

Wednesday, November 16th, 2022

Following directions on the mark-sense form, write your **name, and student number** in the blanks and fill in the bubbles. In addition, write your **name** on this exam.

When finished with the test, turn in both the mark-sense form and the exam at the front of the room.

PLACE ALL ANSWERS ON THE MARK-SENSE FORM

MULTIPLE CHOICE: Always choose the BEST, most complete answer. (2 points each)

1. Sensory receptors are specialized cells that
 - a) communicate directly with skeletal muscle fibers.
 - b) convert physical stimuli into changes in membrane potential.
 - c) have lipid molecules embedded in cell membranes.
 - d) are found only in the skin.
 - e) are responsible for synaptic transmission

2. The “adequate stimulus” for a sensory receptor
 - a) is the type of stimulus that is most effective in activating the sensory receptor.
 - b) always causes a depolarization of the membrane potential.
 - c) always causes a hyperpolarization of the membrane potential.
 - d) is the smallest stimulus that will elicit a response.
 - e) prevents adaptation.

3. Which of the following is the best description of the “neural code”?
 - a) A series of dots and dashes that are used to represent physical stimuli.
 - b) All synaptic connections are coded as positive.
 - c) Electrical messages are hidden in chemical synapses.
 - d) The intensity of a stimulus is encoded by the magnitude of the change in membrane potential it produces in the sensory receptor.
 - e) An encryption system that protects the identity of sensory receptors.

4. How do phasic sensory receptors respond to sustained, long-lasting stimuli?
 - a) response increases over time
 - b) response remains constant over time
 - c) response oscillates over time
 - d) response declines over time
 - e) response is unpredictable

5. Which of the following is NOT considered to be a somatic sensation?
- sound
 - temperature
 - pain
 - touch
 - itch
6. Which of the following is a difference between the somatosensory neural pathways for pain and fine touch?
- the location of the primary sensory receptor
 - the location of the secondary sensory neuron
 - the number of different neurons in the labelled line
 - the pathway for pain sensation is always bilateral
 - signals from touch stimuli bypass the thalamus
7. What is the difference between how sharp, fast pain and slow, diffuse pain are detected?
- Sharp, fast pain is detected by chemoreceptors only.
 - Slow, diffuse pain is detected by chemoreceptors only.
 - Sharp, fast pain is detected by A-delta fibers and slow, diffuse pain is detected by C fibers.
 - Slow diffuse pain is detected exclusively by mechanoreceptors.
 - Sharp, fast pain is detected by receptors exclusively located in the hands and feet.
8. When the sensation of pain from an internal organ is localized to a region on the surface of the body, this is called
- a sensory illusion.
 - phantom limb pain.
 - psychosomatic pain.
 - hypochondria.
 - referred pain.
9. Where are taste receptors found in the body?
- in the mouth, digestive tract, and lungs
 - only in the mouth
 - only on the tongue
 - on the skin surface and the tongue
 - everywhere on the body
10. How many different olfactory receptor proteins are found in each single olfactory sensory neuron?
- 1
 - 2-5
 - 5-7
 - 10-20
 - 343

11. How can the number of odors we detect exceed the number of different types of olfactory receptor proteins?
- Novel odorant molecules cause the expression of new olfactory receptor proteins.
 - Some odors activate non-olfactory accessory neurons.
 - Odorant molecules can bind to more than one type of olfactory receptor protein.
 - The olfactory sensory neurons express different receptor proteins as needed.
 - Exposure to new odors causes new olfactory sensory neurons to appear.
12. What are the major sensory modalities that converge in the brain to generate what we call “flavor”?
- visual, tactile, and vestibular
 - auditory, visual, and taste
 - auditory, olfactory, and somatosensory
 - taste, olfactory, and somatosensory
 - taste, olfactory, and visual
13. Which of the following structures is NOT directly involved in audition?
- oval window
 - basilar membrane
 - tympanic membrane
 - cochlea
 - semicircular canal
14. What is the function of the ossicles in the middle ear?
- prevent water from entering the inner ear through the round window
 - transmit sound waves from the outer ear to the inner ear
 - connect the helicotrema to the tectorial membrane
 - connect the tympanic membrane to the Eustachian tube
 - prevention of ear infections
15. What determines the optimal sound frequency that stimulates a hair cell receptor in the cochlea?
- the size of its tip link proteins
 - the density of potassium leak channels
 - its position along the basilar membrane
 - its distance from the tectorial membrane
 - its degree of myelination

