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**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

UNIVERSITY EXAMINATIONS

2023/2024 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE

OF

BACHELOR OF NURSING

COURSE CODE: NRN 123

COURSE TITLE: HUMAN PHYSIOLOGY II (MAIN EXAM).

DATE: 9TH APRIL,2024

TIME: 8AM-11AM

INSTRUCTIONS TO CANDIDATES

Answer ALL questions

TIME: 3 Hours

MCQS

1. The following is TRUE regarding embryological development of the nervous system
 - a. The peripheral nervous system is derived from neural crest cells
 - b. The CNS develops from the surface ectoderm
 - c. The frontal lobe is a derivative of diencephalon
 - d. Metencephalon gives rise to thalamus and epithalamus
2. The following is a function of the sensory nervous system
 - a. Transduction of external stimuli into an electrical impulse
 - b. Transmitting impulse from the brain to the skeletal muscle
 - c. Contraction of smooth muscle
 - d. Secretion by the glands
3. A neuron is a structural and functional unit of the nervous system that
 - a. Lacks a nucleus
 - b. Lack a centromere
 - c. Non-excitabile, non-conductive
 - d. Includes astrocytes
4. Regarding the structure of a neuron :-
 - a. Dendrites transmit impulse to the Axonal hillock
 - b. A cluster of cell bodies in the peripheral nervous system is known as a nuclei
 - c. A cluster/group of axons/nerve fibers in the central nervous system is known as a tract
 - d. Bi-polar neuron has several processes exiting from the soma/neuron cell body
5. The following is true regarding transmission of impulse by a nerve
 - a. The thicker the nerve fiber the slower the transmission
 - b. Myelinated fibers transmit impulse at a slower speed compared to myelinated
 - c. 'A' fibers transmit impulse faster than C fibers
 - d. Saltatory impulse transmission refers to transmission in unmyelinated fiber
6. Concerning functions/roles of neuroglia
 - a. Oligodendrocytes myelinate neurons in peripheral nervous system
 - b. Ependymal cells are responsible for generation and propagation of an impulse
 - c. Astrocytes help in the formation of blood brain barrier
 - d. Schwann cells help in destroying/phagocytizing dead cells/debris from CNS
7. Regarding sensory receptors
 - a. Proprioceptors is an example of mechanoreceptive
 - b. Nociceptors detect change in electromagnetic wave
 - c. Photo receptors detect changes in acoustic energy
 - d. The retina in the eye is an example of chemoreceptor
8. Many of us wear a watch and are probably unaware of its presence on the arm most of the time because of sensory phenomenon known as:-
 - a. Specificity

- b. Adaptation
 - c. Intensity discrimination
 - d. Phantom sensation
9. Regarding the transmission of an electrical impulses from a receptor upto the sensory area in the brain
- a. Majority of the time it shows two(2) neurons to reach the sensory area
 - b. The 1st order neurons decussates/crosses over to the opposite site of spinal cord or brain stem
 - c. The cell body of 1st order neuron is in the dorsal root ganglia of spinal nerve or cranial root ganglia of the brain
 - d. The 3rd order neuron terminates in the thalamus
10. Which one of the following is correctly matched?
- a. Somatosensory are is in post-central gyrus
 - b. Auditory sensation in occipital lobe
 - c. Gustatory sensation in the pre-central gyrus
 - d. Vision sensation in the frontal lobe
11. Sense of taste
- a. Is a mechanical sense
 - b. Sweet taste is elicited by sodium ion containing substances
 - c. Sour taste is elicited by hydrogen ions like in acids
 - d. Salty taste is elicited by organic substances like alcohol
12. Regarding pathway for taste sensation from the tougue to the central nervous system.
- a. They travel through cranial nerves 2, 3, and 8
 - b. Anterior 2/3 travels through facial nerve (CN 7)
 - c. Posterior 1/3 travels through hypoglossal nerve (CN 12)
 - d. Sensations from every part of tougue travel through trigeminal nerve (CN 5)
13. Action potential
- a. Is a graded potential.
 - b. Is produced by sub threshold stimulus.
 - c. Starts with repolarization caused by outward movement of Cl –
 - d. Is conducted slower in thin nerve fibers.
14. A nerve impulse jumps from -----to another during salutatory conduction
- a. Synapse
 - b. Axon
 - c. Node of Ranvier
 - d. Myelin sheath
15. Nerve cells can send impulses faster if they have
- a. Many mitochondria
 - b. Many dendrites
 - c. Myelinated
 - d. Non-myelinated

