

## Written Q

1. Enumerate function of outer pigmented layer ?
2. Compare () rods and cones ?
3. Compare () macula lutea and optic disc ?
4. Why fovea centralis is the area of acute vision ?
5. Enumerate changes that occur in dark and light adaptation ?
6. Def retinal adaptation ?
7. Enumerate function of ganglion cell , LGB , 1ry visual area ?
8. Enumerate requirement and advantages of binocular vision ?
9. Compare () photopic and scotopic vision ?

## Formative MCQ

<p>1. Activation of transducin by light activates an enzyme which:</p> <ul style="list-style-type: none"><li>a) Hydrolyzes cGMP</li><li>b) Increases the dark current</li><li>c) Activates adenylyl cyclase</li><li>d) Releases calcium from intracellular stores</li><li>e) Depolarizes the membrane</li></ul>	<b>A</b>
<p>2. Which of the following is a step in photoreception in the rods:</p> <ul style="list-style-type: none"><li>a) Light converts all-trans rhodopsin to 11-cis rhodopsin</li><li>b) Metarhodopsin II activates transducin</li><li>c) Cyclic guanosine monophosphate (cGMP) levels increase</li><li>d) Rods depolarize</li><li>e) Release of neurotransmitter increases</li></ul>	<b>B</b>

<p><b>3. Which one of the reactions in the retinal rods is caused directly by the absorption of light energy?</b></p> <p>a) Dissociation of scotopsin and metarhodopsin</p> <p>b) Decomposition of scotopsin</p> <p>c) Transformation of 11-cis retinal to all-trans retinal</p> <p>d) Transformation of metarhodopsin to lumirhodopsin</p> <p>e) Transformation of vitamin A to retinene</p>	C
<p><b>4. When light strikes the eye there is an increase in:</b></p> <p>a) The activity of the transducin</p> <p>b) The amount of transmitter released from the photoreceptors</p> <p>c) The concentration of 11-cis retinal within the photoreceptors</p> <p>d) The concentration of calcium within the photoreceptors</p> <p>e) The activity of guanylyl cyclase</p>	A
<p><b>5. Given these areas of the retina:</b></p> <p style="text-align: center;">1. macula lutea                      2. fovea centralis</p> <p style="text-align: center;">3. optic disc                          4. periphery of the retina</p> <p><b>Choose the arrangement that lists the areas according to the density of cones, starting with the area that has the highest density of cones.</b></p> <p>a) 1,2,3,4                              b) 1,3,2,4</p> <p>c) 2,1,4,3                              d) 2,4,1,3</p> <p>e) 3,4,1,2.</p>	C
<p><b>6. One of advantages of binocular vision is:</b></p> <p>a) Help the eye to see fine details and color of the objects.</p> <p>b) Prevent spherical and chromatic aberrations.</p> <p>c) Correct the minor defects in the visual field of one eye by the other eye.</p> <p>d) Increase the field of vision vertically from 160 to 200 degrees.</p> <p>e) Increase the acuity of vision.</p>	C

<p><b>7. A requirement of binocular vision is:</b></p> <ul style="list-style-type: none"> <li>a) Corneal dehydration.</li> <li>b) High intraocular pressure.</li> <li>c) Intact neuromuscular apparatus of the eye.</li> <li>d) Intact secondary visual area (area 19).</li> <li>e) Absence of overlap between the visual fields of the two eyes.</li> </ul>	<b>C</b>
<p><b>8. The fovea centralis:</b></p> <ul style="list-style-type: none"> <li>a) is the area of least acute vision.</li> <li>b) Is specialized for dark vision.</li> <li>c) Has the lowest threshold of excitation in the retina.</li> <li>d) Contain only cones.</li> </ul>	<b>D</b>
<p><b>9. The retinal adaptation in dim light is:</b></p> <ul style="list-style-type: none"> <li>a) a primary function of the cones.</li> <li>b) Normally completed in 2 – 3 minute.</li> <li>c) Entirely due to regeneration of Rhodopsin.</li> <li>d) Accompanied with decreased retinal sensitivity.</li> </ul>	<b>C</b>
<p><b>10. Cones are:</b></p> <ul style="list-style-type: none"> <li>a) Present mainly in the peripheral parts of the retina.</li> <li>b) Responsible for colour vision.</li> <li>c) Associated with a lower visual acuity than rods.</li> <li>d) Connecting to bipolar cells with great convergence than rods.</li> </ul>	<b>B</b>
<p><b>11. Rhodopsin:</b></p> <ul style="list-style-type: none"> <li>a) In the photosensitive pigment present in the cones.</li> <li>b) Is responsible for light adaptation.</li> <li>c) Is bleached in the dark.</li> <li>d) Is decreased in Vit A deficiency.</li> </ul>	<b>D</b>

