



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

**END OF TRIMESTER EXAMINATIONS JANUARY TO APRIL 2026**

**UNIT CODE: PHT 232**

**UNIT NAME: THERAPEUTIC EXERCISE AND EXERCISE PRESCRIPTION**

**DATE: 13th APRIL 2026**

**TIME: 11.15am-1.15pm**

**INSTRUCTIONS**

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

## **Section A: Multiple Choice Questions (30 Marks)**

1. Which of the following best describes the "dose-response" relationship in therapeutic exercise?
  - a) The specific type of exercise performed for a given condition.
  - b) The relationship between the intensity, duration, and frequency of exercise and the resulting physiological adaptation.
  - c) The patient's subjective report of pain during an activity.
  - d) The biomechanical leverage applied during a resistance exercise.
  
2. A physiotherapist is designing a community-based program for fall prevention in older adults. Which of the following exercise components is MOST critical to include?
  - a) High-intensity aerobic interval training.
  - b) Progressive resistance training for upper body strength.
  - c) Balance training combined with lower limb strengthening.
  - d) Static stretching for all major muscle groups.
  
3. During the acute stage of soft tissue injury (first 48-72 hours), the primary goal of therapeutic exercise is to:
  - a) Regain full range of motion through aggressive stretching.
  - b) Begin high-load resistance training to prevent atrophy.
  - c) Minimize pain and swelling while performing pain-free, gentle range of motion.
  - d) Commence sport-specific agility drills.
  
4. What is the primary purpose of diagnostic exercise testing, such as a graded exercise test (GXT) on a treadmill?
  - a) To determine the patient's one-repetition maximum (1RM).
  - b) To assess the flexibility of the hamstrings.
  - c) To evaluate the cardiovascular response to exercise and identify ischemic thresholds.
  - d) To teach a patient how to use an aerobic exercise machine.
  
5. A patient with adhesive capsulitis (frozen shoulder) is in the chronic stage. What type of exercise technique is MOST appropriate to address the significant capsular restrictions?
  - a) High-velocity, low-amplitude thrust manipulation.
  - b) Sustained, low-load grade III and IV joint mobilizations.
  - c) Aggressive concentric strengthening of the rotator cuff.
  - d) Isometric contractions of the deltoid.

6. The FITT-VP principle for exercise prescription stands for:
- a) Frequency, Intensity, Time, Type, Volume, and Progression.
  - b) Form, Integration, Tension, Timing, Velocity, and Power.
  - c) Flexibility, Isometrics, Trunk stability, Training, Vigor, and Posture.
  - d) Function, Intervention, Therapeutic exercise, Testing, Verification, and Protocol.
7. A patient with chronic low back pain presents with a flexor-dominant pattern. Which of the following stretching exercises would be MOST indicated?
- a) Prone press-ups (extension).
  - b) Seated trunk flexion (touching toes).
  - c) Side-lying trunk rotation towards extension.
  - d) Standing quadriceps stretch.
8. Which of the following is a PRIMARY contraindication for peripheral joint mobilization?
- a) Mild joint effusion.
  - b) Generalized hypermobility.
  - c) Acute fracture or malignancy in the area to be treated.
  - d) Muscle tightness surrounding the joint.
9. When prescribing resistance exercise for a deconditioned older adult, what is the MOST appropriate initial intensity?
- a) 85-95% of 1RM to maximize strength gains.
  - b) 40-50% of 1RM, focusing on proper form and control.
  - c) Maximal eccentric contractions to fatigue.
  - d) Plyometric drills to improve power.
10. The inflammatory phase of soft tissue repair is characterized by:
- a) Deposition of type I collagen along lines of stress.
  - b) Increased tissue strength and remodeling.
  - c) Hemostasis, vasodilation, and phagocytosis of debris.
  - d) A decrease in the number of fibroblasts and capillaries.

11. Which of the following is a hallmark sign of cumulative trauma disorder (e.g., lateral epicondylitis)?

- a) Sudden onset of sharp pain following a direct blow.
- b) Pain that is consistently worst first thing in the morning.
- c) Insidious onset of pain related to repetitive, low-force activities.
- d) Immediate, complete loss of motor function.

12. A patient 6 weeks post-ankle sprain (subacute stage) still has limited dorsiflexion due to anterior talofibular ligament tightness. What is the most effective stretching technique?

- a) Static gastrocnemius stretch in full knee extension.
- b) Contract-relax PNF stretching for the plantarflexors.
- c) Weight-bearing lunges with the knee over the toes, aiming to increase the tibio-talar glide.
- d) Active range of motion circles.

13. When progressing a patient through the subacute stage of a rotator cuff injury, which of the following is a key consideration?

