BACHELOR OF SCIENCE IN PHYSIOTHERAPY (DIRECT)
MAIN

COURSE CODE: PHT 313

COURSE TITLE: NEUROREHABILITATION I

DATE: 7th April 2025 **TIME: 11.15am-1.15am**

INSTRUCTIONS TO CANDIDATES
Answer All Questions

Section A: Multiple Choice Questions (MCQ)	30 Marks.
Section B: Short Answer Questions (SAQ)	20 Marks.
Section C: Long Answer Question (LAQ)	20 Marks

TIME: 2 Hours

SECTION A: MULTIPLE CHOICE QUESTIONS (MCQ) 20 MARKS

1. A patient presents with an altered level of consciousness post-trauma. His eye-opening response is only to pain, his best verbal response is incomprehensible sounds, and his best motor response is abnormal flexion. His Glasgow Coma Scale (GCS) score is:
   a) 5
   b) 6
   c) 7
   d) 8

2. Which standardized assessment scale best differentiates between functional independence and dependence in stroke rehabilitation?
   a) Rancho Los Amigos Scale
   b) Functional Independence Measure (FIM)
   c) Glasgow Coma Scale
   d) Berg Balance Scale

3. During a neurological exam, a positive Romberg's test suggests dysfunction in:
   a) Cerebellar pathways
   b) Vestibular system or proprioception
   c) Corticospinal tracts
   d) Spinothalamic tracts

4. Which neurophysiological technique focuses on facilitating automatic movement patterns by stimulating reflex zones?
   a) Bobath Approach
   b) Vojta Therapy
   c) Brunnstrom Therapy
   d) Motor Relearning Programme

5. Constraint-Induced Movement Therapy (CIMT) relies on which of the following principles?
   a) Reflex-based motor recovery
   b) Learned non-use reversal
   c) Reciprocal inhibition
   d) Strength training for unaffected limbs

6. In Brunnstrom's recovery stages, which movement pattern is typically observed first in stroke recovery?
   a) Isolated joint movements
   b) Synergistic flexor patterns
   c) Reflex inhibition
   d) Bilateral coordination

7. The Carr and Shepherd approach emphasizes:
   a) Reflex integration through facilitation
   b) Cognitive processing in motor relearning
   c) Task-specific movement retraining
   d) Synergistic pattern development

8. Neurodevelopmental Therapy (NDT) as conceptualized by Bobath focuses on:
   a) Enhancing primitive reflexes
   b) Inhibiting abnormal postural reflexes
   c) Strengthening isolated muscle groups
   d) Encouraging compensatory movement patterns

9. A 58-year-old male post-stroke exhibits severe left-sided neglect, anosognosia, and spatial disorientation. Lesion localization is most likely in the:
   a) Right superior parietal lobe
   b) Left inferior temporal lobe
   c) Right posterior parietal cortex
   d) Left prefrontal cortex

10. Which principle of Constraint-Induced Movement Therapy (CIMT) directly challenges learned non-use in chronic stroke rehabilitation?
    a) Neural plasticity through inhibitory disinhibition
    b) Cortical remapping via repeated, high-intensity forced-use training
    c) Direct strengthening of the unaffected limb to compensate
    d) Reflex potentiation and facilitation of brainstem pathways
11. A patient with right hemisphere stroke is more likely to exhibit:
    a) Expressive aphasia
    b) Ideomotor apraxia
    c) Impulsivity and left-sided neglect
    d) Wernicke's aphasia

12. In a patient with chronic stroke, which therapy is most effective for improving upper limb function?
    a) CIMT
    b) Bobath
    c) Passive range of motion exercises
    d) Rood's Sensory Approach

13. The most common cause of central post-stroke pain is:
    a) Thalamic infarction
    b) Brainstem stroke
    c) Frontal lobe damage
    d) Cerebellar infarction

14. What is the underlying mechanism of spasticity post-stroke?
    a) Loss of reciprocal inhibition
    b) Impaired cerebellar processing
    c) Increased basal ganglia output
    d) Myelin sheath regeneration

15. A therapist utilizing the Vojta Therapy approach applies reflex locomotion techniques to stimulate automatic movement patterns. What is the primary rationale behind this intervention?
    a) Activation of global synergy patterns
    b) Restoration of selective voluntary control
    c) Peripheral neuromuscular activation via sensory feedback loops
    d) Reorganization of central pattern generators (CPGs)

16. Which of the following accurately differentiates between Bobath Therapy and the Motor Relearning Programme (MRP) in stroke rehabilitation?
    a) Bobath prioritizes compensatory movement strategies, while MRP inhibits abnormal tone
    b) Bobath focuses on reflex inhibition, whereas MRP emphasizes task-oriented functional movements
    c) MRP relies on passive facilitation, while Bobath emphasizes task-oriented reorganization
    d) Bobath uses neuroplasticity principles, whereas MRP is solely biomechanical

17. Which of the following is a fundamental critique of the Brunnstrom approach in modern neurorehabilitation?
    a) It ignores the role of abnormal reflex activity in motor recovery
    b) It assumes a rigid, linear recovery sequence that does not accommodate individual variability
    c) It overemphasizes cognitive strategies in the recovery of motor function
    d) It completely disregards functional training

18. A stroke patient with left-sided weakness is trained using PNF patterns. Which principle of PNF explains how resistance applied to the stronger right limb can facilitate movement in the weaker left limb?
    a) Successive Induction
    b) Reciprocal Inhibition
    c) Overflow (Irradiation)
    d) Autogenic Inhibition

