AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF REHABILIATION MEDICINE

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

END OF TRIMESTER EXAMINATIONS JANUARY TO APRIL 2026

UNIT CODE: PHT 214

UNIT NAME: Movement science II (Main exam)

DATE: 15th APRIL 2026
TIME: 11.15am-1.15pm
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 7 including the cover.**
6. **Read through the paper quickly before you start.**

SECTION A. MCQs Answer all the questions. (30 Marks)

1. During prolonged submaximal exercise, which factor primarily delays central fatigue. (1 mark)
   a. Increased afferent group III/IV feedback
   b. Increased brain serotonin concentration
   c. maintenance of blood glucose availability
   d. Elevated ammonia concentration
2. During sustained isometric contraction, fatigue occurs faster than during dynamic contractions primarily because:
   a. Greater glycolytic flux
   b. Impaired muscle perfusion
   c. Increased oxygen extraction
   d. Lower motor unit recruitment
3. The cooper 12-minute test primarily estimates:
   a. Anaerobic capacity
   b. Running economy
   c. VO2 max
   d. Lactate threshold
4. The progressive nature of the beep test increases physiological stress primarily by:
   a. Increasing distance
   b. Increasing recovery intervals
   c. Increasing running velocity
   d. Increasing rest duration
5. The 6MWT is best classified as:
   a. Maximal graded test
   b. Submaximal functional capacity test
   c. Anaerobic threshold test
   d. Lactate profiling test
6. Which fiber type has the greatest resistance. (1 mark)
   a. Type IIx
   b. Type IIa
   c. Type I
   d. Type IIb
7. In prolonged endurance events (>2 hours), performance decline is most associated with. (1 mark)
   a. PCr depletion
   b. CNC inhibition
   c. Glycogen depletion
   d. Myosin denaturation

8. Central fatigue during endurance Exercise is partly mediated by: (1 mark)
    a. Decreased motor neuron firing
    b. Reduced Ca2+ release
    c. Cross-bridge detachment failure
    d. Sarcomere damage
9. The gold standard laboratory test for cardiorespiratory endurance is: (1 mark)
    a. Cooper 12-min test
    b. 6 min walk test
    c. VO2 max treadmill test
    d. Beep test
10. A plateau in oxygen consumption despite increasing workload indicates: (1 mark)
    a. Ventilatory threshold
    b. VO2 max attainment
    c. Poor effort
    d. Mechanical inefficiency
11. A patient with cerebellar ataxia demonstrates high variability in step length and increased double support. This primarily reflects impairment in: (1 mark)
    a. Feedforward motor planning
    b. Basal ganglia automaticity
    c. Corticospinal strength modulation
    d. Temporal coordination and error correction
12. During preswing, plantarflexors function concentrically to: (1 mark)
    a. Control tibial advancement
    b. Stabilize the knee
    c. Initiate limb advancement
    d. Shorten the limb
13. The greatest percentage of gait cycle is spent in: (1 mark)
    a. Swing phase
    b. Single limb support
    c. Double limb support
    d. Stance phase
14. During loading response, the ankle primarily moves into. (1 mark)
    a. Dorsiflexion
    b. Plantarflexion
    c. Inversion
    d. Eversion

15. Foot slap during early stance is most commonly due to weakness of:
    a. Gastrocnemius
    b. Soleus
    c. Tibialis anterior
    d. Peroneus longus
16. During a plumb line assessment, a patient presents with anterior translation of the pelvis and increased lumbar lordosis. Which of the following muscle imbalance is most likely contributing to this posture. (1 mark)
    a. Tight hamstring and weak gluteus maximus
    b. Tight iliopsoas and weak abdominal muscles
    c. Weak erector spinae and tight rectus abdominis
    d. Tight gluteus medius and weak quadratus lamborum
17. A patient demonstrates a forward head posture with rounded shoulders. Which of the following is the most appropriate corrective focus based on postural assessment? (1 mark)
    a. Strengthening pectoralis major and minor
    b. Stretch upper trapezius and levator scapulae
    c. Strengthen deep cervical flexors and scapular retractors
    d. Stretch rectus abdominis and erector spinae
18. When assessing posture, which combination represents a functional postural fault rather than a structural deformity. (1 mark)
    a. Fixed thoracic kyphosis
    b. Leg length discrepancy due to bone shortening
    c. Rounded shoulder due to muscle tightness
    d. Congenital scoliosis
19. Which factor should be considered first in differentiating structural vs functional postural deviations. (1 mark)
    a. Patient age
    b. Presence of pain
    c. Ability to correct posture voluntarily
    d. Muscle strength
20. Which postural assessment finding is most likely a functional adaptation rather than a structural deformity. (1 mark)
    a. Scoliosis with vertebral rotation on X ray
    b. Leg length discrepancy due to tibial shortening
    c. Rounded shoulders with tight pectorals
    d. Congenital kyphosis
    e.

