



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

**UNIVERSITY EXAMINATIONS
2023/2024 ACADEMIC YEAR**

**FIRST YEAR SECOND TRIMESTER EXAMINATIONS
FOR THE DEGREE OF
BACHELOR OF SCIENCE IN NURSING
(ODEL)**

COURSE CODE: NCD 114

COURSE TITLE: MEDICAL PHYSIOLOGY II

DATE: TUESDAY, 09/4/2024

TIME: 3 PM – 6PM

INSTRUCTIONS TO CANDIDATE

- Write your registration no, on every piece of paper used. Do not write your name.
- Read carefully any additional instructions preceding each section.

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 10 Printed Pages. Please Turn Over.



SECTION A: MULTIPLE CHOICE QUESTIONS (MCQS); 20 MARKS

Choose the most appropriate answer which gives you (1 mark)

- Q1. Which of the following statement is true
- Ascending tracts carry impulse to the brain
 - Descending tracts carry impulse to the nerves
 - Ascending tracts carry impulse to the spinal cord
 - Descending tracts carry impulse from the periphery.
- Q2. The medulla oblongata contains three control centers that are vital for homeostasis namely:
- Cardiac center, vasomotor center, emotional center
 - Balance center, vasomotor center, cardiac center
 - Cardiac center, vasomotor center, respiratory center
 - Vasomotor center, balance center, cardiac center
- Q3. Cerebral lobe that contains the hearing cortex is?
- Temporal lobe
 - Insula lobe
 - Frontal lobe
 - Occipital lobe
- Q4. Which of the following receptors are correctly matched
- Nociceptors are sensitive to heat and cold
 - Chemoreceptors are sensitive to tissue injury
 - Mechanoreceptors are sensitive to mechanical energy
 - Photoreceptors are sensitive to specific chemicals
- Q5. The following are regulated by the autonomous nervous system EXCEPT
- Accommodation for far vision
 - Dilatation and constriction of blood vessels
 - Size of the pupil
 - Adjustment of the rate and force of cardiac contraction
- Q6. Contraction of the circular muscles of the iris causes
- Constriction of the pupil
 - Dilatation of the pupil
 - Both constriction and dilatation
 - Stimulation of the rods
- Q7. Alteration in smell sensation due to hormonal effects in pregnancy is known as
- Hypersomnia
 - Anosmia
 - Hyposomia
 - Smell alteration
- Q8. The following statements are true about the trigeminal nerve EXCEPT?
- It is the largest cranial nerve
 - It a sensory only nerve
 - It is a motor only nerve
 - It is a mixed nerve

- Q9. The following statement is true about the apocrine glands
- Occur all over the body
 - Are a type of sweat glands attached to the sympathetic nervous system
 - They are small glands found around the neck
 - They are larger and occur in the armpits and groins
- Q10. The skin conserves heat by
- Increase in sweating
 - Vasodilatation of the arteries
 - Cessation of sweating
 - Vasoconstriction of the veins
- Q11. The receptors that respond to stroking in the human body are referred to as
- Proprioceptors
 - Nociceptors
 - Chemoreceptors
 - Mechanoreceptors
- Q12. The cardiac control center that regulates the rate of cardiac function is located in?
- Diencephalon
 - Cerebrum
 - Cerebellum
 - Medulla oblongata
- Q13. The sympathetic response in a 'fight or flight' reaction causes a decrease in?
- The arterial blood pressure
 - The diameter of the pupil
 - The resistance of the airways
 - The blood glucose concentration
- Q14. The part of the brain mainly concerned with regulation of primitive functions for survival is?
- Cerebellum
 - Brainstem
 - Cerebrum
 - Diencephalon
- Q15. Which taste bud has been matched correctly with its site?
- Sweet taste buds are situated at the back of the tongue
 - Salt taste buds are situated at the middle of the tongue
 - Sour taste buds are on either side of the front of tongue
 - Bitter taste buds are in the front of the tongue
- Q16. Loss of the sense of taste on the posterior 1/3 of the tongue might be due to injury to
- Cranial nerve VII
 - Cranial nerve III
 - Cranial nerve IX
 - Cranial nerve V.