16. Which of the following is involved in detecting rotational movements of the head?
- the tympanic membrane
 - the cochlea
 - the semicircular canals
 - the oculomotor nucleus
 - the utricle and saccule
17. What is the function of the vestibulo-ocular reflex?
- maintaining balance
 - controlling posture
 - sensing gravitational forces
 - maintaining visual fixation during head movements
 - keeping the eyes open during rapid body movements
18. What structure(s) in the brain receive direct input from the vestibular sensory neurons?
- visual and auditory cortex
 - somatosensory cortex
 - basal ganglia and dorsal root ganglia
 - hippocampus
 - vestibular nuclei of the medulla and the cerebellum
19. Which of the following is NOT a principal component of the visual pathway into the brain?
- the cerebellum
 - the retina
 - the optic chiasm
 - the optic nerve
 - the lateral geniculate body of the thalamus
20. What is accommodation in the visual system?
- decreasing the retinal response to sustained light
 - adjusting the shape of the lens to keep objects in focus
 - learning to recognize new objects
 - adjusting visual perception when wearing new glasses
 - reversing the orientation of vertical and horizontal images projected on the retina
21. What process initiates the visual experience?
- action potentials in the optic nerve
 - synaptic potentials in bipolar cells
 - phototransduction
 - opening the optic disc
 - occluding the optic chiasm

22. What is the origin of color vision?
- a) color-specific regions in the visual cortex
 - b) segregation of different color streams in the thalamus
 - c) photopigments in the different layers of the thalamus
 - d) the existence of different photopigments in different cone photoreceptors
 - e) the existence of different photopigments in different rod photoreceptors
23. During active muscle contractions, transient chemical bonds are formed between
- a) adjacent muscle fascicles.
 - b) acetylcholine and calcium channels.
 - c) T-tubules and the sarcoplasmic reticulum.
 - d) troponin and the sarcomere.
 - e) thick and thin filaments composed mostly of myosin and actin, respectively.
24. The T-tubules are essential for propagating action potentials from
- a) the sarcolemma to the interior of the muscle cell.
 - b) the motor nerve terminal to the motor endplate.
 - c) the tendons to the muscle fibers.
 - d) the sarcoplasmic reticulum to the mitochondria.
 - e) the nucleus to the Golgi apparatus.
25. The relaxation phase of muscle contraction occurs as
- a) the thick filaments begin to shorten.
 - b) the thin filaments begin to shorten.
 - c) chloride ions are released from the sarcoplasm.
 - d) glutamate is released.
 - e) calcium ions are pumped back into the sarcoplasmic reticulum.
26. During a voluntary movement, motor units are recruited in order of
- a) increasing resistance to fatigue.
 - b) decreasing axonal conduction velocity.
 - c) decreasing contraction speed.
 - d) increasing force.
 - e) decreasing force.
27. It is thought that motor neurons in the spinal cord are normally activated in order of increasing size because
- a) small cells receive more synaptic input than large cells.
 - b) small cells consume more energy than large cells.
 - c) small cells do not have voltage-gated channels.
 - d) large cells cannot generate action potentials.
 - e) the smaller the cell, the higher the input resistance.

28. The knee jerk reflex is initiated by
- the activation of cutaneous receptors in the skin.
 - the activation of sensory afferent fibers innervating muscle spindles.
 - spontaneous action potentials in spinal motor neurons.
 - spinal interneurons that make synaptic connections onto motor neurons.
 - visual or auditory input.
29. The functional role of the flexion reflex is to
- increase running speed to escape danger.
 - override the knee jerk reflex.
 - withdraw a limb away from a noxious stimulus.
 - counteract the vestibulo-ocular reflex.
 - stabilize the head during flexion movements.
30. Diseases affecting the cerebellum produce all of the following motor deficits EXCEPT
- delayed movement onset
 - range of movement errors (dysmetria)
 - defects in movement accuracy
 - paralysis
 - patterned movement errors

END OF TEST

Turn in your mark-sense form
and your question sheets
at the front of the room.