<p><b>12. Layer 1 of LGB:</b></p> <ul style="list-style-type: none"> <li>a) <i>Receives signals from coniocellular ganglion cells.</i></li> <li>b) <i>Receives signals from parvocellular ganglion cells.</i></li> <li>c) <i>Receives impulses from retina on the same side.</i></li> <li>d) <i>Sends signals to primary visual area via parvocellular pathway.</i></li> <li>e) <i>Is important in detection of shape and motion of the object.</i></li> </ul>	<b>E</b>
<p><b>13. Damage of area 18 causes:</b></p> <ul style="list-style-type: none"> <li>a) <i>Complete blindness</i></li> <li>b) <i>Contralateral homonymous hemianopia</i></li> <li>c) <i>Bitemporal hemianopia</i></li> <li>d) <i>Visual agnosia</i></li> <li>e) <i>Binasal hemianopia</i></li> </ul>	<b>D</b>
<p><b>14. The main function of the rods in the eye is:</b></p> <ul style="list-style-type: none"> <li>a) <i>depth perception.</i></li> <li>b) <i>color vision.</i></li> <li>c) <i>vision in dim light.</i></li> <li>d) <i>accommodation for near vision.</i></li> <li>e) <i>prevention of light reflection inside the eye.</i></li> </ul>	<b>C</b>
<p><b>15. The blind spot of the eye is:</b></p> <ul style="list-style-type: none"> <li>a) <i>where more rods than cones are found</i></li> <li>b) <i>where the macula lutea is located</i></li> <li>c) <i>where only cones occur</i></li> <li>d) <i>Where the optic nerve leaves the eye.</i></li> <li>e) <i>Where more cones than rods are found.</i></li> </ul>	<b>D</b>

<p><b>16. Retinal cells which respond by full depolarization is:</b></p> <ul style="list-style-type: none"> <li>a) Amacrine cells</li> <li>b) Horizontal cells</li> <li>c) Photoreceptors</li> <li>d) Ganglion cells</li> <li>e) Bipolar cells.</li> </ul>	<b>D</b>
<p><b>17. Concerning dark adaptation:</b></p> <ul style="list-style-type: none"> <li>a) the amount of rhodopsin increases.</li> <li>b) the pupils constrict.</li> <li>c) it occurs more rapidly than light adaptation.</li> <li>d) Retinal sensitivity markedly decreases.</li> <li>e) Retinal threshold is increased.</li> </ul>	<b>A</b>
<p><b>18. About the ganglion cells of the retina:</b></p> <ul style="list-style-type: none"> <li>a) Are only one type.</li> <li>b) Do not respond when light is turned off.</li> <li>c) Their axons form the optic nerve.</li> <li>d) Are inhibited by the amacrine cells.</li> </ul>	<b>C</b>
<p><b>19. The fovea centralis:</b></p> <ul style="list-style-type: none"> <li>a) Is located at the periphery of the macula lutea.</li> <li>b) Lies where the optic axis meets the retina.</li> <li>c) Lies on the temporal side of the blind spot.</li> <li>d) Contains more rods than cones.</li> </ul>	<b>C</b>

