



**AMREF INTERNATIONAL UNIVERSITY  
SCHOOL OF MEDICAL SCIENCE  
DEPARTMENT OF REHABILITATION MEDICINE  
BACHELOR OF SCIENCE IN PHYSIOTHERAPY  
END OF SEPT-DECEMBER 2024 TRIMESTER EXAMINATIONS**

**UNIT CODE: PHT 224                      UNIT NAME: Neuro science 1 (special exam)**

**DATE:                      Day/ Date/ December**

**TIME:                      TWO HOURS**

**START:                      0:00                      STOP : 0:00**

**INSTRUCTIONS (physical exams)**

- 1. Do not write on this question paper**

(Marks and questions distribution as per program curriculum.)

**INSTRUCTIONS (Online examinations)**

1. This exam is marked out of 70 marks
2. This Examination comprises 3 Sections
3. This online exam shall take 2 Hours
4. Late submission of the answers will not be accepted
5. Ensure your web-camera is on at all times during the examination period
6. No movement is allowed during the examination
7. Idling of your machine for 5 min or more will lead to lock out from the exam
8. The Learning Management System (LMS) has inbuilt integrity checks to detect cheating
9. Any aspect of cheating detected during and or after the exam administration will lead to nullification of your exam
10. In case you have any questions call the invigilator for this exam on Tel. 0705833434 and or the Head of Department on Tel 0720491032
11. For adverse incidences please write an email to: [amiu.examinations@amref.ac.ke](mailto:amiu.examinations@amref.ac.ke)

## SECTION A: MULTIPLE CHOICE QUESTIONS (MCQ) 30 MARKS

1. After 5 years of taking a cholinergic drug to reduce the symptoms of schizophrenia, Frank has developed tardive dyskinesia, a condition causing muscular spasms and involuntary motor movements such as lip smacking, tongue protrusion, head snapping, and jerking of the arms and legs. This disorder results from:
  - A. An increased effect of acetylcholine (ach) at the neuromuscular junction due to long-term cholinergic drug use
  - B. Blockage of acetylcholine at the neuromuscular junction causing neurotransmitter fatigue and resulting in skeletal paralysis
  - C. Anoxia, or lack of oxygen, at the neuromuscular junction resulting in failed synaptic transmission and muscle weakness
  - D. Denervation of the ach receptors causing muscle atrophy and weakness
2. Mr. Stanilopolis recently fell. He told his therapist that he fell because he was not wearing his glasses. However, his daughter reports to the therapist that her father commonly walks with a broad-based gait, uses furniture in the home to help him stabilize his balance while walking, and frequently loses his balance in dim light and unlevel surfaces. The daughter also states that her father commonly complains of dizziness (vertigo), ear ringing (tinnitus), and decreased hearing. Upon examination, the therapist finds an abnormal presence of nystagmus. She suspects impairment of which neurological system?
  - A. Visual system
  - B. Proprioceptive system
  - C. Vestibular system
  - D. Autonomic nervous system
3. In the above question, Mr. Stanilopolis's therapist administers the Romberg test to assess his balance. She asks Mr. Stanilopolis to stand with eyes closed, feet together, and shoulders flexed to 90 degrees (held in front of the body). Mr. Stanilopolis begins to sway and loses his balance. When using the Romberg test and removing visual cues, a patient's postural stability is based on:
  - A. Vestibular and proprioceptive information
  - B. Reticular formation and cerebellar information
  - C. Parasympathetic and sympathetic nervous system information
  - D. Basal ganglia information

4. Ann and Amanda are in a car traveling to school. Amanda is a passenger in the front seat while Ann drives. Amanda is using this commuting time to catch up on reading for her classes. Fifteen minutes into the drive, Amanda begins to sweat and feel nauseated. She first attributes her discomfort to a lack of breakfast. Amanda continues to read but feels increasingly dizzy, faint, and nauseous. She tells Ann, who recognizes Amanda's condition as motion sickness and advises her to stop reading and instead watch the oncoming traffic. Ann recognizes that motion sickness is often caused by:
- A. An incongruence between proprioceptive and vestibular system signals reaching the cortex
  - B. Incongruent signals traveling to the cortex from the reticular activating and inhibiting systems
  - C. Parasympathetic nervous system dominance (over sympathetic nervous system activity)
  - D. An incongruence between visual and motion signals reaching the vestibular system
5. James has been in a persistent vegetative state for 5 days after an auto vehicle accident. Although an electroencephalogram indicates no cortical activity, James' vegetative functions (eg, temperature, heart rate, respiration, blood pressure, and gag and cough reflexes) continue to be maintained. The neurological system responsible for the control of vegetative functions is the:
- A. Vestibular system
  - B. Autonomic nervous system
  - C. parasympathetic nervous system
  - D. Sympathetic nervous system
6. Mr. Shibata has intense burning that extends down both legs. This condition is called \_\_\_\_\_ and is a form of \_\_\_\_\_.
- A. Causalgia; dysesthesia
  - B. Thermohypoesthesia; thermesthesia
  - C. Paresthesia; hyperalgesia
  - D. Allodynia; hyperalgesia
7. After a soccer injury in which 16-year-old Tommy injured his left shoulder and arm, he developed a chronic neurovascular disease characterized by debilitating pain, edema, restricted movement, and muscular atrophy in his left upper extremity. Tommy also experiences burning, stabbing, and throbbing sensations that make touch to his left upper extremity intolerable. This syndrome is called:
- A. Fibromyalgia syndrome
  - B. Causalgia
  - C. Stocking and glove syndrome
  - D. Complex regional pain syndrome