- Q17. The color of the skin is affected by three substances namely;
- Melanin, hemoglobin level, genetics
 - Hemoglobin level, bile pigmentation, genetics
 - Melanin, hemoglobin level, bile pigmentation
 - Melanin, bile pigmentation, genetics
- Q18. The following parts of the brain are associated with skeletal muscle control EXCEPT
- Cerebrum
 - Cerebellum
 - Cerebral motor cortex
 - Basal ganglia
- Q19. Cerebral lobe that contains the visual cortex is?
- Temporal lobe
 - Insula lobe
 - Frontal lobe
 - Occipital lobe
- Q20. Receptors of hearing are located in the?
- Utricle
 - Cochlea
 - Semicircular canals
 - sacculae
- Q21. Cortical level of the brain undertakes the following activities
- Control of blood pressure, respiration, hunger
 - Control of blood pressure, respiration, anger
 - Excitement, sexual response, hunger
 - Excitement, defecation, urination
- Q22. Three layers of the eye are?
- Sclera, retina and Iris
 - Iris, Choroid and Retina
 - Retina, Sclera and Iris
 - Sclera, Choroid and Retina
- Q23. The receptor cells serving taste
- Are stimulated when chemicals diffuse through the overlying epithelium to reach them.
 - Are primary sensory neurons.
 - For sweetness are more common at the tip than at the back of the tongue
 - Are histologically different for the four primary taste modalities.
- Q24. The spinal cord communicates with the brain via
- Tracts of white matter
 - Tracts of grey matter
 - The sympathetic nervous system
 - Sensory neurons in the spinal cord.

Q25. The following statement is true about the apocrine glands

- a. Occur all over the body
- b. Are a type of sweat glands attached to the sympathetic nervous system
- c. They are small glands found around the neck
- d. They are larger and occur in the armpits and groins

Q26. The following are regulated by the autonomous nervous system EXCEPT

- a. Accommodation for far vision
- b. Dilatation and constriction of blood vessels
- c. Size of the pupil
- d. Adjustment of the rate and force of cardiac contraction

For question 27 and 28, Match the function with correct areas of control in the brain.

Q27. Thirst and water _____

Q28. Control of rate and depth of breathing _____

Control in the Brain

- a. Medula oblongata
- b. Pons
- c. Hypothalamus
- d. Temporal lobe

Q29a. The abducens nerve is a very small mixed nerve that emerges from nucleus within the midbrain and passes from the cranium through the superior orbital fissure of the orbit. It innervates the superior oblique muscle of the eye ball with both motor and sensory fibres.

- a. True
- b. False

Q29b. The M1 muscarinic receptors are located in the heart

- a. True
- b. False

Q30. The iris has special role in regulating the amount of light entering the eye. Bright light causes the _____

- a. Circular muscle of the iris to contract, causing pupil constriction
- b. Circular muscle of the iris to relax, causing pupil constriction
- c. Circular muscles of the iris to contract, causing pupil dilation
- d. Radial muscles of the iris to contract causing the pupil to dilation

Q31. The action potential is caused by rapid _____.

- a. Polarity changes
- b. PH changes
- c. Breakdown of the membrane structure
- d. Water content changes

Q32. A deer is frightened by a predator and runs away. Which of the following would not occur due to the action of epinephrine and norepinephrine?

- a. There would be increased blood flow to the skeletal muscles.
- b. There would be increased activity of the digestive system.
- c. There would be increased blood flow to the lungs and heart.
- d. Blood pressure would increase

Q33. The area containing the highest concentration of cones is the

- a. Fovea centralis
- b. Optic disc.
- c. Macula lutea.
- d. Blind spot.

Q34. Light passes through the globe structures in the following order?

- a. Vitreous humor, lens, aqueous humor, cornea
- b. Cornea, aqueous humor, lens, vitreous humor
- c. Cornea, vitreous humor, lens, aqueous humor
- d. Aqueous humor, cornea, lens, vitreous humor

Q35. A person with an abnormally short eyeball (anterior to posterior) would be ____ and would wear ____ lenses to correct their vision.

- a. Nearsighted / concave
- b. Farsighted /concave
- c. Nearsighted / convex
- d. Farsighted convex.

Q36. Receptors for general senses provide information for all the following except:

- a. Temperature
- b. Pain
- c. Touch
- d. Sight

Q37. Which of the following is NOT a possible cause of conduction deafness?

- a. Impacted cerumen
- b. Middle ear infection
- c. Cochlear nerve degeneration
- d. Otosclerosis

Q38. Why does eating peppers feel “hot”?

- a. Molecules in the pepper trigger vasodilation through endothelial receptors in blood vessels
- b. Molecules in pepper destroy cells, which triggers a pain response that follows the same pathway as the heat response

- c. Molecules in pepper bind the same receptors responsible for thermoregulation
- d. Molecules in the pepper stimulate the posterior pituitary, like the heat response

Q39. The phenomenon known as “goosebumps” is often combined with shivering to reduce heat loss. What integumentary layer is most directly related to this reflex?

- a. Papillary dermis
- b. Epidermis
- c. Hypodermis
- d. Reticular dermis

Q40. People with albinism have a defect in tyrosinase, an oxidase that helps to control skin pigment production. In what epidermal layer is tyrosinase active?

- a. Stratum Lucidum
- b. Stratum Granulosum
- c. Stratum Basale
- d. Stratum Spinosum

Q41. The cerebellum is located between the cerebrum and the brain stem in the back of the head. It helps in _____

- a. Breathing and controlling blood pressure
- b. Voluntary movement
- c. Balance and coordination
- d. Speech and hearing

Q42. Transmission of sound wave through the inner ear occurs through.