- a) Avoiding all movement to prevent re-injury.
- b) Gradually introducing controlled resistance through range of motion.
- c) Performing high-intensity eccentric training only.
- d) Immobilizing the shoulder in a sling for most of the day.

14. For a patient with patellofemoral pain syndrome, what is a primary goal of therapeutic exercise for the knee?

- a) Strengthening the quadriceps, particularly the VMO, in inner range (terminal knee extension).
- b) Stretching the quadriceps aggressively.
- c) Strengthening the hamstrings concentrically.
- d) Avoiding all weight-bearing activities.

15. A key indication for aquatic exercise in the early stages of rehabilitation is:

- a) To provide maximal resistance for strengthening.
- b) To utilize the buoyancy of water to unload weight-bearing joints and facilitate early movement.
- c) To improve cardiovascular fitness with high-intensity intervals.
- d) To provide a gravity-dependent environment to increase joint compression.

16. Which of the following is an absolute contraindication to aerobic exercise testing?

- a) Well-controlled type 2 diabetes.
- b) Mild, stable aortic stenosis.
- c) Acute myocardial infarction (within 2 days).
- d) History of smoking.

17. A patient presents with a "step defect" during shoulder elevation, indicating weakness of which muscle?

- a) Supraspinatus
- b) Infraspinatus
- c) Subscapularis
- d) Serratus anterior

18. Osteoporosis is a relative contraindication for which type of therapeutic exercise?

- a) Aquatic walking
- b) Seated resistance band rows
- c) High-velocity spinal flexion exercises (e.g., full sit-ups)
- d) Stationary cycling with low resistance

19. What is the primary goal of a Grade I joint mobilization (small amplitude oscillation at the beginning of range)?

- a) To stretch a tight joint capsule.
- b) To increase joint flexibility.
- c) Primarily for pain modulation.
- d) To increase muscle strength.

20. The "tendinopathy continuum" described by Cook and Purdam progresses through which stages?

- a) Acute, Subacute, Chronic
- b) Inflammatory, Proliferative, Remodelling
- c) Reactive tendinopathy, Tendon disrepair, Degenerative tendinopathy
- d) Grade I, Grade II, Grade III

21. Which of the following exercises is most appropriate for improving dynamic balance in a community-ambulating older adult?

- a) Single-leg stance on a firm surface with eyes open.
- b) Tandem walking (heel-to-toe) for a set distance.
- c) Seated marching.
- d) Supine bridging.

22. A patient in the chronic stage of recovery from an ACL reconstruction is ready to return to sport. Which type of exercise should be prioritized?

- a) Isolated open-chain knee extension.
- b) Plyometric and agility training.
- c) Stationary cycling.
- d) Passive range of motion.

23. What is a key safety consideration when prescribing aerobic exercise for a patient with known cardiac disease?

- a) Ensuring the patient exercises to maximal exertion every session.
- b) Monitoring for signs and symptoms of exercise intolerance (e.g., chest pain, severe dyspnea, dizziness).
- c) Avoiding any warm-up or cool-down periods.
- d) Prescribing only upper body exercise.

24. A patient with plantar fasciitis (chronic stage) is expected to have tightness in which muscle group, which should be a focus of stretching?

- a) Tibialis anterior
- b) Hamstrings and gastrocnemius-soleus complex
- c) Quadriceps
- d) Intrinsic foot muscles only

25. According to principles of risk stratification, a patient with known coronary artery disease but no current symptoms is classified as having:

- a) Low risk
- b) Moderate risk
- c) High risk
- d) No risk

26. During the subacute stage of a lateral ankle sprain, proprioceptive training should begin with which activity?

- a) Hopping on the involved ankle.
- b) Single-leg stance on a wobble board.
- c) Single-leg stance on a firm surface.
- d) Running figure-of-eights.

27. What is the primary mechanism by which static stretching is thought to increase muscle length?

- a) Permanent plastic deformation of collagen fibers.
- b) Increased sarcomere number and tolerance to stretch.
- c) Activation of the Golgi tendon organ to cause muscle relaxation.
- d) Increased muscle temperature alone.

28. A common indication for therapeutic exercise in a patient with hip osteoarthritis is:

- a) Strengthening of the hip abductors and extensors to improve gait and stability.
- b) High-impact jumping exercises to maintain bone density.
- c) Aggressive capsular stretching to increase range of motion.
- d) Complete immobilization to reduce pain.

29. In the context of soft tissue injury, what is the purpose of the "repair" phase?

- a) To remove damaged tissue and initiate healing.
- b) To lay down new collagen and capillaries to restore the tissue's structural integrity.
- c) To remodel and organize collagen along lines of stress.
- d) To completely restore tissue to its pre-injury state, which is always possible.

