

# A & P 1 –Unit 4 Review

## Mary Stangler Center for Academic Success

*This review is meant to highlight basic concepts from unit 4. It does not cover all concepts presented by your instructor. Refer back to your notes, unit objectives, labs, handouts, etc. to further prepare for your exam.*

1. Give a general explanation of what makes up the following:
  - a. CNS-
  - b. PNS –
2. Describe the divisions and subdivisions of PNS, give a general function of each.
  - a. Sensory division-
  - b. Motor division –
    - i. Visceral motor division –
      - 1)Sympathetic division –
      - 2)Parasympathetic division –
    - ii. Somatic motor division –
3. Structures of Neurons – define the following:
  - a. Dendrites –
  - b. Soma (Cell Body) –
  - c. Axon –
  - d. Myelin Sheath –
  - e. Schwann Cells –
  - f. Nodes of Ranvier –
  - g. Internodes –
  - h. Synaptic Knobs & Synaptic Vesicles –
4. Name the functional class of neurons:
  - a. \_\_\_\_\_ - conduct signals from CNS to muscles/glands
  - b. \_\_\_\_\_ - conduct signals within the CNS
  - c. \_\_\_\_\_ - conduct signals from the PNS to the CNS
5. Name the structural class of neurons:
  - a. \_\_\_\_\_ Neuron - Many dendrites converge into one main dendrite; one axon, found in retina, inner ear, olfactory cells
  - b. \_\_\_\_\_ Neuron - Many dendrites; no axon, found in the brain and retina
  - c. \_\_\_\_\_ Neuron - Many dendrites lead directly to cell body; one axon, make up most neurons in brain and spinal cord
  - d. \_\_\_\_\_ Neuron - Many dendrites converge into one axon, cell body in middle of axon, make up sensory neurons from skin and organs to spinal cord
6. Name the following neuroglial cell and determine if it part of the CNS or PNS(circle one):

- a. \_\_\_\_\_, belongs to the CNS/PNS - (star shaped), 2 types, one forms the blood/brain barrier, one replaces dead neurons (scar tissue)
  - b. \_\_\_\_\_, belongs to the CNS/PNS- Surround nerve cell bodies, regulate levels of oxygen, carbon dioxide, nutrients, and neurotransmitters
  - c. \_\_\_\_\_, belongs to the CNS/PNS - line ventricles of brain and produce CSF
  - d. \_\_\_\_\_, belongs to the CNS/PNS - (spider shaped), form myelin sheath in CNS
  - e. \_\_\_\_\_, belongs to the CNS/PNS - Form myelin sheath around neurons of PNS
  - f. \_\_\_\_\_, belongs to the CNS/PNS – macrophages phagocytize foreign invaders
7. Nerve Signals: Generation & Propagation - define each term and explain what is happening with K<sup>+</sup> and Na<sup>+</sup> at each step:
- a. Polarization:
  - b. Depolarization:
  - c. Repolarization :
  - d. In general use the above information to explain how nerve signals are generated and propagated down an axon.
8. Describe the structures found at a synapse and determine where they are found:
- a. Presynaptic Neuron –
  - b. Postsynaptic Neuron –
  - c. Synaptic Cleft –
  - d. Synaptic Knob –
  - e. Synaptic Vesicles –
  - f. Neurotransmitters –
  - g. Receptors –
9. Give the function of the following neurotransmitters:
- a. Acetylcholine -
  - b. Epinephrine/ Norepinephrine-
  - c. Dopamine –
  - d. Serotonin –
  - e. Endorphine -
10. Name the types of memory:
- a. \_\_\_\_\_ - Retention of info for just a few seconds, the “here and now”
  - b. \_\_\_\_\_ - Permanent storage of info, more reinforcement increases permanence
  - c. \_\_\_\_\_ - Retention of small bits of info for seconds to hours, lost if not reinforced
11. Name the nervous tissue disorder:
- a. \_\_\_\_\_ Formation of neurofibrillary tangles and amyloid plaques, memory loss, confusion

- b. \_\_\_\_\_ - Myelin sheaths of CNS deteriorate, replaced by scar tissue (sclera), may be autoimmune
- c. \_\_\_\_\_ - Degeneration of dopamine-releasing neurons, Progressive loss of motor function
- d. \_\_\_\_\_ - Absence of enzyme that breaks down glycolipid in myelin sheath, genetic disorder, Eastern European Jewish ancestry

