

SECTION A

PART I: Multiple Choice Questions [30 marks]

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. A 55-year-old patient presents with insidious onset of shoulder pain that is worse at night and difficulty lifting their arm. The most likely initial impairment to assess is:
 - a) Scapulothoracic rhythm
 - b) Rotator cuff muscle strength
 - c) Cervical active range of motion
 - d) Glenohumeral joint accessory mobility
2. The primary muscle responsible for inspiration is:
 - a) Diaphragm
 - b) External oblique
 - c) Internal oblique
 - d) Rectus abdominis
3. The center of gravity in a normal adult standing upright is located at:
 - a) At the umbilicus
 - b) Level of S1 vertebra
 - c) At the xiphoid process
 - d) Just anterior to S2 vertebra
4. In stroke rehabilitation, the Brunnstrom approach describes recovery in:
 - a) 3 stages
 - b) 5 stages
 - c) 6 stages
 - d) 7 stages
5. A common physiotherapy intervention for post-operative total knee replacement in the first week is
 - a) Plyometric training
 - b) Jogging and stair climbing
 - c) High-resistance strength training
 - d) Cryotherapy and passive ROM exercises
6. During a squat assessment, you observe a patient's knees moving into significant valgus (knock-knee). Which of the following muscles is most likely weak and contributing to this movement fault?
 - a) Tensor Fascia Latae (TFL)
 - b) Gluteus Medius
 - c) Adductor Longus
 - d) Biceps Femoris

7. A patient with a complete T6 spinal cord injury is learning wheelchair mobility. To prevent a pressure injury, what is the most effective technique you should teach them?
 - a) Shifting weight side-to-side every 15 minutes
 - b) Performing a full wheelchair push-up every 30 minutes
 - c) Leaning forward for 2 minutes every hour
 - d) Using a specialized cushion without the need to reposition
8. The primary goal of pursed-lip breathing in a patient with severe COPD is to:
 - a) Strengthen the inspiratory muscles
 - b) Improve oxygenation by increasing FiO₂
 - c) Prevent early airway closure and reduce air trapping
 - d) Facilitate a more effective cough
9. A 22-year-old basketball player lands awkwardly after a jump. They report hearing a "pop," immediate swelling, and a feeling of the knee "giving way." The most likely injured structure is:
 - a) Medial Meniscus
 - b) Anterior Cruciate Ligament (ACL)
 - c) Patellar Tendon
 - d) Lateral Collateral Ligament (LCL)
10. During a special test for shoulder impingement, the therapist passively flexes the patient's shoulder to 90° and then forcibly internally rotates the arm. This maneuver is known as:
 - a) Apprehension Test
 - b) Hawkins-Kennedy Test
 - c) Neer's Test
 - d) Empty Can Test
11. A patient presents with loss of pain and temperature sensation on the left side of the body and loss of proprioception on the right side below the level of a cervical lesion. This presentation is most characteristic of:
 - a) Brown-Séquard Syndrome
 - b) Anterior Cord Syndrome
 - c) Central Cord Syndrome
 - d) Cauda Equina Syndrome
12. For a patient in the early stages of Parkinson's disease, which of the following exercise interventions is MOST beneficial for improving gait amplitude and overcoming bradykinesia?
 - a) Repetitive, rhythmic rocking in sitting
 - b) High-intensity resistance training for the lower limbs
 - c) Use of external cues, such as walking to the beat of a metronome or over floor markers
 - d) Passive stretching of all major muscle groups

