

BMD 334
Human Physiology
Practice Exam 3
Sample 2

Name _____

Student ID _____

There are 40 multiple choice questions. All answers must be recorded on the computer form to receive credit. Choose the one best answer. 2.5 points each.

1. **The modality to which a receptor responds best is called the ____.**
 - A) appropriate stimulus
 - B) appropriate modality
 - C) adequate stimulus
 - D) adequate modality
 - E) composite modality

2. **The process whereby a sensory receptor converts a stimulus modality into a change in membrane potential is called ____.**
 - A) signal generation
 - B) signal production
 - C) signal transduction
 - D) signal conversion
 - E) modality conversion

3. **In the thalamus, a synapse with ____ occurs that transmit the information to the cerebral cortex.**
 - A) afferent neurons
 - B) efferent neurons
 - C) first-order neurons
 - D) second-order neurons
 - E) third-order neurons

4. **The larger the receptive fields in a region of the body, ____.**
 - A) the smaller the two-point discrimination threshold
 - B) the larger the two-point discrimination threshold
 - C) the larger the area of somatosensory cortex devoted to that region
 - D) A and C
 - E) B and C

5. **Which of the following structures is NOT a mechanoreceptor located within the skin?**
 - A) Pacinian corpuscles
 - B) hair follicle receptors
 - C) Meissner's corpuscles
 - D) Merkel's disks
 - E) hair cells

6. **Which of the following receptors responds to chemicals like histamine and bradykinin that are released from damaged tissue?**
 - A) Ruffini's endings
 - B) hair follicle receptors
 - C) mechanical nociceptors
 - D) polymodal nociceptors
 - E) proprioceptors

7. **A person has damage to the right dorsal columns of the spinal cord at the thoracic level. This person would have impaired _____.**
- A) temperature sensation of the right leg
 - B) touch sensation of the right leg
 - C) pain sensation of the right arm and leg
 - D) temperature sensation of the left leg
 - E) touch sensation of the left leg
8. **Fast pain is perceived as a _____ pain and is transmitted along _____ fibers.**
- A) sharp : $A\delta$
 - B) sharp : $A\beta$
 - C) sharp : C
 - D) dull : $A\delta$
 - E) dull : C
9. **Which of the following is NOT part of the gate-control theory of pain modulation?**
- A) Inhibitory interneurons can modulate second-order pain neurons.
 - B) Inhibitory interneurons are activated by collaterals of $A\beta$ fibers that are associated with mechanical stimuli.
 - C) Inhibitory interneurons are inhibited by collaterals from the pain afferent.
 - D) A non-painful stimulus can activate the inhibitory interneuron and thereby inhibit the painful stimulus.
 - E) Signals that modify pain originate from the brainstem.
10. **What is the highly pigmented layer of tissue within the eye that absorbs light that has reached to back of the eye to prevent its reflection?**
- A) pupil
 - B) ciliary body
 - C) cornea
 - D) sclera
 - E) choroid
11. **The cornea and lens are _____ surfaces that cause light to converge on the _____.**
- A) concave : ciliary body
 - B) convex : ciliary body
 - C) concave : retina
 - D) convex : retina
 - E) concave : sclera
12. **When the ciliary muscles are relaxed, the lens is relatively _____, allowing the eye to focus on objects that are _____.**
- A) round : close
 - B) round : distant
 - C) flat : close
 - D) flat : distant
13. **In the visual system, activation of the parasympathetic nervous system causes which of the following?**
- A) pupillary dilation
 - B) decreases the refractive power of the lens
 - C) contraction of the circular muscle of the iris and ciliary muscle
 - D) A and C
 - E) All of the above

14. _____ is a condition where light, originating a short distance from the eye, is focused behind the retina.
- A) Presbyopia
 - B) Emmetropia
 - C) Hyperopia
 - D) Myopia
 - E) Neurotropia
15. Which of the following is NOT a cell type found in the retina?
- A) photoreceptors
 - B) amacrine cells
 - C) horizontal cells
 - D) bipolar cells
 - E) macular cells
16. The light-absorbing portion of the photopigment is _____; its sensitivity to a particular wavelength of light is determined by _____.
- A) retinal : opsin
 - B) opsin : retinal
 - C) transducin : phosphodiesterase
 - D) phosphodiesterase : transducin
 - E) opsin : transducin
17. In the absence of light, the membrane potential of a photoreceptor is relatively _____ by the presence of _____ channels.
- A) depolarized : open potassium
 - B) depolarized : closed potassium
 - C) depolarized : open sodium
 - D) hyperpolarized : closed sodium
 - E) hyperpolarized : open calcium
18. Which of the following is characteristic of ON-center, OFF-surround cells in the retina?
- A) they are bipolar cells
 - B) they are amacrine cells
 - C) light in the center of the visual field increases the frequency of action potentials
 - D) A and C
 - E) B and C
19. Which of the following parts of the visual pathway is 100% contralateral to the visual field?
- A) visual cortex
 - B) optic nerve
 - C) optic radiations
 - D) A and C
 - E) B and C
20. In the optic chiasm, ganglion cells from the _____ portion of the retina cross over, whereas the ganglion cells from the _____ portion of the retina remain on the same side.
- A) nasal : temporal
 - B) temporal : nasal