12. Name the landmarks/divisions of the brain:

- a. \_\_\_\_\_ – groove separates frontal and parietal lobes
- b. \_\_\_\_\_ – outer layer of gray matter; unmyelinated
- c. \_\_\_\_\_ left/right halves of cerebrum
- d. \_\_\_\_\_ – inner layer of white matter; myelinated
- e. \_\_\_\_\_ – thick nerve bundle that connects hemispheres
- f. \_\_\_\_\_ raised folds of gray matter (the general term)
- g. \_\_\_\_\_ – groove separates temporal, frontal, and parietal lobes
- h. \_\_\_\_\_ – deep sulcus that separates hemispheres
- i. \_\_\_\_\_ – raised folds gray matter posterior to central sulcus
- j. \_\_\_\_\_ – raised folds of gray matter anterior to central sulcus
- k. \_\_\_\_\_ grooves between gyri ( the general term)

13. Describe the primary functions of each lobe of the brain:

- a. frontal lobe –
- b. parietal lobe –
- c. temporal lobe –
- d. occipital lobe –

14. Which brain system is important for long term memory storage, control of emotions, and links functions of the cerebrum with functions of the brainstem?

15. Which area of the brain directs nerve signals to appropriate areas of the cerebral cortex and encloses the third ventricle?

16. Name 3 structures that make up the brainstem and give the major function of each.

17. Name the area of the brain that smoothes movements and helps maintain balance.

18. Put the 3 meninges of the brain and the resulting spaces between them in order for outer to inner.

Arachnoid, Dura Mater, Pia Mater, Subarachnoid Space, Subdural Space

19. The ventricles and CSF:

- a. What is CSF and where is it produced?
- b. What is the function of CSF?

c. Name the ventricles and briefly describe the flow of CSF.

20. Cranial nerves, give the basic function of each and whether sensory/motor/or both:

- a. I      Olfactory –
- b. II      Optic –
- c. III      Oculomotor –
- d. IV      Trochlear –
- e. V      Trigeminal –
- f. VI      Abducens –
- g. VII      Facial -
- h. VIII      Auditory(Vestibulocochlear) –
- i. IX      Glossopharyngeal –
- j. X      Vagus –
- k. XI      Accessory -
- l. XII      Hypoglossal –

21. What is the function of the spinal cord?

22. Describe the regions of the spinal cord, define any specialized structures.

23. How many spinal nerves are there? Are they part of the CNS or PNS?

24. The spinal cord has the same 3 meninges as the brain, but which additional space does the spinal cord have and where is it located?

25. Cross section of the spinal cord:

- a. Which area of the spinal cord contains gray matter? Inner or outer core?
- b. The \_\_\_\_\_ Horn contains the sensory (afferent) nerves
- c. The \_\_\_\_\_ Horn contains the motor (efferent) nerves
- d. What is the Posterior (Dorsal) Root Ganglion?

26. Describe the anatomical organization of a nerve:

- a. \_\_\_\_\_ – bundle of nerve fibers (axons), surrounded by Perineurium
- b. \_\_\_\_\_ – nerve fibers (axons) bound together, surrounded by Epineurium
- c. \_\_\_\_\_ – individual nerve cell, surrounded by Endoneurium

27. What is a dermatome?

28. Explain a reflex arc, describe putting your hand on a hot stove to moving your hand away, name all the appropriate neurons and any structures of the CNS involved.

- a. What is the purpose of reflexes?
- b. What type of reflex is this example?
  - i. Stretch Reflex –
  - ii. Tendon Reflex –
  - iii. Flexor (Withdrawal) Reflex –
  - iv. Crossed Extension Reflex –

29. Name the spinal cord/spinal nerve disorder:

- a. \_\_\_\_\_ - Congenital defect, one/more vertebrae fail to enclose spinal cord and it grows outside of body
- b. \_\_\_\_\_ - Recurrence of *Varicella zoster* virus, Painful itching and fluid-filled vesicles along nerve
- c. \_\_\_\_\_ – Loss of sensation and motor control of both arms and legs
- d. \_\_\_\_\_ – Loss of sensation and motor control in both legs, arms still useable

30. Name two functions of the structures of the ear.

31. Outer Ear:

- a. What is the auricle (pinna) and why is it important for hearing?
- b. What is the function of ceruminous glands? –
- c. What do guard hairs protect?
- d. What is an infection of the outer ear called?
- e. Technical name for the ear drum?