13. On auscultation of a post-operative patient's lungs, you hear a continuous low-pitched, snoring sound over the trachea and main bronchi. This is most indicative of:
- a) Wheeze
 - b) Stridor
 - c) Rhonchi
 - d) Fine Crackles
14. The Active Cycle of Breathing Techniques (ACBT) is a cornerstone of airway clearance. What is the correct sequence of its components?
- a) Breathing Control → Thoracic Expansion Exercises → Forced Expiration Technique
 - b) Thoracic Expansion Exercises → Breathing Control → Forced Expiration Technique
 - c) Forced Expiration Technique → Breathing Control → Thoracic Expansion Exercises
 - d) Thoracic Expansion Exercises → Forced Expiration Technique → Breathing Control
15. According to the ICF (International Classification of Functioning, Disability and Health) model, "the inability to climb stairs" is classified as a(n):
- a) Impairment
 - b) Activity Limitation
 - c) Participation Restriction
 - d) Health Condition
16. A randomized controlled trial (RCT) shows that a new treatment is statistically significantly better than the current standard ($p=0.04$). To apply this to your patient, what is the MOST important next step?
- a) Immediately adopt the new treatment for all relevant patients.
 - b) Dismiss the findings as the p-value is not less than 0.01.
 - c) Evaluate if your patient is similar to those in the study and consider the treatment alongside clinical expertise and their values.
 - d) Wait for a systematic review to be published before considering the treatment.
17. A 2-year-old child presents with hypertonia in a "scissoring" posture, persistent primitive reflexes, and delayed motor milestones. This clinical picture is MOST suggestive of:
- a) Duchenne Muscular Dystrophy
 - b) Spastic Diplegic Cerebral Palsy
 - c) Down Syndrome
 - d) Brachial Plexus Palsy
18. What is the primary respiratory physiotherapy goal for an infant with cystic fibrosis?
- a) To strengthen inspiratory muscles
 - b) To mobilize and clear thickened pulmonary secretions
 - c) To provide postural drainage only during pulmonary exacerbations
 - d) To increase tidal volume through incentive spirometry

19. Therapeutic handling in pediatric physiotherapy for a child with cerebral palsy should focus on:
- a) Letting the child move freely to encourage independence
 - b) Using firm handling on distal parts to guide movement
 - c) Inhibiting abnormal patterns and facilitating normal alignment and movement sequences
 - d) Focusing solely on strengthening within the child's preferred movement patterns
20. When treating a child with Osteogenesis Imperfecta (OI), the physiotherapist's primary precaution is to:
- a) Avoid all weight-bearing activities
 - b) Prevent fractures by handling the child gently and avoiding excessive force during stretching or exercises
 - c) Focus intensely on high-impact activities to strengthen bones
 - d) Prioritize cardiovascular fitness over all other goals
21. Multiple sclerosis (MS) primarily involves:
- a) Demyelination of central nervous system neurons
 - b) Destruction of peripheral nerves
 - c) Muscle degeneration
 - d) Neuromuscular junction defect
22. In motor relearning, feedback is most effective when:
- a) Delayed and generalized
 - b) Immediate and specific
 - c) Absent
 - d) Random and inconsistent
23. Which syndrome often results from a hyperextension injury in an elderly individual with cervical stenosis and typically presents with greater weakness in the upper limbs than the lower limbs?
- a) Cauda Equina Syndrome
 - b) Anterior Cord Syndrome
 - c) Central Cord Syndrome
 - d) Posterior Cord Syndrome
24. Neurogenic shock, which can occur immediately after a cervical or high thoracic SCI, is characterized by:
- a) Hypertension and tachycardia
 - b) Hypertension and bradycardia
 - c) Hypotension and bradycardia
 - d) Hypotension and tachycardia

