AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF REHABILIATION MEDICINE

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

END OF TRIMESTER EXAMINATIONS SEPTEMBER TO DECEMBER 2025

UNIT CODE: PHT 334

UNIT NAME: Prosthetics and Orthotics (main exam)

DATE: 5th 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 6 including the cover.**
6. **Read through the paper quickly before you start.**

Section A MCQS Answer all the questions (30 marks)

1. What are the clinical and biomechanical reasons for selecting stiff materials in specific prosthetic and orthotic designs?
   A. It increases flexibility and comfort during movement
   B. It allows better conformation to body segments
   C. It reduces the likelihood of deformation underload
   D. It enhances the cosmetic appearance of the device
2. What is the significance of evaluating skin mobility over the residual limb during post-operative assessment in amputee care
   A. To determine the need for additional surgery
   B. To ensure the scar is cosmetically acceptable
   C. To reduce friction and prevent skin breakdown during prosthetic use
   D. To assess the strength of the underlying muscles
3. Why is it clinically important to identify bony prominences during residual limb assessment in amputee care?
   A. They improve prosthetic suspension
   B. They indicate good healing
   C. They require padding or socket modification to avoid pressure injury
   D. They are irrelevant once the wound has healed
4. A patient reports tingling and burning sensations in the absent limb. What type of post-amputation pain is this most likely to represent?
   A. Residual limb pain
   B. Neuroma pain
   C. Phantom pain
   D. Generalized pain
5. Which of the following positioning strategies helps prevent contractures immediately after a trans-tibial amputation?
   A. Placing a cushion under the knee while sitting
   B. Encouraging prolonged hip flexion in bed
   C. Supporting the stump on a leg rest when seated
   D. Crossing the legs to maintain alignment
6. What are the therapeutic benefits and clinical rationale for promoting early ambulation in elderly patients after amputation surgery?"
   A. A. To accelerate prosthetic fitting
   B. To reduce the effects of bedrest such as DVT, pressure areas, and contractures
   C. To improve upper limb strength
   D. To prevent phantom limb pain
7. Which acute care complications are most likely to elevate morbidity and hinder active engagement in rehabilitation therapy?
   A. A. Mild post-operative fatigue
   B. Deep vein thrombosis and pulmonary embolism
   C. Temporary numbness at the surgical site
   D. Use of a wheelchair for mobility
8. Which contracture is most frequently observed in patients following transfemoral (above-knee) amputation?

A. Knee flexion contracture
B. Equines contracture
C. Hip abduction, external rotation, and flexion contracture
D. Shoulder internal rotation contracture

9. What is the primary therapeutic goal of applying desensitization techniques in post-amputation stump management?
   A. To increase muscle strength in the residual limb
   B. To eliminate scar tissue completely
   C. To reduce hypersensitivity and phantom limb pain
   D. To accelerate prosthetic fitting
10. When is it appropriate to begin using a shrinker instead of bandages for stump management?
   A. Immediately after surgery
   B. Once the wound is completely healed and the surgical site is stable
   C. After the first prosthesis is fitted
   D. When the patient begins walking unaided
11. Which functional activity can be facilitated by applying an air splint to a lower limb residual stump
   A. Full prosthetic gait training
   B. Balance training
   C. Running drills
   D. Weight-bearing on the amputated limb
12. Which limitation is commonly associated with the use of silicone liners during post-operative management of the residual limb?
   A. They cannot be sterilized
   B. They restrict mobility
   C. They are costly and require resizing as oedema decreases
   D. They increase the risk of infection
13. Which physical therapy intervention has demonstrated approximately 50% effectiveness in alleviating phantom limb pain?
   A. Cryotherapy
   B. Ultrasound
   C. Transcutaneous Electrical Nerve Stimulation (TENS)
   D. Eye Movement Desensitization and Reprocessing
14. Why is collaborative goal setting considered a vital component of psychosocial rehabilitation for individuals with lower limb amputation?
   A. To determine the cost of prosthetic devices
   B. To help the individual cope with phantom limb pain
   C. To establish realistic rehabilitation and functional outcomes
   D. To reduce the need for physical therapy
15. What is the main objective of conducting a pre-prosthetic evaluation in interdisciplinary amputee rehabilitation?
   A. A. To begin gait training immediately
   B. To assess the residual limb's readiness for prosthetic fitting
   C. To prescribe pain medication
   D. Selecting clothing that accommodates the prosthesis