32. Middle Ear:

- a. Name the ossicles in order in which they transmit vibrations from the ear drum to the oval window.
- b. Name the tube that connects the middle ear to the throat.
- c. What is an infection of the middle ear called?

33. Inner ear, Cochlea:

- a. What is the function of the cochlea?
- b. Use the following terms to describe the path of vibrations through the cochlea until they are turned into electrical signals: Cochlear Duct, Cochlear Nerve, Endolymph, Hair Cells, Organ of Corti, Oval Window, Perilymph, Round Window, Stapes, Tectorial Membrane, Tympanic Duct, Vestibular Duct,

34. How do we hear different volumes of sound and different pitches?

35. Explain the difference between conductive hearing loss and sensorineural hearing loss.
36. Inner ear, Semicircular Canals and vestibule:
- What is the function of these structures?
  - Use the following terms to describe how the brain detects movements of the head: Ampullae, Cupulae, Hair Cells, Nerve Cells, Semicircular Canal, Vestibular Nerve
  - Use the following terms to describe how the brain detects movements of the head: Hair Cells, Maculae, Nerve Cells, Otoliths, Saccule & Utricle, Vestibular Nerve, Vestibule
37. Describe the path of a tear from being produced in the lacrimal gland to draining through the nose when crying.
38. Extrinsic eye muscles: Describe the movement of each.
- Superior/Inferior Rectus Muscles
  - Medial/Lateral Rectus Muscles
  - Superior/Inferior Oblique Muscles
39. Name the mucous membrane that lines the eye lids and anterior part of the eye (except at the cornea).
- Why does it seem to heal so quickly when you scratch it?
40. Tunics of the eyeball, name the structures:
- Tunica Fibrosa (Fibrous Layer) - Outer fibrous layer
    - \_\_\_\_\_ – dense, collagenous white layer
    - \_\_\_\_\_ – transparent area of sclera, allows in light
  - Tunica Vasculosa (Vascular Layer) - Middle vascular Layer
    - \_\_\_\_\_ – vascular, pigmented, dark layer behind retina
    - \_\_\_\_\_ – muscular ring, supports lens and iris, produces aqueous humor
    - \_\_\_\_\_ – support lens and iris from ciliary body
    - \_\_\_\_\_ – colored diaphragm that controls size of pupil
    - \_\_\_\_\_ – central opening of iris, allows in light

c. Tunica Interna (Inner Layer)

- i. \_\_\_\_\_ – layer where light is focused to form an image
- ii. \_\_\_\_\_ – beginning of optic nerve, where retinal nerves converge

41. Describe the structure and function of...

- a. Cornea –
- b. Lens -

42. Humors of the eye:

- a. Explain the difference between aqueous humor and vitreous humor
- b. What is the canal of schlemm ?

43. Name the parts of the retina:

- a. \_\_\_\_\_ – patch of cells where light is focused on retina
- b. \_\_\_\_\_ – center of macula lutea, where cones are densely packed, area of sharpest vision
- c. \_\_\_\_\_ – photoreceptor cells activated by many wavelengths of light, not a clear image
- d. \_\_\_\_\_ – photoreceptor cells activated by specific wavelengths, detect color, clear image
- e. \_\_\_\_\_ - Nerve cells which send signals from rods and cones to ganglion cells
- f. \_\_\_\_\_ - Nerve cells which transmit signals to optic nerve

44. The optic disc creates a blind spot, what structure leads off the back of the eye behind the optic disc?

45. Name the disorders of the eye:

- a. \_\_\_\_\_ -cornea or lens is too rounded or too flat
- b. \_\_\_\_\_ - Cloudiness of lens
- c. \_\_\_\_\_ - excess aqueous humor in anterior chamber increases pressure, blindness may result
- d. \_\_\_\_\_ - Focal length < eyeball length, image is focused in front of retina
- e. \_\_\_\_\_ -Focal length > eyeball length, image is focused behind retina
- f. \_\_\_\_\_ – farsightedness with age; lens not as elastic, cannot return to same thickness
- g. \_\_\_\_\_ -Inability to detect certain colors properly, due to defective cones
- h. \_\_\_\_\_ -Macula lutea cells die, resulting in vision loss