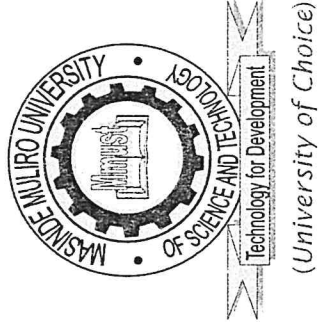


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**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY**

(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021 / 2022 ACADEMIC YEAR

FIRST YEAR, SECOND TRIMESTER EXAMINATIONS

FOR THE DEGREE

OF

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

COURSE CODE: BSP 122

COURSE TITLE: MEDICAL PHYSIOLOGY

DATE: FRIDAY 22ND APRIL 2022

TIME: 2:00-5:00 PM

INSTRUCTIONS TO CANDIDATES

Answer all Questions

Sec A: Multiple Choice Questions (MCQ) 20 Marks

Sec B: Short Answer Questions (SAQ) (40 Marks)

Sec C: Long Answer Questions (LAQ) (40 Marks)

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over.

SECTION A: MULTIPLE CHOICE QUESTIONS

20 MARKS

- Which of the following statements regarding the lateral geniculate nucleus is correct?
 - Layer one is called a parvocellular layer
 - Layer one receives signals from the lateral half of the retina
 - Layer one receives signals that originate from rods
 - Layer four receives signals from the ipsilateral retina
- When comparing the fovea with the periphery of the retina, which of the following statements is correct?
 - The fovea contains an increased proportion of cones
 - The fovea contains an increased proportion of ganglion cells
 - The fovea contains an increased proportion of horizontal cells
 - The fovea contains an increased proportion of rods
- Which of the following is the middle ear ossicle that is attached to the tympanic membrane?
 - Columella
 - Incus
 - Malleus
 - Stapes
- Light entering the eye passes through which retinal layer first?
 - Inner nuclear layer
 - Outer nuclear layer
 - Photoreceptor layer
 - Retinal ganglion layer
- Ganglion cells attached to photoreceptors located on the temporal portion of the retina project to which of the following structures?
 - Contralateral lateral geniculate nucleus
 - Ipsilateral lateral geniculate nucleus
 - Ipsilateral medial geniculate nucleus
 - Contralateral medial geniculate nucleus
- Which of the following regarding the attenuation reflex is correct?
 - Can increase the intensity of low-frequency sound transmission by 30 to 40 decibels
 - Increases the rigidity of the ossicular system, thereby reducing conduction of low-frequency sounds
 - Masks high-frequency sounds in a loud environment so lower frequency sounds are more easily heard
 - Occurs following a latent period of 4 to 8 seconds after the loud sound

7. Which of the following statements is correct regarding the focal length of a convex lens?
- A. Converging light rays passing through a convex lens will converge at a focal point farther away than the focal length of that lens
 - B. Diverging light rays passing through a convex lens will converge at a focal point closer than the focal length of that lens
 - C. Parallel light rays passing through a convex lens will converge at a focal point equal to the focal length of that lens
 - D. The image produced by a convex lens is right side up, but its two lateral sides are reversed with respect to the object
8. The condition of cataracts is usually the result of which of the following processes or conditions?
- A. Denaturation of the proteins in lens of the eye
 - B. Elongated eye globe
 - C. Unresponsive and dilated pupil
 - D. Coagulation of the proteins in the lens of the eye
9. Which of the following statements regarding the basilar membrane is correct?
- A. Vibrates best at high frequency near the base of the cochlea, whereas it vibrates best at low frequency at the apex of the cochlea
 - B. Spiral ganglion lies on its surface
 - C. Contains basilar fibers whose diameter increases from the base of the cochlea to the apex of the cochlea
 - D. Contains basilar fibers whose length decreases from the base of the cochlea to the apex of the cochlea
10. Analysis of visual detail occurs in which secondary visual area?
- A. Brodmann's area 18
 - B. Inferior ventral and medial regions of the occipital and temporal cortex
 - C. Frontal lobe
 - D. Occipitoparietal cortex
11. Which of the following statements best describes the role of melanin in the pigment layer of the retina?
- A. Precursor of the light sensitive chemical rhodopsin
 - B. Dark pigment that prevents the reflection of light inside the globe of the eye
 - C. Responsible for maintaining integrity of the canal of Schlemm
 - D. Light reflected off the melanin pigment is a key element used in
12. Which of the following statements regarding the transmission of taste information from the tongue to the cerebral cortex is correct?
- A. Majority of thalamic neurons in taste pathway synapse in the occipital lobe
 - B. Nerve fibers carrying taste information from the tongue have no synapse in the brainstem
 - C. Nerve fibers carrying taste information from the tongue synapse in the solitary nucleus
 - D. Thalamic nucleus involved in the taste pathway is the dorsal medial nucleus

13. Which of the following hormone is a steroid?
- A. Epinephrine
 - B. Thyroxine
 - C. Estrogen
 - D. Prostaglandins
14. FSH and LH are collectively known as _____
- A. Neurohormones
 - B. Antistress hormones
 - C. Gonadotrophic hormone
 - D. Emergency hormone
15. Which statement about antidiuretic hormone (ADH) is true?
- A. It is synthesized in the posterior pituitary gland
 - B. It increases salt and water reabsorption in the collecting tubules and ducts
 - C. It stimulates thirst
 - D. It has opposite effects on urine and plasma osmolality
16. Which of the following is both synthesized and stored in the hypothalamus?
- A. ADH
 - B. Thyroid-stimulating hormone (TSH)
 - C. LH
 - D. Somatostatin
17. Which of the following statements concerning the general functional role of the cerebellum is correct?
- A. The cerebellum is unable to make corrective adjustments to the movement once it is performed
 - B. The cerebellum does not receive feedback from muscles that execute the actual movement
 - C. The cerebellum is not involved in the planning of a movement, only its execution
 - D. The cerebellum plays an active role in the coordination of the muscles required to make a movement
18. Which of the following body parts is represented most laterally and inferiorly within the primary motor cortex?
- A. Face
 - B. Hand
 - C. Neck
 - D. Lower limb
19. Which of the following items is the type of neuron whose axon forms synaptic junctions with skeletal muscle cells (intrafusal fibers) within the muscle spindles?
- A. Alpha motor neurons
 - B. Pyramidal neurons
 - C. Gamma motor neurons
 - D. Purkinje cells

20. Which statement concerning the premotor cortex is correct?

- A. The premotor cortex is located just posterior to the primary motor cortex
- B. The lateral to medial sequence in the somatotopic organization of the premotor cortex is just the reverse of that seen in the primary motor cortex
- C. Stimulation of a small discrete group of neurons in premotor cortex will produce contraction of an individual muscle
- D. The premotor cortex sets the specific posture required for the limb to produce the desired movement

SECTION B: SHORT ANSWER QUESTIONS

40 MARKS

- 1. Briefly explain the physiology of smell 5 marks
- 2. Discuss briefly how crista ampullaries work 5 marks
- 3. Explain the concept of accommodation of the lens 5 marks
- 4. Briefly explain the positive feedback mechanism that happens during birth 5 marks
- 5. Explain the control of thyroid hormone secretion 5 marks
- 6. Discuss how nerve impulse propagation mechanism 5 marks
- 7. Discuss the stepwise physiology of reflex arc 5 marks
- 8. Briefly explain how blood glucose levels in human body is regulated 5 marks

SECTION C: LONG ANSWER QUESTIONS

40 MARKS

- 1. Using diagrams discuss various patterns of neural circuits in neuronal pools 20 marks
- 2. Discuss the physiological differences and similarities between the cones and the rods 20 marks