16. Which of the following criteria best indicates that a patient is ready for a definitive prosthesis?
    A. The patient has completed all psychological counseling sessions
    B. The stump shape is stable for over two weeks with no significant oedema
    C. The patient has returned to full-time employment
    D. The patient has used a temporary prosthesis for at least one month
17. How does a myoelectric transradial prosthesis function?
    A. It uses a cosmetic sleeve to cover the limb
    B. It relies on shoulder harnesses for manual control
    C. It detects muscle signals in the upper arm to activate movement
    D. It is operated by voice commands
18. What is the primary objective of conducting a trial fitting during transfemoral prosthetic rehabilitation?"
    1. To permanently fix the prosthesis
    2. To test socket fit and functional compatibility before finalizing the definitive prosthesis
    3. To reduce the cost of rehabilitation
    4. To begin gait training without professional supervision
19. What is the correct technique for measuring stump length to ensure accuracy?
    A. Measure diagonally across the limb to capture full volume
    B. Use a flexible tape and follow the contour of the stump
    C. Measure in a straight line from the selected landmark, avoiding oblique placement of the measuring tool
    D. Estimate visually and record the average
20. When measuring the sound limb to correspond with below-knee stump measurements, which anatomical landmarks should be used?
    A. Greater trochanter to heel
    B. Patella to floor on the lateral side
    C. Ischial tuberosity to medial tibial plateau
    D. Iliac crest to ankle joint
21. What is the rationale for progressively increasing prosthesis wear time during early stages of amputee rehabilitation?
    A. A. To allow the patient to adjust psychologically to the prosthesis
    B. To prevent skin breakdown and monitor for pressure areas
    C. To reduce the cost of rehabilitation
    D. To accelerate socket fitting
22. What factors contribute to the increased cardiopulmonary demand during gait training following a more proximal amputation, such as a transfemoral level?
    A. A. Because the prosthesis is heavier
    B. Because the patient must use crutches
    C. Because more muscle groups are bypassed, increasing energy demands
    D. Because the socket fit is less secure
23. What is the principal goal of prosthetic rehabilitation for individuals with limb loss?
    A. To achieve cosmetic symmetry
    B. To gain independence with the most efficient gait possible
    C. To reduce the cost of prosthetic care
    D. To avoid physical therapy interventions

24. What is the main therapeutic objective of incorporating lateral weight-shifting exercises in early prosthetic gait training?
    A. To strengthen the upper limbs for crutch use
    B. To improve proprioception and activate gluteal and residual limb muscles for stabilization
    C. To reduce phantom limb pain
    D. To stretch the hip flexors
25. How can stair/stool stepping exercises be progressed to improve single-leg stance on the prosthetic side?
    A. By using a lower step and increasing hand support
    B. By stepping with both legs simultaneously
    C. By increasing step height, reducing hand support, slowing movement, and adding arm swings
    D. By performing the exercise seated
26. The primary function of foot orthoses is?
    A. To permanently replace footwear for people with foot pain
    B. To redistribute ground reaction forces and improve foot posture
    C. To immobilize the foot and ankle during injury recovery
    D. To increase shoe size for better comfort
27. Which type of foot orthosis is specifically designed to relieve pressure spots and prevent conditions like corn or calluses?
    A. Functional foot orthosis
    B. Cushioning orthosis
    C. Fabricated orthosis
    D. Pressure relief orthosis
28. When designing or fitting an Ankle-Foot Orthosis (AFO), which of the following should generally be avoided as a starting point?
    A. Thermoformed plastic material for adjustability
    B. Below-knee extension for proper coverage
    C. Customization based on patient development
    D. Starting above the knee for standard AFO design
29. Which of the following is NOT one of the five key characteristics considered when selecting materials for prosthetic fabrication?
    A. Strength
    B. Elasticity
    C. Density
    D. Corrosion resistance
30. What is the recommended initial setting for gait re-education in prosthetic users?
    A. On uneven terrain outdoors
    B. Between parallel bars with two-handed support
    C. On a treadmill without supervision
    D. Using crutches on stairs

Short answer questions. Answer all the questions. 20 marks

1. Briefly outline 5 potential complications that can impact the amputated patient's ability to participate in therapy 5 marks
2. Highlight five physiotherapy interventions post-amputation 5 marks
3. State the advantages of using a prosthetic foot 5 marks
4. State the indication for knee ankle foot orthosis (KAFO) 5 marks

Long essay questions. Attempt only two (20 marks)

1. Discuss in detail the characteristics of a patient ready for a definitive prosthesis 10 marks
2. Discuss how you will avoid joint contractures in a below knee amputated patient. 10 marks
3. Explain the goals of prosthetic rehabilitation 10 marks