## Other MCQ

<p><b>1. Rods in the retina are:</b></p> <ul style="list-style-type: none"><li>a) more in the central part of the retina.</li><li>b) better innervated than cones.</li><li>c) more sensitive to light.</li><li>d) responsible for color vision.</li><li>e) present in fovea.</li></ul>	<b>C</b>
<p><b>2. In dark adaptation:</b></p> <ul style="list-style-type: none"><li>a) the retinal sensitivity is decreased.</li><li>b) it is associated with papillary constriction.</li><li>c) the retinal sensitivity is increased.</li><li>d) it is associated with increased power of lens.</li><li>e) it is caused by decomposition of rhodopsin pigment.</li></ul>	<b>C</b>
<p><b>3. Dark adaptation in the eye is mainly due to:</b></p> <ul style="list-style-type: none"><li>a) dilatation of pupil.</li><li>b) cone adaptation.</li><li>c) rod adaptation.</li><li>d) constriction of pupil.</li><li>e) increase intraocular pressure</li></ul>	<b>C</b>
<p><b>4. During photopic vision :</b></p> <ul style="list-style-type: none"><li>a) Rods are not stimulated</li><li>b) Colour and details are perceived</li><li>c) Visual acuity is low</li><li>d) The eye is adapted to dim light .</li></ul>	<b>B</b>

<p><b>5. The fovea centralis :</b></p> <ul style="list-style-type: none"> <li>a) is the area of least acute vision.</li> <li>b) Is specialized for dark vision.</li> <li>c) Has the lowest threshold of excitation in the retina</li> <li>d) Contain only cones</li> </ul>	<b>D</b>
<p><b>6. In hypermetropia , All are true except :</b></p> <ul style="list-style-type: none"> <li>a) The far point in nearer than normal .</li> <li>b) The image is formed behind the retina.</li> <li>c) Convex lenses correct the condition.</li> <li>d) Presbyopia worsens the condition.</li> </ul>	<b>A</b>
<p><b>7. The fovea centralis :</b></p> <ul style="list-style-type: none"> <li>a) Is not used during routine vision.    B) is the area of least acute vision.</li> <li>c) Is specialized for dark vision.</li> <li>d) Has the lowest threshold of excitation in the retina,</li> <li>e) Contains the highest concentration of cones.</li> </ul>	<b>E</b>
<p><b>8. In myopia :</b></p> <ul style="list-style-type: none"> <li>a) The eyeball tends to be longer than the average normal .</li> <li>b) The lens power is weaker than normal in most casos .</li> <li>c) The use of biconvex lenses corrects the error .</li> <li>d) Near vision is more seriously affected than far vision .</li> <li>e) A circular object may appear oval .</li> </ul>	<b>A</b>
<p><b>9. The primary visual cortex (area 17):</b></p> <ul style="list-style-type: none"> <li>a) Is not essential for the visual sensation .</li> <li>b) is a small area in the limbic lobe.</li> <li>c) Also receives auditory information .</li> <li>d) Perceives visual sensations and localizes them in relation to each other</li> <li>e) Is able to interpret the images completely.</li> </ul>	<b>D</b>

<p><b>10. In hypermetropia:</b></p> <ul style="list-style-type: none"> <li>a) The objects at Infinity cannot be clearly seen.</li> <li>b) ciliary muscle must contract more strongly than normal even during far vision</li> <li>c) The range of clear vision is greater than normal.</li> <li>d) Correction is obtained by use of converging (convex) lenses .</li> </ul>	<b>D</b>
<p><b>11. When comparing the fovea with the periphery of the retina, which of the following statements is correct?</b></p> <ul style="list-style-type: none"> <li>a) The fovea contains an increased proportion of cones</li> <li>b) The fovea contains an increased proportion of ganglion cells</li> <li>c) The fovea contains an increased proportion of horizontal cells</li> <li>d) The fovea contains an increased proportion of rods</li> <li>e) The fovea contains an increased proportion of vasculature</li> </ul>	<b>A</b>
<p><b>12. Light entering eye passes through which retinal layer first?</b></p> <ul style="list-style-type: none"> <li>a) Inner nuclear layer</li> <li>b) Outer nuclear layer</li> <li>c) Outer plexiform layer</li> <li>d) Photoreceptor layer</li> <li>e) Retinal ganglion layer</li> </ul>	<b>E</b>
<p><b>13. Ganglion cells attached to photoreceptors located on the temporal portion of the retina project to which of the following structures?</b></p> <ul style="list-style-type: none"> <li>a) Contralateral lateral geniculate nucleus</li> <li>b) Ipsilateral lateral geniculate nucleus</li> <li>c) Ipsilateral medial geniculate nucleus</li> <li>d) Calcarine fissure</li> <li>e) Contralateral medial geniculate nucleus</li> </ul>	<b>B</b>