30. Which of the following best describes a contraindication for performing resistive exercise in a patient with osteoporosis?

- a) Performing high-intensity resistance training with weights that are tolerable.
- b) Performing exercises that involve spinal flexion against resistance.
- c) Performing aquatic resistance exercises.
- d) Performing resistance bands exercises in a seated position.

## **Section B: Short Answer Questions (20 Marks)**

1. A 70-year-old patient with a 3-year history of bilateral knee osteoarthritis (OA) reports difficulty getting out of a chair and walking more than one block. Using the FITT-VP principle, briefly prescribe an initial lower extremity strengthening program for this patient. Include the specific mode (type) of exercise you would recommend. (4 Marks)
2. Compare and contrast the treatment goals and appropriate exercise interventions for the acute stage versus the chronic stage of a Grade II medial collateral ligament (MCL) sprain of the knee. (4 Marks)
3. A patient presents with a diagnosis of "frozen shoulder" (adhesive capsulitis) in the chronic (thawing) phase. Describe the specific application of a Grade III posterior glide mobilization to the glenohumeral joint. What is the intended therapeutic effect of this technique? (4 Marks)
4. You are designing a rehabilitation program for a patient with chronic low back pain who demonstrates poor core stability and a tendency to "sway back" in standing. Name two specific exercises you would prescribe to address this postural issue and, for each, explain the primary therapeutic goal. (4 Marks)
5. A 55-year-old sedentary male wants to start an aerobic exercise program. He has a history of smoking and hypertension but is currently asymptomatic. According to ACSM risk stratification guidelines, what is his risk category? Before commencing the program, what (if any) further action is recommended? Briefly explain your rationale. (4 Marks)

## **Section C: Long Essay Questions select one of the two**

### Case Study: The Throwing Athlete

1. A 22-year-old competitive baseball pitcher presents with a 2-month history of insidious onset right shoulder pain. The pain is localized to the anterolateral aspect of the shoulder and is most intense during the late cocking and early acceleration phases of throwing. He reports a feeling of "tightness" in the back of his shoulder. Clinical examination reveals:

- Glenohumeral internal rotation deficit (GIRD) of 25 degrees compared to the non-throwing arm.
- Tightness in the posterior capsule.
- Weakness and poor endurance of the scapular stabilizers (specifically, serratus anterior and lower trapezius).
- Positive relocation test (O'Brien's test) for labral irritation.
- Your task: Design a comprehensive, phased rehabilitation program for this athlete, covering the subacute and chronic stages of management. Your answer must include:

a) Pathophysiology: Briefly explain the likely pathophysiological process occurring in his shoulder, linking the posterior capsule tightness (GIRD) to his anterior shoulder pain and labral symptoms. (6 Marks)

b) Subacute Stage (Weeks 1-4): Outline the specific goals and describe at least three (3) appropriate exercise interventions for this stage, with justification. (7Marks)

c) Chronic Stage (Weeks 5-8+): Outline the specific goals and describe at least three (3) appropriate exercise interventions for this stage, with justification, to prepare him for a return to throwing. (7 Marks)

2. A 65-year-old female, 4 weeks post-operative following a right total hip arthroplasty (THA) via a posterior-lateral approach, is referred to physiotherapy. Her past medical history includes well-controlled hypertension and osteopenia. Her current goals are to walk without a limp and resume her hobby of ballroom dancing. On assessment, you note:

She uses a single-point cane in her left hand.

Her gait reveals a lateral trunk lean over the stance phase on the right (Trendelenburg gait).

Active range of motion (ROM) of the right hip: Flexion to 80 degrees (with poor control), Abduction to 15 degrees, Extension to neutral.

Manual muscle testing reveals 3/5 strength in the right gluteus medius and 4/5 in the gluteus maximus.

She has difficulty rising from a standard-height chair without using her arms.

Your task: Using your knowledge of therapeutic exercise, answer the following:

a) Precautions & Goals: List the two most critical post-operative precautions for a posterior-lateral approach THA. Then, state three (3) primary, measurable short-term goals for the next 4 weeks of her rehabilitation. (6 Marks)

b) Exercise Prescription: Design an exercise program for her to address her current impairments. Prescribe two (2) specific resistance exercises to target her gluteal weakness and one (1) specific balance exercise to improve her gait. For each exercise, describe the starting position, the movement, the dosage (sets/reps/frequency), and the clinical rationale for its selection. (8 Marks)

c) Progression & Considerations: Explain how you would progress one of the prescribed gluteal exercises as she moves into the next phase of rehabilitation (e.g., 8-12 weeks post-op). What are two important considerations when prescribing aerobic exercise for this patient, given her history of osteopenia and hypertension? (6 Marks)