- d. The optic tracts synapse in lateral geniculate nucleus in the thalamus
- 24. Loss of the sense of taste on the anterior 2/3 of the tongue might be due to injury to
 - a. Cranial nerve VII
 - b. Cranial nerve III
 - c. Cranial nerve IX
 - d. Cranial nerve V.
- 25. Concerning vision
 - a. The cones are responsible for scotopic vision
 - b. Myopia is corrected by glasses having concave lenses
 - c. The cortex is the center for the light reflex
 - d. The association visual area is responsible for the primary perception of the
- 26. Bitemporal hemianopia is caused by
 - a. Optic nerve lesions
 - b. Optic tract lesions
 - c. Pituitary tumors
 - d. Occipital lobe lesions
- 27. Transmission of sound wave through the inner ear occurs through
 - a. Ossicles
 - b. Air
 - c. Fluid
 - d. Nerves
- 28. A loud sound is high in
 - a. Frequency
 - b. Wavelength \
 - c. Tone
 - d. intensity
 - e.
- 29. A young healthy human being can detect sound waves of
 - a. 10 Hz and 100 KHz
 - b. 40 Hz and 50 KHz
 - c. 40 Hz and 20 KHz
 - d. 5 Hz and 20 KHz
 - e.
- 30. The order in which sound waves travel through the auditory system is?
 - a. External auditory meatus, tympanic membranes, round window, scala tympani, , scala vestibule, oval window
 - b. External auditory meatus, tympanic membranes, ossicles, oval window, scala tympani, , scala media , round window
 - c. External auditory meatus, tympanic membranes, ossicles, round window, scala vestibule, , scala tympani , oval window

- d. External auditory meatus, tympanic membranes, ossicles , oval window, scala vestibule , , scala tympani , round window
 - e.
31. The vestibular system is NOT involved in
- a. Balance
 - b. Hearing
 - c. Postural reflexes
 - d. Eye movements
32. The utricle sends signals representing --- movements and saccule conveys information aboutmovements .
- a. Vertical, forward & backwards
 - b. Forward & backward, vertical
 - c. Rotational, horizontal
 - d. Horizontal, rotational
33. The idea of a voluntary movement is thought to originate in the
- a. Primary sensory cortex
 - b. Primary motor cortex
 - c. Motor association cortex
 - d. cerebellum
34. Which structures could not be innervated by the symphathetic nervous system
- a. Skeletal muscles
 - b. Smooth muscles
 - c. Cardiac muscles
 - d. Glands
35. In the peripheral nervous system cell that myelinate neurons is called :
- a. Schwann cells
 - b. Oligodendroglia
 - c. Endothelial cells
 - d. Astrocytes
36. The following is TRUE regarding basal ganglia
- a. Control balance
 - b. Control equilibrium
 - c. Control conjugate eye movement
 - d. Initiate movement
37. Concerning cerebellar disorders
- a. Tone increases
 - b. Reflexes are exaggerated
 - c. The gait becomes wide-base
 - d. Consciousness is lost
38. pain sensation
- a. It's a perception occurs in the hypothalamic nuclei

- e.
16. Resting membrane potential (RMP) of a nerve
- a. Is caused by equal distribution of ions along both sides of the membrane.
 - b. Is caused by selective permeability of the membrane to the ions.
 - c. $\text{Na}^+ - \text{K}^+$ pump has no role in RMP.
 - d. Is caused mainly by inward movement of Na^+ ions.
17. Regarding chemical and electrical synapses
- a. Both have a physical connection between pre- and postsynaptic structures.
 - b. Electrical synapses are more common than chemical.
 - c. Chemical synapses depend on the release of neurotransmitters .
 - d. Chemical synapses are faster than Electrical ,
18. myelin sheath
- a. Present in the myelinated and unmyelinated nerve fibers
 - b. Formed of lipoprotein complex and acts as electric insulator
 - c. It is formed of successive wrappings of the membrane of Schwann cells.
 - d. It is the cause of decreased conduction of nerve impulse.
19. Which of the following nerve should have the slowest conduction velocity?
- a. An unmyelinated, small-diameter nerve
 - b. An unmyelinated, large-diameter nerve
 - c. A myelinated, small-diameter nerve
 - d. A myelinated, large-diameter nerve
20. In comparison to cones, the rods are
- a. Are concentrated at fovea centralis
 - b. Sensitive to dim light
 - c. Important for color vision
 - d. Sensitive for detail
21. The axon of ganglion cells from the -----region of retina of left eye and those of -----region of retina of right eye proceed into the left optic tract
- a. Temporal, temporal
 - b. Nasal, nasal
 - c. Nasal, temporal
 - d. Temporal, nasal
22. Which of the following cells forms the axons in the optic nerve
- a. Ganglion cells
 - b. Rods
 - c. Bipolar cells
 - d. Amacrine cells
23. Regarding the visual pathway :-
- a. Nasal visual field projects to the nasal hemi-retina
 - b. Nasal hemi-retina fibers do not cross to the opposite side at the chiasma
 - c. The outside image is projected upside down on the retina