25. A patient presents with pain and paresthesia in the lateral forearm and thumb, weakness in elbow flexion and forearm supination. The most likely involved cervical nerve root is:
- a) C4
 - b) C5
 - c) C6
 - d) C7
26. A patient with a complete T10 spinal cord injury will most likely have:
- a) Full upper extremity strength and partial trunk control
 - b) Full upper extremity strength, no trunk or lower extremity control
 - c) Impaired hand function and impaired respiratory function
 - d) Flaccid paralysis of all four limbs
27. Following a median sternotomy for Coronary Artery Bypass Graft (CABG) surgery, a patient should be advised to:
- a) Avoid lifting anything heavier than 5-10 lbs for 6-8 weeks
 - b) Begin aggressive overhead exercises immediately
 - c) Focus only on lower limb exercises
 - d) Avoid deep breathing exercises to prevent pain
28. The primary purpose of proprioceptive neuromuscular facilitation (PNF) diagonal patterns is to:
- a) Isolate a single muscle group
 - b) Mimic natural, multi-joint functional movement
 - c) Provide a passive stretch only
 - d) Treat respiratory conditions
29. The therapeutic ultrasound frequency of 3 MHz is typically used for:
- a) Deep tissue heating (3-5 cm depth)
 - b) Superficial tissue heating (1-2 cm depth)
 - c) Phonophoresis of corticosteroids
 - d) Fracture healing
30. The presence of coarse crackles on auscultation is most commonly associated with:
- a) Secretions in the large airways
 - b) A completely collapsed lung (pneumothorax)
 - c) Bronchospasm (wheezing)
 - d) Pleural friction rub

PART II – Short Answer Questions [20 marks]

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks. Mark for each sub-question is indicated in the brackets.

1. A patient with chronic low back pain tells you that a previous therapist told them they "have the spine of an 80-year-old" and that they "must never lift anything heavy again." The patient is now fearful and avoids all physical activity.
 - a. Identify TWO unprofessional or harmful elements in the previous therapist's communication. **(2 Marks)**
 - b. Describe THREE key principles of your education and advice to this patient, based on a biopsychosocial approach. **(3 Marks)**
2. You are treating a 70-year-old patient with severe COPD (FEV1 <50% predicted) who becomes severely breathless after walking 10 meters.
 - a. Name the validated outcome measure you would use to assess their functional exercise capacity. **(1 Mark)**
 - b. List TWO breathing techniques you would teach this patient to manage their breathlessness and state the purpose of EACH. **(4 Marks)**
3. A 55-year-old patient with right-sided hemiparesis following a left middle cerebral artery stroke demonstrates significant spasticity in their right upper limb, with a flexed elbow, wrist, and fingers.
 - a. Define spasticity. **(1 Mark)**
 - b. List two non-pharmacological treatment techniques to manage this spasticity. **(2 Marks)**
 - c. Explain one functional implication of this spasticity pattern on the patient's daily activities. **(2 Marks)**
4. A 25-year-old long-distance runner presents with a 6-week history of insidious onset anterior knee pain, worsened by descending stairs and prolonged sitting.
 - a. What is the most likely diagnosis? **(1 Mark)**
 - b. Describe TWO key subjective history questions you would ask to confirm your hypothesis. **(2 Marks)**
 - c. Outline TWO key components of your initial exercise management plan. **(2 Marks)**

SECTION B: Case Study [50 marks]

Choose either CASE I OR CASE II from this section. Each case study carries 50 marks. Mark for each sub-question is indicated in the brackets.

Case I

Patient Profile:

- Name : Mrs. Pema Choden
- Age : 72
- Occupation : Retired school teacher
- Past Medical History: Type 2 Diabetes Mellitus (well-controlled with medication), Osteoarthritis (both knees, right more than left).
- Social History: Lives with her husband in a two-story house with 12 stairs to the bedroom. She is independent in all basic Activities of Daily Living (ADLs) but has stopped her daily walks due to knee pain. She is right-hand dominant.

Current Admission:

Mrs. Pema Choden was admitted to the hospital 5 days ago following a right-sided cerebrovascular accident (CVA). Her initial presentation included left-sided hemiplegia, facial asymmetry, and slurred speech. A CT scan confirmed an ischemic infarct in the right middle cerebral artery (MCA) territory.

