence of forces
17. The main function of ligaments is to:
- A. Connect bone to bone
 - B. Produce movement
 - C. Store glycogen
 - D. Connect muscle to bone
18. Flexion and extension occur primarily in which plane?
- A. Oblique
 - B. Frontal
 - C. Transverse
 - D. Sagittal
19. A physiotherapist measuring knee ROM with a goniometer is assessing:
- A. Joint torque generation
 - B. Muscle force production
 - C. Joint angular displacement
 - D. Mechanical work performed
20. A patient lifting a box from the floor primarily demonstrates:
- A. Static equilibrium
 - B. Dynamic movement involving forces
 - C. No biomechanical principles
 - D. Pure rotation
21. Which class of lever is represented by standing on tiptoes?
- A. Second class
 - B. First class
 - C. Third class
 - D. Fourth class
22. In Chronic Obstructive Pulmonary Disease, thoracic biomechanics are altered mainly because of:

- A. Changes in ventilation mechanics
- B. Increased elasticity of lung tissue
- C. Increased thoracic muscle strength
- D. Enhanced mobility of the rib cage

23. Weak abdominal muscles are most likely to affect:

- A Upper limb coordination.
- B. Balance during standing and walking
- C. Vision during movement
- D. Vertebral stability

24. A patient with scoliosis may exhibit:

- A. Improved ventilation
- B. Altered thoracic mechanics
- C. Increased cervical vertebrae
- D. Reduced body mass

25. If a muscle's line of pull moves farther from a joint axis, the muscle:

- A produces greater torque at the joint
- B. Produces less torque at the joint
- C. Has a reduced moment arm
- D. Becomes less mechanically efficient

26. Which structure absorbs compressive forces in the vertebral column?

- A. Muscle belly.
- B. Tendon
- C. Intervertebral disc
- D. Skin

27. Following prolonged bed rest, a physiotherapist should expect:

- A. Increased muscle strength
- B. Muscle atrophy
- C. Increased joint mobility
- D. Bone hypertrophy

28. A force system in which all forces pass through a common point is:

- A. Parallel
- B Static.
- C. Linear
- D. Concurrent

29. During quiet breathing, the diaphragm:

- A. Elevates during inspiration
- B. Descends during inspiration

- C. Does not move
 - D. Rotates
30. Which biomechanical principle best explains maintaining upright posture?
- A. Moment arm
 - B. Lever mechanics
 - C. Equilibrium
 - D. Angular velocity

SECTION B: ANSWER ALL SHORT ANSWER QUESTIONS (20 marks)

31. Differentiate between kinematics and kinetics and give two physiotherapy examples of each.
32. Describe five factors that contribute to the stability of a synovial joint.
33. Explain the effects of immobilization on muscle structure and function.
34. Outline the Biomechanical Role of the Diaphragm and Intercostal Muscles During Normal Inspiration (5 Marks)

SECTION C: LONG ESSAY QUESTION. ANSWER ONE (20 MARKS)

35. A 65-year-old patient presents with chronic low back pain, reduced trunk mobility, and age-related postural changes. Discuss:
- a) The biomechanics of the vertebral column. (8 marks)
 - b) The effects of ageing on the structure and function of the vertebral column. (6 marks)
 - c) Physiotherapy interventions based on biomechanical principles to improve function. (6 marks)
36. Discuss and apply the concept of levers in the human body include lever types, components, and examples illustrating clinical implications.