- a. Erection of penile shaft
 - b. Thickening of the larynx
 - c. Anabolism of skeletal muscles
 - d. Thickening of bones
55. Which of the following is not a result of menopause
- a. Loss of hormones
 - b. Reduction in breast mass
 - c. Increased calcium deposits in bones
 - d. Psychological changes.
56. Which cells are present in a male age five?
- a. spermatocytes
 - b. spermatozoa
 - c. spermatogonia
 - d. spermatid
57. The anterior pituitary gland secretes?
- a. Oxytocin
 - b. Endorphins
 - c. ADH
 - d. TSH
58. Which hormone stimulates the secondary female sex organs?
- a. FSH
 - b. LH
 - c. GnRH
 - d. Estrogen
59. Thyroid hormones
- a. Plasma total T4 is more than T3
 - b. T4 and T3 are mostly bound to albumin than globulin
 - c. Free plasma hormones are less active than protein bound hormones
 - d. It's the protein bound hormones that send feedback to pituitary gland.
60. Glucagon
- a. Is secreted by delta cells
 - b. Secretion is increased in response to falling blood glucose
 - c. Is a double chain of 29 amino acids
 - d. Secretion is accentuated by insulin

SAQs

1. Discuss the hormonal regulation of blood calcium level *(10 marks)*
2. With aid of well labelled diagram describe how impulse is transferred across a synapse *(10 marks)*

LAQS

1. Discuss in detail the function of the kidneys (*20 marks*)

- b. Fast pain is carried by the C-Fibers
 - c. Referred pain is usually from somatic to visceral receptors
 - d. Its receptors are free nerve endings
39. The following is true about frontal lobe
- a. Controls gait
 - b. Is the centre for intelligence b)
 - c. Is the centre for memory
 - d. Is one of the centers for sensation of smell
40. Oxytocin secretion promotes all the following actions except
- a. Myometrium contraction
 - b. Lactogenesis
 - c. Milk ejection
 - d. Myoepithelial cells contraction of mammary glands
41. All the following are stimuli of growth hormone except
- a. Hypoglycemia
 - b. Stress
 - c. Exercise
 - d. obesity
42. Thyroid hormones belong to which class of hormones
- a. Steroids
 - b. Proteins
 - c. Polypeptides
 - d. Amino acid derivatives
43. Thyroid gland secretes approximately ----% T4 and-----T3 hormone
- a. 20, 80
 - b. 10, 90
 - c. 50, 50
 - d. 90, 10
44. The following are functions of calcium ion except?
- a. Helps in blood clotting
 - b. Helps in action potential in heart muscles
 - c. Is the main ion in the bones
 - d. Is acts as 1st messenger for hormone function
45. The active form of Vitamin D is
- a. Cholecalciferol
 - b. 1,25,di-cholecalciferol
 - c. Calcium
 - d. Parathyroid hormone
46. Insulin released from Beta cells in the pancreas affects secretion of glucagon by Alpha cells. What type of signaling is this?
- a. Endocrine

- b. Paracrine
 - c. Autocrine
 - d. Juxtacrine
47. resection of the pituitary stalk would increase the secretion of which of the following hormones?
- a. Growth hormone
 - b. FSH
 - c. LH
 - d. Prolactin
48. The least abundant cell type in the anterior pituitary is :
- a. Thyrotrophs
 - b. Somatotrophs
 - c. Corticotrophs
 - d. Gonadotrophs
49. In which zones is cortisol produced ?
- a. .Zona glomerulosa
 - b. .Zona fasciculata
 - c. .Zona reticularis
 - d. Zona medulla
50. Why do substances in the glomerulus enter the Bowmans capsule
- a. The negative magnetic charge of the bowman's capsule
 - b. The substances are actively transported into the Bowman's capsule
 - c. Blood pressure in the glomerulus is so great that most substances in blood move into Bowman's capsule
 - d. Little green men force it in with their ray guns
51. What part of the nephron reabsorbs/removes close to 100% of filtered glucose ?
- a. Ascending Loop of henle
 - b. Vasa recta
 - c. Peritubular capillaries
 - d. Proximal convoluted tubule
52. Site of action of ADH
- a. Proximal tubule
 - b. Loop of Henle
 - c. Vasa recta
 - d. Collecting tubule
53. Infertility could develop if the sperm cell display-----
- a. Count of 120 million per ml of semen
 - b. Increased acrosomal activity
 - c. A count of less than 20 million per ml of semen
 - d. Normal morphology
54. Which of these is not a function of the testosterone