8. After an acute infectious illness, Mr. Benfenati has developed a progressive ascending muscular weakness in his limbs (flaccid paralysis occurs first in his lower extremities and progresses to his upper extremities), with a symmetric pattern. He also reports paresthesias and numbness in his distal extremities. After 1 month, Mr. Benfenati experiences a complete recovery. This disease process is called:
- A. Diabetes neuropathy
  - B. Poliomyelitis
  - C. Guillain-barré syndrome
  - D. Myasthenia gravis
9. After Alex's spinal cord injury, he can no longer feel sensation (discriminative touch, pressure, vibration, proprioception, and kinesthesia) at or below his injury level at T10. Which spinal cord tract is responsible for discriminative touch, pressure, vibration, proprioception, and kinesthesia?
- A. Dorsal columns
  - B. Lateral spinothalamic
  - C. Anterior spinothalamic
  - D. Cuneocerebellar
10. Alex, in the above question, has also lost his bilateral sense of pain and temperature at and below the lesion level. Which spinal cord tract is responsible for the sensation of pain and temperature?
- A. Dorsal columns
  - B. Lateral spinothalamic
  - C. Posterior spinocerebellar
  - D. Rostral spinocerebellar
11. Alex has no voluntary movement below T10. His lower extremity muscles are spastic; all reflexes in the lower extremities are hyperreflexive. Which spinal cord tract is responsible for voluntary movement?
- A. Medial longitudinal fasciculus
  - B. Vestibulospinal
  - C. Spinocerebellar
  - D. Corticospinal
12. After his auto vehicle accident, Lorenzo lies in a coma with his upper and lower extremities in spastic extension. This condition is called \_\_\_\_\_ and results from a lesion to the \_\_\_\_\_.
- A. Decorticate rigidity; corticospinal tracts
  - B. Decerebrate rigidity; corticospinal tracts
  - C. Decorticate rigidity; extrapyramidal spinal cord tracts in the brainstem
  - D. Decerebrate rigidity; extrapyramidal spinal cord tracts in the brainstem

13. Mr. Tomlinson had a right hemisphere stroke 2 weeks ago. When his therapist passively moves his left elbow joint into extension, the elbow joint is initially highly spastic and cannot be moved. With sustained stretch on the elbow flexors, the spasticity suddenly gives way and the elbow joint can be moved into extension. This type of spasticity is referred to as:
- A. Cogwheel rigidity
  - B. Lead pipe rigidity
  - C. Clonus
  - D. Clasp knife phenomenon
14. Mr. Okonjo has been diagnosed with Parkinson disease. When the therapist attempts to range his elbow joint, the joint resistance is jerky and characterized by a pattern of release/resistance. This type of rigidity is known as:
- A. Cogwheel rigidity
  - B. Lead pipe rigidity
  - C. Clonus
  - D. Clasp knife phenomenon
15. Manuel has just been admitted to the emergency unit after a spinal cord injury. He is currently in a state of areflexia involving flaccid paralysis below the lesion level, loss of reflexes below the lesion level, and loss of autonomic function. This state is referred to as \_\_\_\_\_, occurs immediately after SCI, and can last anywhere from hours to weeks after a SCI. When this state resolves, all spinal reflex activity returns.
- A. Autonomic dysreflexia
  - B. Orthostatic hypotension
  - C. Spinal shock (neurogenic shock)
  - D. Poikilothermy
16. Laura's SCI occurred at T2. One day, when her therapist is helping her to sit upright, Laura experiences significantly decreased blood pressure, dizziness, excessive sweating above the lesion level, and blurred vision. Although she feels faint, she does not lose consciousness. The condition resolves after her therapist declines her position and allows her to rest. This condition is called:
- A. Spinal shock (neurogenic shock)
  - B. Poikilothermy
  - C. Orthostatic hypertension
  - D. Autonomic dysreflexia
17. Jackson's SCI occurred at C4. After injury, Jackson is unable to sweat, shiver, and regulate his body temperature. His body's ability to control blood vessel responses that conserve or dissipate heat is lost. As a result, Jackson's body takes on the temperature of the environment, and he is in danger of becoming too hot or cold. This condition is known as:

- A. Spinal shock (neurogenic shock)
  - B. Poikilothermy
  - C. Orthostatic hypertension
  - D. Autonomic dysreflexia
18. Mrs. Goldstein has been diagnosed with Parkinson disease. When the therapist attempts to passively range her elbow joint, the movement is characterized by a uniform and continuous resistance to passive movement. This form of hypertonicity is known as:
- A. Cogwheel rigidity
  - B. Clasp knife phenomenon.
  - C. Clonus
  - D. Lead pipe rigidity.
19. After his stroke, Mr. Nakai is observed to exhibit scapular elevation and retraction, shoulder abduction and external rotation, elbow flexion, forearm supination, and wrist and finger flexion. This upper extremity pattern is a stereotyped set of movements that occur in response to neurological damage and may be further promoted by an environmental stimulus or by the patient's voluntary movement. This movement pattern is known as:
- A. An associated reaction
  - B. Decerebrate rigidity
  - C. A synergy patterns.
20. After Mrs. Perloff's stroke, she demonstrates increased spasticity in her right upper extremity when she brushes her hair or engages in any effortful movement using her left arm. This phenomenon is called \_\_\_\_\_ and results from an inability to selectively inhibit the interneurons that synapse on motor cell bodies of the opposing limb.
- A. An associated reaction
  - B. A synergy patterns.
  - C. Decorticate rigidity.
21. Since her head injury causing cerebellar damage, Mrs. Johnson has difficulty understanding where her limbs are in relation to each other and where her body is in space. Which neurological system is responsible for the recognition of an organism's position in relationship to the environment?
- A. Vestibular system
  - B. Proprioceptive system
  - C. Basal ganglia system
  - D. Ventricular system
22. Jose lost consciousness after a traumatic brain injury and has not regained it 2 months status post-injury. He can open his eyes and appears to display regular sleep-wake cycles

but does not have cognitive function or awareness. Jose's cough, gag, and swallowing reflexes all remain intact. This state of altered consciousness is called \_\_\_\_\_ and is caused by severe damage to the \_\_\_\_\_:

1. brain death
2. persistent vegetative state
3. Cortex
4. brainstem.

- A. 1, 3
- B. 2, 3
- C. 1, 4.
- D. 2, 4

23. Jose's friend Alejandro, who was in the car accident with Jose, also sustained a traumatic brain injury. Alejandro is in a state of sleep-like (eyes closed) unarousability. All cognitive function has been lost as well as cough, gag, and swallowing reflexes. Alejandro's heartbeat continues from ANS regulation; however, Alejandro has been hooked up to life support because of a severe respiratory infection. This type of coma is called \_\_\_\_\_ and results from severe damage to the \_\_\_\_\_.

1. brain death
2. persistent vegetative state
3. Cortex
4. brainstem

- A. 1, 3
- B. 2, 3
- C. 1, 4
- D. 2,4

24. After his stroke, Mr. Donatelli has difficulty expressing meaningful verbal communications to others and has hemiparesis and hemiparesthesia of his right side. His stroke likely occurred in which cerebral hemisphere?

- A. Left
- B. Right

25. Mr. Kagan is experiencing numbness and weakness in his left arm and leg, blurred vision, dizziness, and confusion. His daughter calls 911, because she recognizes these signs as indicative of a:

- A. Visual-perceptual disorder
- B. Migraine-induced aura
- C. Transient ischemic attack

- D. Tactile agnosia
26. Along with Wernicke aphasia, Ms. Walsh has difficulty understanding gestures and symbols commonly used in social communication. This form of receptive aphasia is called:
- A. Apraxia
  - B. Dyslexia
  - C. Asymbolia
  - D. Dyslexithymia
27. Marrero has been diagnosed with Parkinson disease. The loss of this neurotransmitter from the substantia nigra and the nigrostriatal pathway is a primary cause of Parkinson disease, causing movement paucity, festinating gait, and masked face. This neurotransmitter is called:
- A. Dopamine
  - B. Serotonin
  - C. Norepinephrine
  - D. Glutamate
28. Adelphi has obsessive compulsive disorder (OCD) and depression. One primary neurotransmitter that has been shown to be associated with disruption in sleep-wake cycles, eating disorders, OCD, depression, and aggression is:
- A. Norepinephrine
  - B. Serotonin
  - C. Substance P
29. This neuropeptide acts as a neurotransmitter in the nociceptive pathway and is involved in the transmission of pain sensation.
- A. Glutamate
  - B. Dopamine
  - C. Substance p
  - D. Endorphins
30. While the previous neurotransmitter is responsible for pain sensation, the neuropeptide called \_\_\_\_\_ is responsible for the inhibition of pain and is referred to as the body's natural painkiller.
- A. Dopamine
  - B. GABA
  - C. Serotonin
  - D. Opioid (endorphin, enkephalin, dynorphin)



**SECTION B: SHORT ANSWER QUESTIONS (SAQ)**  
**ANSWER ALL QUESTIONS.**

**20 MARKS**

31. Differentiate between upper motor neuron and lower motor neuron lesions (5 marks)
32. Describe the roles of the cerebellum (5 marks)
33. Compare changes in neural activity in Parkinson's disease with Huntington's disease (5 marks)
34. Describe stocking/glove distribution of sensory impairment (5 marks)

**SECTION C: LONG ANSWER QUESTIONS (LAQS)**  
**ANSWER ALL THE QUESTIONS**

**20 MARKS**

35. Compare causes, pathologies, and prognoses of mononeuropathy, multiple mononeuropathy, and polyneuropathy (10 marks)
36. Examine the cognitive function of a patient who sustained Traumatic Brain Injury (10marks)

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