21. You are designing an ergonomic protocol for a call center where employees sit for 8 hours daily. Which integrated strategy would be most effective in preventing musculoskeletal disorders. (1 mark)
    a. Increasing chair height
    b. Reducing lighting levels
    c. Encouraging fixed posture discipline
    d. Implementing neutral posture education, adjustable workstations and microbreak scheduling
22. When recommending a standing desk, which potential ergonomic risk must also be considered. (1 mark)
    a. Reduced core activation
    b. Increased static load on lower limbs
    c. Decreased lumbar lordosis
    d. Reduced energy expenditure
23. During workstation assessment, a computer user presents with upper trapezius overactivity and c6 radicular symptoms. Which workstation modification addresses the primary biomechanical driver. (1 mark)
    a. Lowering desk height
    b. Raising monitor height
    c. Adjusting chair lumbar support
    d. Reducing mouse sensitivity
24. If head weighs 5kg and shifts 5cm anteriorly, what biomechanical effect is MOST significant. (1 mark)
    a. Increased compressive load only
    b. Increased shear force only
    c. Increased extension moment demand
    d. Decreased ligament strain
25. Monitor position too high leads to:
    a. Increased cervical flexion
    b. Reduced cervical activity
    c. Lumbar hyperextension
    d. None of the above
26. Lower limb circumduction during swing phase most commonly compensates for. (1 mark)
    a. Weak plantarflexors
    b. Hip flexor tightness
    c. Abductor tightness
    d. None of the above

27. Which postural assessment tool would be most useful to quantify spinal curvature objectively. (1 mark)
    a. Visual inspection alone
    b. Plumbline
    c. Inclinometer or spinal radiography
    d. Palpation of bony landmarks
28. Trendelenburg gait is caused by weakness of:
    a. Gluteus maximus
    b. Iliopsoas
    c. Rectus femoris
    d. None of the above
29. A patient walks with decreased right step length and reduced left stance time. The most likely cause is:
    a. Right hip abductor weakness
    b. Left lower limb pain
    c. Left quadriceps weakness
    d. Right ankle instability
30. In cerebellar gait, the wide base primarily compensates for: (1 mark)
    a. Weakness
    b. Spasticity
    c. Sensory loss
    d. Poor coordination

SECTION B. Short structured questions. Answer all question. 20 Marks

31. State 3 components of bed mobility (3 marks)
32. State 3 muscles involved in swing phase and their specific roles. (6 marks)
33. List 3 plumb line landmark in a normal assessment outcome. (3 marks)
34. List 3 pathomechanics seen in lower crossed syndrome. (3 marks)
35. Which muscle fiber type possesses the following characteristics.
    High mitochondrial density
    High oxidative capacity
    Rich capillarization (1 mark)
36. An athlete performing a wall sit muscle endurance test is said to be fatigued. What ae the likely physiological reasons. (4 marks)

SECTION C. Long structured questions. Answer any of the two (20 Marks)

37. State and explain the phases of sitting and standing with key muscles involved (10 marks)

38. A. State 5 pathomechanics of locomotion and a possible reason for the listed misnomers. (5 marks)

B. State and explain 5 abnormal gaits. (5 marks)

39. Outline 5 standardized tests of endurance. (10 marks)