<p><b>14. Which of the following best describes the "blind spot" of the eye?</b></p> <ul style="list-style-type: none"> <li>a) Located 5 degrees lateral to the central point of vision</li> <li>b) Exit point of no optic nerve</li> <li>c) Contains Only rods and thus has monochromatic vision</li> <li>d) Contains no blood vessels</li> <li>e) Area where chromatic aberration of the lens is the greatest</li> </ul>	<b>B</b>
<p><b>15. When parallel light rays pass through a concave lens, which of the following will occur?</b></p> <ul style="list-style-type: none"> <li>a) Rays converge toward each other</li> <li>b) Rays diverge away from each other</li> <li>c) They maintain parallel relationship</li> <li>d) They reflect back in the direction from where they came</li> <li>e) Rays refract to one focal point</li> </ul>	<b>B</b>
<p><b>16. Which of the following statements best describes the role of melanin in the pigment layer of the retina?</b></p> <ul style="list-style-type: none"> <li>a) Precursor of the light sensitive chemical rhodopsin</li> <li>b) Serves as nutritional component to the rods and cones in the retina</li> <li>c) pigment that prevents the reflection of light inside globe of the eye</li> <li>d) Responsible for maintaining integrity of the canal of Schlemm</li> </ul>	<b>C</b>
<p><b>17. Which of following pairs of molecules combine to form rhodopsin ?</b></p> <ul style="list-style-type: none"> <li>a) Bathorhodopsin and 11-cis-retinal</li> <li>b) Bathorhodopsin and all-trans-retinal</li> <li>c) Bathorhodopsin and scolopsin</li> <li>d) Scolopsin and 11-cis-retinal</li> <li>e) Scolopsin and all-trans-retinal</li> </ul>	<b>D</b>

<p><b>18. A deficiency of which vitamin prevents the formation of an adequate quantity of retinal, eventually leading to night blindness ?</b></p> <p>a) Vitamin A b) Vitamin C c) Vitamin D d) Vitamin E</p>	<p><b>A</b></p>
<p><b>19. Under low or reduced light conditions, which of the following chemical compounds is responsible for the inward directed sodium current in the outer segments of the photoreceptors?</b></p> <p>a) Metarhodopsin 11 b) Cyclic GMP c) 11-cis retinal d) Cyclic AMP e) 11-trans retinal</p>	<p><b>B</b></p>
<p><b>20. Which of the following events occurs in photoreceptors during phototransduction in response to light?</b></p> <p>a) Phosphodiesterase activity decreases b) Transducin activity decreases c) Hydrolysis of cGMP increases d) Neurotransmitter release increases e) Number of open voltage-gated calcium channels increases</p>	<p><b>C</b></p>
<p><b>21. During photoreception, all of the following increase except:</b></p> <p>a) CGMP phosphodiesterase b) Transducin c) CAMP d) Metarhodopsin II e) Sodium influx into the outer segment of the rod</p>	<p><b>E</b></p>