19. Which of the following PNF techniques is most effective in improving mobility in a patient with Parkinson's disease who has difficulty initiating movement?
    a) Contract-Relax
    b) Rhythmic Initiation
    c) Hold-Relax
    d) Repeated Contractions

20. PNF diagonal patterns are based on the functional movements of daily activities. Which of the following movements is characteristic of the D1 Flexion pattern for the upper limb?
    a) Shoulder flexion, adduction, external rotation
    b) Shoulder flexion, abduction, external rotation
    c) Shoulder extension, adduction, internal rotation
    d) Shoulder extension, abduction, internal rotation

21. A patient with a C6 spinal cord injury is undergoing PNF-based therapy. Which diagonal pattern is most beneficial in improving functional reaching ability?
    a) D1 Flexion
    b) D2 Flexion
    c) D1 Extension
    d) D2 Extension

22. What are the two primary coding components of the ICF?
    A. Diagnosis and Treatment
    B. Activities and Contextual Factors
    C. Impairments and Participation Restrictions
    D. Body Functions and Body Structures

23. How are "Body Functions" represented in the ICF coding system?
    A. Using the letter "b" followed by a number
    B. Using the letter "s" followed by a number
    C. Using the letter "d" followed by a number
    D. Using the letter "e" followed by a number

24. What does the code "d430" represent in the ICF coding system?
    A. Body structure related to movement
    B. Environmental factor affecting mobility
    C. Activity related to lifting and carrying objects
    D. Participation in community life

25. Which of the following Motor Control Theories emphasizes the role of a memory representation in the control of coordinated action?
    A. Schmidt's Schema Theory
    B. Dynamic Pattern Theory
    C. Motor Program-based Theories
    D. Fitt's Law
26. The Dynamic Pattern Theory:
    A. Is a memory-based construct that controls coordinated movement
    B. Describes and explains the role of coordinated movement that emphasises the role of information in the environment and properties of the body/limbs
    C. Hypothesises a Generalised Motor Program (GMP)
    D. Helps to explain the degrees of freedom problem and describes how the nervous system produces coordinated movement of motor skills

27. Schmidt's Schema Theory proposes that:
    A. Memory is the most important component of a GMP
    B. A GMP serves as the central, memory-based mechanism for the control of motor skill performance
    C. Open and closed loop control systems send movement instructions to the GMP and initiate a movement
    D. When a specific action is performed, specific parameter values must be added to the GMP

28. Which of the following is not a characteristic of the Motor Program Based Theory?
    A. Instructions are specified by the CNS
    B. Control process is managed by a motor program
    C. Motor Program organizes, initiates, and carries out intended actions
    D. Non-linear changes in movement behaviour

29. After a traumatic brain injury, a patient presents with significant difficulties in learning how to use a wheelchair. Memory for new learning is present but limited (Rancho Los Amigos Levels of Cognitive Functioning, level VII). The patient is wheelchair dependent and needs to learn how to transfer from the wheelchair to the mat (a skill never done before). Which of the following is the BEST strategy to enhance this patient's motor learning?

    A. Use only guided movement to ensure correct performance.
    B. Provide bandwidth feedback using a random practice schedule.
    C. Provide consistent feedback using a blocked practice schedule.
    D. Provide summed feedback after every few trials using a serial practice schedule.

30. A patient is recovering from stroke and presents with moderate impairments of the left upper and lower extremities. The PT's goal today is to instruct the patient in a stand-pivot transfer to the more affected side so the patient can go home on a weekend pass. The spouse is attending today's session and will be assisting the patient on the weekend. What is the BEST choice for teaching this task?
    A. Practice the task first with the patient then with the caregiver.
    B. Demonstrate the task, then have the caregiver practice with the patient.
    C. Practice the task first with the caregiver, then with the patient.

SECTION B: SHORT ANSWER QUESTIONS (SAQ) 20 MARKS
ANSWER ALL QUESTIONS. Each question is 5 marks

1. Compare and contrast the effectiveness of PNF diagonal patterns (D1/D2) versus traditional strength training in improving upper limb function in a patient recovering from a stroke affecting the corticospinal tract. Based on neurophysiological principles, which approach would you prioritize and why (5 MARKS)
2. A 6-year-old child with spastic cerebral palsy demonstrates excessive extensor tone in the lower limbs, making it difficult to achieve a standing position. How would you apply Neurodevelopmental Treatment (NDT) principles to facilitate controlled weight-bearing and postural alignment (5 MARKS)
3. A 55-year-old stroke patient has significantly learned non-use of the affected upper limb. How would you apply the principles of Constraint-Induced Movement Therapy (CIMT) to improve functional use of the limb (5 MARKS)
4. Compare and contrast the use of the Ashworth Scale and the Tardieu Scale in assessing spasticity in neurological patients (5 MARKS)

SECTION C: LONG ANSWER QUESTIONS (LAQS) 20 MARKS
ANSWER TWO QUESTIONS EACH ONE IS 10 MARKS

1. Critically evaluate the use of Neurodevelopmental Treatment (NDT) versus task-oriented training in improving upper limb function after stroke. Which approach aligns better with contemporary motor learning principles, and why **(10 MARKS)**
2. A 60-year-old patient has recently suffered from a left middle cerebral artery (MCA) stroke, resulting in right-sided hemiparesis and mild expressive aphasia. Using the International Classification of Functioning, Disability, and Health (ICF) framework, analyze the patient's condition (**10 MARKS)**
3. A physiotherapist is treating a patient with post-stroke hemiparesis. Which neurophysiological techniques would be most appropriate for improving motor recovery, and why (**10 MARKS)**