Current Status (Day 5 Post-Stroke):

- Cognition & Communication: Alert, oriented to person and place. She has difficulty with attention and concentration. She has mild expressive dysphasia but understands simple commands.
- Sensation: Diminished light touch and proprioception in the left upper and lower limbs.
- Tone: Flaccidity (hypotonia) in the left upper limb. Emerging spasticity (Modified Ashworth Scale 1+) in the left lower limb (plantarflexors and hamstrings).
- Motor Function:
 - Left Upper Limb (LUL): Volitional movement is absent (0/5 MRC scale) in the shoulder, elbow, wrist, and fingers. Shoulder subluxation of ~1 finger width is palpable.
 - Left Lower Limb (LLL): Hip: 2/5, Knee: 2/5, Ankle: 1/5. No voluntary movement at the toes.
 - Right Side: Strength is within functional limits (4+/5).
- Balance & Function:
 - Sitting Balance: Requires moderate support to maintain an upright posture. Leans significantly to her right (non-paretic) side. No protective extension on the left.
 - Transfers: Maximal assistance of two people required for bed-to-chair transfer using a sliding board.
 - Mobility: Not yet ambulatory.

- Goals: She is frustrated but highly motivated. She tells you, "I want to go back home and be able to make tea in my kitchen without falling."
- 1. Based on the motor presentation, identify the type of motor deficit Mrs. Pema Choden is exhibiting and explain why it has occurred. **(3 Marks)**
- 2. List THREE specific assessment tools you would use to objectively measure her current status and justify your choice for EACH. (Do not use the Modified Ashworth Scale as it is already mentioned). **(6 Marks)**
- 3. Identify TWO key impairments and TWO activity limitations Mrs. Pema Choden is experiencing. **(4 Marks)**
- 4. What is the most significant potential complication regarding her left upper limb at this stage? Describe ONE strategy to prevent it. **(2 Marks)**
- 5. Outline your physiotherapy goals for Mrs. Pema Choden for the first week of rehabilitation. Include ONE short-term goal for each category: **(6 Marks)**
- 6. Design a treatment plan for your FIRST TWO treatment sessions with Mrs. Pema Choden.
 - a. List FOUR different treatment techniques or activities you would include. **(4 Marks)**
 - b. For EACH technique, provide a brief rationale linking it to her specific problems. **(8 Marks)**
- 7. As Mrs. Pema's recovery progresses, spasticity is likely to increase.
 - a. Describe ONE stretching technique and ONE positioning strategy to manage spasticity in her left plantarflexors. **(4 Marks)**
 - b. Explain the neurophysiological rationale for using sustained stretching. **(3 Marks)**
- 8. Considering her goal of making tea, describe the THREE main components of kitchen-related function you would need to assess and rehabilitate before a safe discharge home. **(3 Marks)**
- 9. What is the recommended gait aid for initial ambulation for a patient with left hemiplegia and poor balance? Justify your answer. **(2 Marks)**
- 10. List FIVE essential considerations for discharge planning to ensure Mrs. Pema's safety and continued progress at home. **(5 Marks)**

Case II

Patient Profile:

- Name : Mr. Dorji
- Age : 45
- Occupation : Bus driver
- Past Medical History: Hypertension (controlled with medication). Two previous episodes of LBP in the last 10 years, each resolving within a week with rest.
- Social History: Married with two children. Sedentary outside of work. Smokes 10 cigarettes a day. Reports moderate levels of work-related stress.

Presenting Condition:

Mr. Dorji presents to the physiotherapy clinic with a 7-day history of severe low back pain. The pain began gradually over last weekend after he spent two days building a new shed in his garden. He reports a lot of bending, twisting, and lifting heavy timber.

