



(University of Choice)

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

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

**SECOND TRIMESTER
MAIN EXAM**

**FOR THE DEGREE
OF
BACHELOR OF OPTOMETRY AND VISION SCIENCE**

COURSE CODE: BOV 222

COURSE TITLE: VISUAL PERCEPTION AND NEURO-PHYSIOLOGY

DATE: Thursday 20/4/2023 TIME: 3pm to 5pm

**INSTRUCTIONS TO CANDIDATES
PAPER CONTAINS TWO SECTION**

SECTION A and B and C

Answer all questions

TIME: 2 hrs

MMUST observes ZERO tolerance to examination cheating



Section A. Multiple Choice Questions (MCQs) Each contain score of one mark. Answer all questions.

- 1. With regard to horizontal cells, which of the following statement explains other cells?**
 - A. Show spatial antagonism
 - B. Hyperpolarize in response to light
 - C. Postsynaptic to photoreceptor
 - D. Manifest spatial summation

- 2. Which one of the following is not the characteristic of on-center bipolar cells?**
 - A. Generate action potential
 - B. Glutamate causes hyperpolarization
 - C. Spatial antagonism
 - D. Presynaptic to ganglion cells

- 3. The following factors are considered sensitive across the visual field except?**
 - A. Stimulus size
 - B. Stimulus duration
 - C. Stimulus color
 - D. Stimulus orientation

- 4. If a bulb rated 75watts with radiant power of 75 joules, how much energy does it produce within 90 seconds?**
 - A. 6750 Joules
 - B. 112.50 Joules
 - C. 6750 candelas
 - D. 112.50 candelas

- 5. If a white piece of paper of 100 nits is brought near the eye with pupil diameter of 9mm calculate the retinal illuminance.**
 - A. 450 trolands
 - B. 63.62 trolands
 - C. 6362 trolands
 - D. 314 trolands

- 6. One of the following statement deviates from showing the similarities between cellular structures of cones and rods.**
 - A. They have long tubular cells

- B. They synapse with bipolar and other cells in the outer plexiform layer.
 - C. Ciliary process connect inner and outer segments.
 - D. Inner segment near RPE contains cellular organelles such as nucleus and mitochondria.
7. **One of the following statements does not describe the characteristics of sine waves**
- A. How many cycles contained in a period
 - B. How high are the peaks and low the troughs
 - C. The waveform shifts from right to left
 - D. The wave must have definite timeline.
8. **White –on-white static automated perimetry is the current standard for making final diagnosis of?**
- A. Visual field scotoma
 - B. Panum’s Fusional area
 - C. Glaucoma
 - D. Retinal detachment
9. **Which of the following best describe the Gullstrand’s schematic eye?**
- A. One surface cornea and four surface lens spherical and rotationally symmetric surfaces
 - B. Two-surface cornea, four surface lens, spherical and rotationally symmetrical.
 - C. One surface aspheric cornea with a pupil
 - D. Two surface aspheric working close to exit and entrance pupil to form perfect purkinje image
10. **Why is pupil size critical in aberrometry?**
- A. It make the vision supernormal leading to aberration free optics.
 - B. The correction of high order aberration is for large pupil.
 - C. Small pupil increases the reduction of different aberration.
 - D. Supernormal vision is equal to perfect vision but full of correctable aberration.
11. **What do aberrometers measure?**
- A. Prismatic effects
 - B. Distortions in wave front of light

- C. Pin cushion
 - D. Phi in sky
- 12. A 23 year old male had radial keratotomy surgery year before complaining of shadows, double vision, and glare eye strain especially at night during driving. Aberrometry revealed large than normal high order aberration secondary to RK. What kind of medication do you think will be useful in vision improvement of the patient?**
- A. Brimocheck –T eye drop
 - B. Zolichcheck –T eye drop
 - C. Atropine eye drop
 - D. Brimonidine eye drop
- 13. Which of the following potentials is least affected by macular lesion?**
- A. Full-field ERG
 - B. Flash VEP
 - C. Steady- state VEP
 - D. Vestibule
- 14. Which of the following layers of the right LGN, receives input from the right eye?**
- A. 1
 - B. 2
 - C. 4
 - D. 6
- 15. As the mixture of the Nagel anomaloscope is adjusted _____**
- A. Luminance remains constant
 - B. Radiance remains constant
 - C. Both luminance and radiance remain constant
 - D. None of the above
- 16. Which of the following is the correct name for the eye chart that consist of letters of constant size and diminishing contrast?**
- A. Baily- Lovie
 - B. Baily- Robinson
 - C. Pelli-Lovie
 - D. Pelli – Robinson
- 17. Monovision contact lenses typically cause?**
- A. Stereopsis to improve
 - B. Stereopsis to become worse
 - C. No change in stereopsis
 - D. The ROC to constant stereopsis

18. When the subject reports that he cannot see a clearly visible suprathreshold stimulus, this is called

- A. False-positive
- B. False –negative
- C. False-alarm
- D. Positive -alarm

19. When testing under scotopic conditions, the CFF (critical flicker frequency) is expected to be closest to

- A. 30Hz
- B. 40Hz
- C. 50Hz
- D. 60Hz

20. Which of the following will not be appreciated by a patient with a monocular Vision?

- A. Motion parallax
- B. Accommodation
- C. Convergence
- D. Linear perspectives

Section B Short answer question (30 marks)

1. The human eye is actually more unique to humans than most people typically are aware. Provide a detailed explanation with regard to this statement (5marks).
2. Discuss the concept of receptive fields and how they are "distributed" across the retina (5marks).
3. Why might an infant prefer to look at large rather than small finely detailed objects and also seem to have little to no preference for colored over black and white patterns/objects? (5marks)
4. If we perceive colors as a function of the particular combinations of wavelengths of light entering our eyes (e.g., blue = about 450 nm), then how does color constancy work?(10 marks)
5. Define each of the following: (5marks)
 - a. Strabismus,
 - b. neon spreading,
 - c. stereopsis,
 - d. binocular-rivalry
 - e. amodal completion.

Section C Long essay question (20 marks)

1. Using a well labelled diagram describe the visual pathway of human visual system (20 marks)