21. **Both the auditory and vestibular systems rely upon _____ to detect movement of fluid within the ear.**
- A) hair cells
 - B) chemoreceptors
 - C) thermoreceptors
 - D) osmoreceptors
 - E) hair follicle receptors
22. **How does endolymph differ from perilymph?**
- A) There is no difference between these two solutions.
 - B) Perilymph is more similar in composition to intracellular fluid.
 - C) Endolymph is more similar in composition to intracellular fluid.
 - D) Endolymph is located within the scala tympani.
 - E) Perilymph is located within the scala media.
23. **The organ of Corti is located on what membrane?**
- A) vestibular membrane
 - B) tympanic membrane
 - C) tectorial membrane
 - D) basilar membrane
 - E) all of the above
24. **Bending of the stereocilia on a hair cell can induce either a closure or an opening of a potassium channel based upon the _____.**
- A) size of the stereocilia
 - B) frequency of the bending of the stereocilia
 - C) amplitude of the bending of the stereocilia
 - D) direction that the stereocilia bend
 - E) rate that the stereocilia bend
25. **In comparison to high pitch sound, low pitch sound will cause vibrations of the basilar membrane _____.**
- A) of greater amplitude
 - B) of lesser amplitude
 - C) closer to the oval window
 - D) closer to the helicotrema
 - E) two of the above are true
26. **What type of movement does the saccule detect?**
- A) angular acceleration as when nodding the head yes
 - B) angular acceleration as when shaking the head no
 - C) angular acceleration as when tilting the head so that the ear approaches the shoulder
 - D) linear acceleration up or down
 - E) linear acceleration forward or backward
27. **The primary afferent neurons from taste receptor cells terminate within what area of the central nervous system?**
- A) thalamus
 - B) cerebellum
 - C) medulla oblongata
 - D) cervical spinal cord
 - E) olfactory tubercle

28. **Taste receptor cells can be depolarized by decreased outward flux of potassium by all of the following primary tastes except one. Which of the following is the exception?**
- A) bitter
 - B) sweet
 - C) sour
 - D) salty
29. **First-order olfactory neurons synapse with _____ that occur in clusters called _____.**
- A) mitral cells : glomeruli
 - B) bicuspid cells : glomeruli
 - C) gustducin : plexi
 - D) basal cells : plexi
 - E) olfactory tubercle cells : raphe nuclei
30. **Which of the following is an INCORRECT match between cranial nerve and special sense?**
- A) cranial nerve I – olfaction
 - B) cranial nerve II – vision
 - C) cranial nerve III – taste
 - D) cranial nerve VIII – hearing
 - E) cranial nerve VIII - equilibrium
31. **Lateral inhibition _____.**
- A) produces contrast within the nervous system
 - B) enhances acuity
 - C) inhibits neurons receiving information from afferents associated with neighboring receptive fields
 - D) A and C
 - E) All of the above
32. **Which of the following statements about the spinothalamic tract is FALSE?**
- A) Pain signals are transmitted along this pathway.
 - B) Cold temperature signals are transmitted along this pathway.
 - C) Warm temperature signals are transmitted along this pathway.
 - D) The pathway crosses to the contralateral side in the brainstem.
 - E) The first-order neuron synapses with the second-order neuron in the spinal cord dorsal horn.
33. **Activation of the periaqueductal gray (PAG) activates the nucleus raphe magnus (NRM), which _____.**
- A) decreases the perception of pain
 - B) decreases substance P release in the spinal cord
 - C) produces an IPSP in the second-order neuron for pain
 - D) A and C
 - E) All of the above
34. **The lens and cornea are nourished by _____.**
- A) the choroid plexus
 - B) Purkinje fibers
 - C) the optic disk
 - D) aqueous humor
 - E) vitreous humor

35. Which of the following conditions below describes irregularities in the structure of the cornea or lens?
- A) cataracts
 - B) presbyopia
 - C) glaucoma
 - D) astigmatism
 - E) hyperopia
36. Disks of a photoreceptor are located in the _____ and contain _____.
- A) inner segment : transmitter
 - B) outer segment : transmitter
 - C) synaptic terminal : transmitter
 - D) inner segment : photopigment
 - E) outer segment : photopigment
37. The area on the retina where the optic nerve exits the eye is called what?
- A) fovea
 - B) macula
 - C) optic disk
 - D) choroid
 - E) ciliary body
38. The three ossicles in correct order from tympanic membrane to oval window is _____.
- A) incus, stapes, malleus
 - B) malleus, incus, stapes
 - C) stapes, incus, malleus
 - D) incus, malleus, stapes
 - E) malleus, stapes, incus
39. The mass of the gelatinous material within the saccule and utricle is enhanced by the presence of what type of crystals?
- A) sodium chloride
 - B) sodium carbonate
 - C) potassium chloride
 - D) calcium carbonate
 - E) calcium phosphate
40. Which of the following cells is the precursor cell for the olfactory receptor cells?
- A) support cells
 - B) basal cells
 - C) mitral cells
 - D) ciliary cells
 - E) tubercle cells