Subjective Assessment:

- Pain:
 - Location: Central and left-sided low lumbar region (L4-S1 area).
 - Irritability: Highly irritable. Pain increases from 3/10 at rest to 8/10 with minimal provocation.
 - Behaviour: Worse with sitting (particularly driving), forward bending, coughing/sneezing. Better with lying down on his right side with knees bent.
 - 24-Hour Pattern: Stiff and very painful first thing in the morning (approx. 30 minutes). Pain increases significantly towards the end of his driving shift.
- Additional Symptoms: He reports a vague, intermittent tingling sensation in his left lateral calf and dorsum of the foot. No weakness reported in his legs. Bladder and bowel function are normal.
- Function: He has been off work for the past 3 days. He struggles to put on his socks and shoes. He is avoiding all lifting.
- Goals: Get back to work as soon as possible and be able to play with his young children without pain.

Objective Assessment:

- Observation: Antalgic lean to the right in standing. Reduced lumbar lordosis. Moving very cautiously and stiffly.
- Active Movements (Standing):
 - Forward Flexion: Limited to 20% of range by severe central LBP (fingers to mid-thigh).
 - Extension: Limited to 50% by local LBP.
 - Right Side Flexion: Limited to 70%.
 - Left Side Flexion: Limited to 30% by sharp left-sided LBP.

- Repeated Movements: Centralization: Repeated extension in lying significantly reduces his central and leg symptoms. Peripheralization: Repeated flexion in sitting increases his left calf symptoms.
 - Neurological Examination:
 - Myotomes: Left ankle dorsiflexion strength 4/5 (right 5/5). All other lower limb myotomes 5/5.
 - Reflexes: Left Achilles reflex diminished (1+) compared to right (2+).
 - Sensation: Subtle diminished light touch in the web space between left 1st and 2nd toes.
 - Palpation: Severe tenderness and muscle guarding over the left L5/S1 paraspinal region.
 - Special Tests:
 - Positive: Slump Test on left side reproduces left calf pain.
 - Negative: Straight Leg Raise (SLR) is negative for neural pain but limited to 60° on left by hamstring tightness. Femoral Nerve Test negative.
1. Based on the subjective and objective history, what is your primary clinical hypothesis? Provide THREE key pieces of evidence to support your hypothesis. **(5 Marks)**
 2.
 - a. Identify the most likely spinal nerve root involved. **(1 Mark)**
 - b. Provide TWO objective findings that support this. **(2 Marks)**
 3. The concepts of *Centralization* and *Peripheralization* are crucial.
 - a. Define both terms. **(2 Marks)**
 - b. Why is the presence of centralization a positive prognostic indicator? **(2 Marks)**
 4. List THREE key *impairments* and TWO key *activity limitations* for Mr. Matthews. **(5 Marks)**
 5. Identify TWO "yellow flags" present in this case. **(2 Marks)**
 6. What is the single most important "red flag" to have ruled out in this presentation, and how did the case information provide reassurance? **(2 Marks)**
 7. Outline your physiotherapy management goals for the first 1-2 weeks (Acute Phase). **(6 Marks)**
 8. Design a treatment plan for the first two sessions.
 - a. List THREE specific treatment strategies you would employ. **(3 Marks)**
 - b. For EACH strategy, provide a clear physiological or clinical rationale. **(6 Marks)**
 9. Mr. Dorji's job as a bus driver is a major aggravating factor. Describe THREE specific pieces of advice you would give him to manage his pain at work upon his return. **(3 Marks)**
 10. As he moves into the sub-acute phase (weeks 2-4), his program must evolve. Describe TWO key exercise progressions you would implement, specifying their purpose. **(4 Marks)**

11. Despite 4 weeks of physiotherapy, the neurological deficit (diminished reflex and sensation) persists, and his leg pain remains unchanged. What would be your next step in management? **(2 Marks)**
12. Explain why a course of NSAIDs (e.g., Ibuprofen) might be medically prescribed for this condition and what their primary mechanism of action is. **(2 Marks)**
13. Describe the key differences in presentation between Neurogenic Claudication (from Lumbar Spinal Stenosis) and the symptoms Mr. Dorji is experiencing. **(3 Marks)**

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