



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE (NURSING AND PUBLIC HEALTH)

HNS 122N: ADVANCED HUMAN PHYSIOLOGY IV

DATE: Monday 2nd April 2012

TIME: 2.00p.m – 4.00p.m

INSTRUCTIONS:

1. This paper consists of three sections; A, B & C. Section A is multiple choice questions (MCQs). Choose the single best response.
2. Section B is of short answer questions (SAQs). Answer All questions in the answer booklet provided.
3. Section C is long answer questions (LEQs). Answer All questions on the answer booklet provided.
4. Write your registration number and NOT your name on the answer booklet provided
5. Mobile phones, computers and apple pads are not permitted inside the examination room.

SECTION A: MULTIPLE CHOICE QUESTIONS (MCQs) – Choose the single best response

1. Muscle stretch leads to a direct increase in firing rate of which type of nerve?
 - (a) α -motoneurons
 - (b) γ -motoneurons
 - (c) Group 1a fibres
 - (d) Group 1b fibres
2. Which of the following is TRUE about cerebrospinal fluid?
 - (a) Is formed in the arachnoid granulations
 - (b) Provides the brain with most of its nutrition
 - (c) Protects the brain from injury when the head is moved
 - (d) Has a lower pressure than that in the cerebral venous sinuses
 - (e) Flow around the adult brain is around one litre per day
3. The cerebellum;
 - (a) Modifies the discharge of spinal motor neurons
 - (b) Is essential for finely coordinated movements

- (c) Has an afferent input from the motor cortex and muscle proprioceptors
 - (d) Has an afferent input from the vestibular system
 - (e) All of the above are true
4. The following is TRUE, impulse serving pain sensation in the left foot are relayed;
- (a) Across synapses in the left posterior root ganglion
 - (b) By fibres in the left spinothalamic tract
 - (c) By the same spinal cord tract which serves heat or cold sensation
 - (d) To the thalamus on the left side
 - (e) To the cerebral cortex before entering consciousness
5. The following is TRUE about the blood-brain barrier
- (a) Slows equilibration of solutes between blood and brain tissue fluids
 - (b) Is a more effective barrier for fat-soluble substances than water-soluble substances
 - (c) Is a more effective barrier in infants than in adults
 - (d) Is a more effective barrier for CO₂ than for O₂
 - (e) Permits hydrogen ions to pass freely
6. The following is FALSE concerning the spinal cord
- (a) Pain impulses traffic may be modulated in the posterior horn
 - (b) Autonomic motor neurons arise in the lateral horn
 - (c) Gamma-aminobutyric acid may act as an excitatory neurotransmitter
 - (d) Reflex centres are normally facilitated by descending impulses from supra-spinal centres
 - (e) Post-synaptic excitation may be mediated by amino derivatives acting as neurotransmitters
7. The α (alpha) rhythm of the electroencephalogram (EEG)
- (a) Disappears when the eyes are closed
 - (b) Is an electrical potential with an amplitude around one millivolt
 - (c) Has a lower frequency than the δ (delta) rhythm
 - (d) Has a frequency of 12 – 14 Hz
 - (e) Indicates that the subject is awake.
8. The following is TRUE about pain receptors, are;
- (a) Similar in structure to pacinian corpuscles
 - (b) Stimulated by a fall in the local K⁺ concentration
 - (c) Quick to adapt to a constant stimulus
 - (d) More easily stimulated in injured tissue

- (e) Stimulated in the wall of the gut by agents which damage the tissues
9. Rapid eye movement (REM) sleep differs from non-REM sleep in that
- (a) The EEG shows waves of lower frequency
 - (b) Muscle tone is higher
 - (c) Heart rate and respiration are more regular
 - (d) Secretion of growth hormone is increased
 - (e) Dreaming is more common
10. Increased intracranial pressure may cause the following EXCEPT
- (a) Cranial enlargement in children
 - (b) Squinting and loss of smell sensation in children
 - (c) Papilloedema-bulging in the opposite direction of the optic disc
 - (d) An increase in cerebral blood flow
 - (e) Arterial/hypertension
11. Visceral pain
- (a) Is poorly localized compared with pain arising in skin
 - (b) May cause reflex contraction of overlying skeletal muscle
 - (c) May cause reflex vomiting
 - (d) May cause reflex changes in arterial blood pressure
 - (e) All of the above are correct
12. The primary motor cortex
- (a) Is located in the parietal lobes
 - (b) In the left cerebral hemisphere controls the skeletal muscles on the right side of the body
 - (c) It is the only region of the brain involved with motor control
 - (d) Develops motor programs for specific voluntary tasks
 - (e) More than one of the above is correct
13. Language ability is usually associated with
- (a) The hypothalamus
 - (b) The right cerebral hemisphere
 - (c) The left cerebral hemisphere
 - (d) The limbic system
 - (e) The prefrontal association cortex
14. The left cerebral hemisphere normally excels in all of the following EXCEPT
- (a) Musical ability

- (b) Verbal tasks
 - (c) Math skills
 - (d) Logical and analytical tasks
 - (e) Language ability
15. The Thalamus
- (a) Performs preliminary processing of all sensory input on its way to the cortex
 - (b) Inhibits muscles tone throughout the body
 - (c) Controls thirst, urine output, and food intake
 - (d) Plays a role in emotional and behavioral patterns
 - (e) Selects and maintains purposeful motor activity while suppressing useless or unwanted patterns of movement
16. Which of the following functions is NOT associated with the hypothalamus?
- (a) Control of respiration and circulatory function
 - (b) Control of thirst and urine output
 - (c) Control of body temperature
 - (d) Control of food intake
 - (e) Extensively involved with emotion and behavioral patterns
17. A deficiency of dopamine in the basal ganglia causes
- (a) Schizophrenia
 - (b) Epilepsy
 - (c) Parkinson's disease
 - (d) Depression
 - (e) Aphasia
18. What region of the brain houses the centers that control the sleep-wake cycle?
- (a) Hypothalamus
 - (b) Thalamus
 - (c) Brain stem
 - (d) Cerebral cortex
 - (e) None of the above is correct
19. Which of the following is a monosynaptic reflex?
- (a) Stretch reflex
 - (b) Withdrawal reflex
 - (c) Brain stem reflexes
 - (d) Both (a) and (b) above are correct
 - (e) All of the above are correct

20 Short term memory

- (a) Has a larger storage capacity than long-term memory
- (b) Takes longer to retrieve than long-term memory
- (c) Involves transient modifications in the function of preexisting synapses, such as Channel modification
- (d) Two of the above are correct. Specify
- (e) All of the above are correct

SECTION B: SHORT ANSWER QUESTIONS (SAQs)

Answer All questions in the answer booklet provided. Each question is five (5) marks.

1. State differences between upper motor neurons and lower motor neurons
2. State five (5) differences between slow pain and fast pain
3. explain the major functions of the frontal lobe of human brain
4. describe the concept of accommodation in the human eye for near vision
5. Name the last five (5) cranial nerves and state their functions
6. Name three (3) specialized regions of the motor cortex and state their functions
7. Explain the mechanisms of stretch reflex in human beings
8. State five (5) functions of the hypothalamus

SECTION C: LONG ESSAY QUESTIONS (LEQs). Answer all questions provided. Each question is twenty (20) marks

1. Describe the role of cerebellum and Basal ganglia in control of posture and movement
2. Describe the formation, circulation, functions and disorders of cerebral spinal fluid (CSF)