- a. Ossicles
- b. Air
- c. Fluid
- d. Nerves

Q43. The order in which sound travels through the auditory system is

- a. external auditory meatus, tympanic membrane, round window, scala tympani, scala vestibuli, oval window
- b. external auditory meatus, tympanic membrane, ossicles, oval window, scala tympani, scala media, round window
- c. external auditory meatus, tympanic membrane, ossicles, round window, scala vestibuli, scala tympani, oval window
- d. external auditory meatus, tympanic membrane, ossicles, oval window, scala vestibuli, scala tympani, round window

Q44. 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

Q45. Meissner's corpuscles are located in the

- a. Deep layer of the dermis
- b. In the hairless portion of the skin (finger tips, palms and lips).
- c. Epithelial layer
- d. Connective Tissue

Q46. The iris has a special role of regulating the amount of light entering the eye. Bright light causes the

- a. Circular muscle of the iris to contract, causing pupil constriction
- b. Circular muscle of the iris to relax, causing pupil constriction
- c. Circular muscle of the iris to contract, causing pupil dilation
- d. Radial muscles of the iris to contract causing pupil dilation

Q47. The functions of Myelencephalon (Medulla) are

- a. Vestibular control of eye movements, Respiratory and urinary bladder control
- b. Brainstem reflexes, Cardiovascular control, respiratory control
- c. Control of eye movements, motor control, Acoustic relay
- d. Sensory and motor relay to cerebral cortex

Q48. The functions of Diencephalon are: -

- a. Sensory and motor relay to cerebral cortex
- b. learning and memory; cognition; Sensory perception; motor planning and voluntary movement
- c. Motor control, motor learning
- d. Autonomic and endocrine control

Q49. The major light refractive part of the eye is: -

- a. Cornea
- b. Iris
- c. Lens
- d. Aqueous humour

Q50. Which of the following set of special sensory information is transduced through chemoreceptors: -

- a. Touch and sight
- b. Hearing and smell
- c. Taste and smell XN
- d. Taste and touch

Q51. The specific neurotransmitter at the parasympathetic post ganglionic nerve ending is: -

- a. Acetylcholine
- b. Adrenaline
- c. Glutamine
- d. Glycine

Q52. Indicate whether the following statements are True or False

- a. Rods are highly sensitive to light and function in dim light (True)
- b. Rhodopsin pigment in the Rods requires Vitamin A for activation (True)

Q53. The part of the brain mainly concerned with regulation of primitive functions for survival is:

- a. Cerebrum
- b. Brainstem
- c. Cerebellum
- d. Diencephalon

Q54. Concerning cerebellar disorders

- a. Tone increases
- b. Reflexes are exaggerated
- c. The gait becomes wide-base
- d. Consciousness is lost

Q55. Hyperhidrosis is characterized by excessive sweating, especially at the palms of the hands and soles of the feet. Which of the following could cause this disorder?

- a. Increased sweat at the base of hair follicles
- b. Apocrine gland activation with puberty
- c. Higher density of Holocrine glands
- d. Increased stimulation of Merocrine glands

Q56. Lesions of the speech center in frontal lobe results in :-

- a. paralysis of speech muscles
- b. inability to select appropriate words for use in speech
- c. inability to understand spoken language
- d. failure of coordination of speech muscles

Q57. Control/Regulation of the rhythm and rate of breathing is at the respiratory center located in the,

- a. Cerebrum
- b. Midbrain
- c. Pons and the medulla
- d. Hypothalamus

Q58. When a person goes outdoors into a cold environment:

- a. heat loss is limited and heat-loss responses are activated
- b. the rate of sweat production increases
- c. the thermoregulatory centre in the hypothalamus is inhibited
- d. blood flow to the skin increases

Q59. Broca's area is located in.....and is responsible for

- a. the frontal lobe, Motor speech
- b. the parietal lobe, sensory reception of speech
- c. the temporal lobe, Motor speech

- d. the occipital lobe, sensory reception of speech

Q60. The following statement is true about the apocrine glands

- a. Occur all over the body
- b. Are a type of sweat glands attached to the sympathetic nervous system
- c. They are small glands found around the neck
- d. They are larger and occur in the armpits and groins

SECTION B: SHORT ANSWER QUESTIONS (SAQS); 20 MARKS

Q1. State eight (8) functions of CSF (8 Marks)

Q2. Explain three tracks of extrapyramidal system (6 marks)

Q3. State six (6) functions of the nose (6 marks)

SECTION C: LONG ESSAY QUESTIONS (LEQS); 20 MARKS

Q1. Regarding the integumentary system;

- a. Explain 3 (three) ways in which the skin regulates the body temperature (6 marks)
- b. Describe 6 (six) roles of the skin in maintaining homeostasis (14 marks)

End