Multiple-Choice Questions (MCQs)

1. **Which principle of motor control emphasizes the importance of task-specific practice to improve functional outcomes in neurological rehabilitation?**
   a) Reflex-based training
   b) Task-oriented training
   c) Passive movement therapy
   d) Isometric strengthening

2. **Which neurotherapeutic approach uses diagonal patterns of movement to facilitate functional recovery?**
   a) Bobath (NDT)
   b) Proprioceptive Neuromuscular Facilitation (PNF)
   c) Rood approach
   d) Carr and Shepherd approach

3. **What is the primary goal of functional re-education exercises in neurological physiotherapy?**
   a) To increase muscle mass
   b) To restore purposeful movement patterns for daily activities
   c) To reduce joint stiffness only
   d) To improve cardiovascular endurance

4. **Which of the following is a key feature of the Rood approach in neurological rehabilitation?**
   a) Use of sensory stimulation to facilitate or inhibit motor responses
   b) Focus on surgical interventions
   c) Emphasis on static stretching
   d) Use of high-frequency electrical stimulation

5. **What is the purpose of using a tilt board in neurological physiotherapy?**
   a) To assess cranial nerve function
   b) To improve balance and postural control
   c) To measure joint range of motion
   d) To enhance aerobic capacity

Short-Answer Questions

6. Describe the role of motor learning theories in designing physiotherapy interventions for stroke patients. Provide one example of a motor learning principle applied in treatment.

7. Explain how the Proprioceptive Neuromuscular Facilitation (PNF) technique of "slow reversals" can be used to improve motor control in a patient with hemiplegia.

8. Discuss the importance of gait training in neurological rehabilitation and outline one specific gait training strategy for a patient with Parkinson's disease.

9. Describe the principles of the Bobath (NDT) approach and how they are applied to manage spasticity in cerebral palsy patients.

Design Thinking (DT)-Based Question

10. Design a patient-centered neurorehabilitation program for a patient with multiple sclerosis experiencing balance and coordination difficulties. Outline the steps of the Design Thinking process (empathize, define, ideate, prototype, test) to develop this program, and explain how it aligns with the principles of neurological physiotherapy treatment in Unit C.

Answer Key with Explanations and References

Multiple-Choice Questions

1. **Answer: b) Task-oriented training**
   Explanation: Task-oriented training is a principle of motor control that emphasizes practicing functional, task-specific activities to enhance motor recovery and independence in daily tasks, which is critical in neurological rehabilitation (Syllabus, Page 74, Unit C, Point 1). Reflex-based training is less functional, while isometric strengthening and passive movement are not primary motor control principles.

2. **Answer: b) Proprioceptive Neuromuscular Facilitation (PNF)**
   Explanation: PNF uses diagonal movement patterns to stimulate functional motor recovery by engaging multiple muscle groups in coordinated movements, as outlined in the syllabus (Page 74, Unit C, Point 5). Other approaches like NDT or Rood focus on different techniques, such as normalizing tone or sensory stimulation.

3. **Answer: b) To restore purposeful movement patterns for daily activities**
   Explanation: Functional re-education exercises aim to restore purposeful movements for activities of daily living (ADLs), such as walking or dressing, by retraining motor patterns (Syllabus, Page 74, Unit C, Point 2). Other options like muscle mass increase or aerobic capacity are not the primary focus.

4. **Answer: a) Use of sensory stimulation to facilitate or inhibit motor responses**
   Explanation: The Rood approach uses sensory inputs (e.g., quick stretch, vibration) to facilitate or inhibit motor responses based on the patient's needs, as described in the syllabus (Page 74, Unit C, Point 5; Page 84, Rood Approach). Other options are unrelated to Rood's principles.

5. **Answer: b) To improve balance and postural control**
   Explanation: Tilt boards are used in neurological physiotherapy to challenge and improve balance and postural control, particularly for patients with coordination deficits (Syllabus, Page 74, Unit C, Point 6). They are not used for cranial nerve assessment, joint range measurement, or aerobic capacity.

Short-Answer Questions

6. **Answer**: Motor learning theories guide physiotherapy interventions by focusing on how patients acquire and refine motor skills through practice and feedback. These theories emphasize repetition, feedback, and task-specific training to promote neuroplasticity. An example is the principle of *specificity*, where a stroke patient practices reaching for a cup to improve upper limb function for daily tasks like drinking.
   Explanation: Motor learning theories, such as those in the Carr and Shepherd approach, promote functional recovery by structuring practice to enhance skill acquisition (Syllabus, Page 74, Unit C, Point 1; Page 82, Motor Relearning Programme). Specificity ensures training is relevant to the patient's goals.

7. **Answer**: The PNF technique of slow reversals involves alternating contractions of agonist and antagonist muscles in diagonal patterns to improve motor control. For a patient with hemiplegia, slow reversals can be applied to the affected arm by guiding the patient through D1 flexion (shoulder flexion, adduction, external rotation) and D1 extension patterns, using resistance to enhance strength and coordination.
   Explanation: Slow reversals enhance motor control by promoting reciprocal innervation and coordination, as outlined in PNF principles (Syllabus, Page 74, Unit C, Point 5; Page 86, PNF Techniques). This is effective for hemiplegia to improve functional movements.

8. **Answer**: Gait training is crucial in neurological rehabilitation to restore mobility, reduce fall risk, and enhance independence. For a patient with Parkinson's disease, a specific strategy is *cueing*, using visual (e.g., lines on the floor) or auditory (e.g., metronome) cues to improve step length and rhythm, addressing festinating gait.
   Explanation: Gait training is a core component of neurological physiotherapy to improve functional mobility (Syllabus, Page 74, Unit C, Point 2). Cueing helps overcome bradykinesia and gait freezing in Parkinson's (Page 74, Unit D, Point 5).

9. **Answer**: The Bobath (NDT) approach focuses on normalizing movement patterns and tone through handling techniques that facilitate normal postural control and inhibit abnormal patterns. For cerebral palsy patients with spasticity, therapists use specific handling to position limbs to reduce spastic tone (e.g., gentle weight-bearing to inhibit extensor spasticity) and guide functional movements like rolling or sitting.
   Explanation: NDT principles aim to improve movement quality by addressing spasticity and promoting functional patterns, as outlined in the syllabus (Page 74, Unit C, Point 5; Page 83, NDT). This is particularly effective for cerebral palsy (Page 75, Unit E, Point 1).

Design Thinking (DT)-Based Question

10. **Answer**:
    Empathize: Interview the multiple sclerosis (MS) patient to understand their balance and coordination challenges, such as difficulty walking or frequent falls, and their emotional needs (e.g., fear of falling). Observe their daily activities to identify barriers.
    Define: Set goals to improve balance, coordination, and confidence in ADLs like walking or climbing stairs.
    Ideate: Consider interventions like balance exercises (e.g., tilt board tasks), PNF patterns for coordination, or assistive devices like canes. Incorporate sensory cueing or virtual reality for engagement.
    Prototype: Develop a balance training program using a tilt board and PNF D2 patterns, with a schedule of 30-minute sessions thrice weekly, including tasks like standing on a tilt board with visual cues.
    Test: Implement the program in a clinical setting, monitor the patient's balance (e.g., using the Berg Balance Scale), and gather feedback on feasibility. Adjust intensity or cues based on progress.
    Explanation: This program aligns with Unit C's focus on motor control, balance, and coordination exercises (Syllabus, Page 74, Unit C, Points 1, 4, 5). It uses patient-centered, task-specific interventions to promote functional recovery, consistent with neurotherapeutic principles like PNF and NDT.