<p><b>22. Transmission of visual signals to the primary visual cortex from the retina includes a synapse in which structure?</b></p> <p>a) Lateral geniculate nucleus  b) Medial geniculate nucleus  c) Pretectal nucleus  d) Superior colliculus  e) Suprachiasmatic nucleus</p>	<b>A</b>
<p><b>23. Which of the following statements is correct concerning the elements of the retina ?</b></p> <p>a) Total number of cones in the retina is much greater than the total number of rods  b) Each individual cone responds to all wave lengths of light  c) Photoreceptors activation (rods and cones) results In hyperpolarization of the receptor  d) Central fovea contains only rods  e) Pigment layer of the retina contains the photoreceptors</p>	<b>C</b>
<p><b>24. Which of the following neurotransmitters is released by both rods and cones at their synapses with bipolar cells?</b></p> <p>a) Acetylcholine                      b) Dopamine  c) Glutamate                              d) Glycine  e) Serotonin</p>	<b>C</b>
<p><b>25. The condition of hyperopia is usually caused by which of the following anomalies of the eye?</b></p> <p>a) Decreased production of melanin  b) Uneven curvature of the cornea  c) Eyeball that is shorter than normal  d) Eyeball that is longer than normal  e) Lens system that is too powerful and focuses object in front of retina</p>	<b>C</b>

<p><b>26. Which of the following retinal cells have action potentials?</b></p> <ul style="list-style-type: none"> <li>a) Amacrine cells</li> <li>b) Bipolar cells</li> <li>c) Ganglion cells</li> <li>d) Horizontal cells</li> <li>e) Photoreceptors</li> </ul>	<b>C</b>
<p><b>27. When compared with the cones of the retina, the rods:</b></p> <ul style="list-style-type: none"> <li>a) are more sensitive to low-intensity light</li> <li>b) adapt to darkness before the cones</li> <li>c) are most highly concentrated on the foveal</li> <li>d) are primarily involved in color vision</li> </ul>	<b>A</b>
<p><b>28. Which of the following is a step in photoreception in the rods?</b></p> <ul style="list-style-type: none"> <li>a) Light converts all-trans rhodopsin to 11-cis rhodopsin</li> <li>b) Metarhodopsin II activates transducin</li> <li>c) Cyclic guanosine monophosphate (cGMP) levels, increase</li> <li>d) Rods depolarize</li> <li>e) Release of neurotransmitter increases</li> </ul>	<b>B</b>
<p><b>29. Cutting which structure causes blindness in the temporal fields of the left and right eyes?</b></p> <ul style="list-style-type: none"> <li>a) Optic nerve</li> <li>b) Optic chiasma</li> <li>c) Optic tract</li> <li>d) Geniculo-calcarine tract</li> </ul>	<b>B</b>

<p><b>30. Which of the following actions occurs when light strikes a photoreceptor cell of the retina?</b></p> <ul style="list-style-type: none"> <li>a) <i>Transducin is inhibited</i></li> <li>b) <i>The photoreceptor depolarizes</i></li> <li>c) <i>Cyclic guanosine monophosphate (cGMP) levels in the cell decrease</i></li> <li>d) <i>All-trans rhodopsin is converted to 11-cis rhodopsin</i></li> <li>e) <i>An excitatory neurotransmitter is released</i></li> </ul>	<p><b>C</b></p>
<p><b>31. The fovea of the eye:</b></p> <ul style="list-style-type: none"> <li>a) <i>Has the lowest light threshold.</i></li> <li>b) <i>is the region of highest visual ability.</i></li> <li>c) <i>contains only red and green cones.</i></li> <li>d) <i>contains only rods.</i></li> <li>e) <i>is situated over the head of the optic nerve.</i></li> </ul>	<p><b>B</b></p>
<p><b>32. Which of the following is not correctly paired?</b></p> <ul style="list-style-type: none"> <li>a) <i>Rhodopsin: retinal and opsin</i></li> <li>b) <i>Obstruction of the canal of Schlemm: elevated intraocular pressure</i></li> <li>c) <i>Myopia: convex lenses</i></li> <li>d) <i>Astigmatism: nonuniform curvature of the cornea</i></li> <li>e) <i>Inner segments of rods and cones: synthesis of the photosensitive compounds</i></li> </ul>	<p><b>C</b></p>