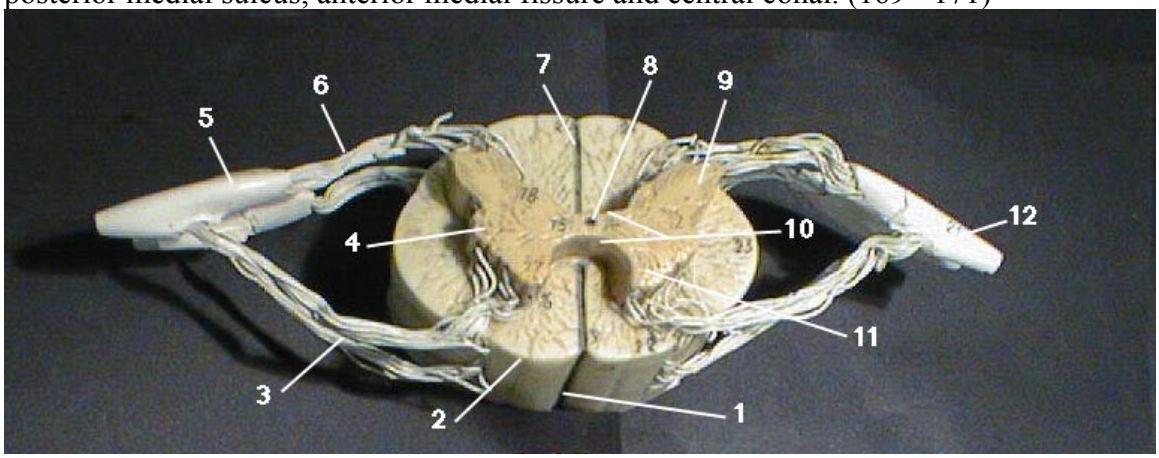
A&P Final Exam Study Guide

GUARANTEED QUESTIONS:

1. In the spinal cord what does the grey matter do and what does the white matter do? (171)
Grey Matter: Integrates somatic reflexes of skeletal muscle and autonomic reflexes (reflex arch)
White Matter: Myelinated nerves which carry signals up and down the spinal cord, to and from the brain.

2. On a diagram of a cross section of the spinal cord be able to identify the grey commissure, anterior grey horns, posterior grey horns, posterior roots, anterior roots, posterior medial sulcus, anterior medial fissure and central conal. (169 - 171)



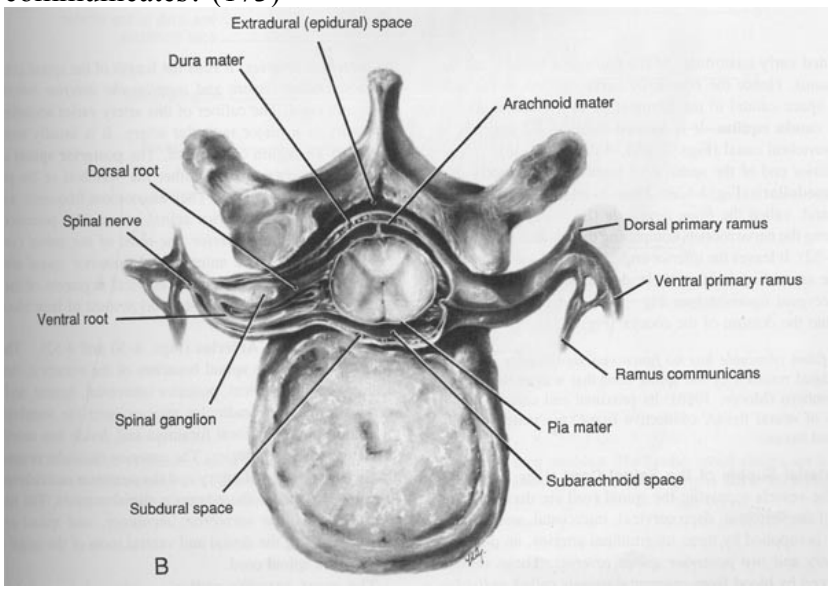
10. Grey commissure
11. Anterior grey horns
9. Posterior grey horns
6. Posterior roots
3. Anterior roots
7. Posterior medial sulcus
1. Anterior medial fissure
8. Central canal

3. What do the posterior roots and anterior roots connect to? (171)
Posterior roots connect the afferent (sensory) nerves to the posterior grey horn
Anterior roots connect the efferent (motor) nerves to the anterior grey horn

4. How many pairs of cervical, thoracic, lumbar, sacral and coccygeal nerves are there? (172)
Cervical: 8 pair
Thoracic: 12 pair
Lumbar: 5 pair
Sacral: 5 pair
Coccygeal: 1 pair

5. What are rami? What are plexuses? (172)
Rami: Branches of the spinal nerves. At short distance after leaving the intervertebral foramen the spinal nerves branch into a number of branches called rami.
Plexuses: Come from junctions of several ventral ramus which then branch out to an area/part of the body which they control.

6. Be able to identify the following rami on a diagram of a cross section of the spinal cord and explain what they control: dorsal ramus, ventral ramus, meningeal branch, and rami communicates? (173)



Dorsal ramus: Serves the skin and dorsal surface of the trunk.
Ventral ramus: Major branch of the spinal nerves, form the plexuses, serves most of the body.
Rami communicates: Part of the sympathetic nervous system, have paravertebral ganglia on them, send signals out to the organs.
Meningeal branch: Loop back into the vertebra to control the inside of the vertebral column.

7. Where are the following plexuses located and what parts of the body do they control: cervical plexus, branchial plexus, lumbar plexus, and sacral plexus? (173)
Cervical plexus (C1-C5): Serves the skin and muscles of the head, neck, and superior part of the shoulders.
Branchial plexus (C4-C8, T1 & T2): Supplies the shoulders and upper limbs
Lumbar plexus (L1-L5): Serves the abdominal walls, external genital, and part of the lower limbs.
Sacral plexus (L4, L5, S1-S4): Serves the buttocks, perineum and lower limbs.

8. What part of the brain controls the autonomic nervous system? (176)
The hypothalamus (in conjunction with the brainstem) controls the autonomic nervous system.

9. What functions do the sympathetic and parasympathetic nerve fibers have? (176-179)
Sympathetic:

- **Increase**
  - **Heart rate**
  - **Vasoconstriction in most tissues**
  - **Breathing rate**
  - **Pupil dilation**
  -
- **Decrease**
  - **Contraction of the gut**
  - **Release of digestive enzymes**
- **Other**
  - **Sweat glands**
  - **Arrector pili muscles**
  - **Blood vessels in skin**
  - **Adrenal gland causing the release of norepinephrine and epinephrine**
  - **Kidney**
  - **Adipose cells**

Parasympathetic:

- **Decrease**
  - **Heart rate**
  - **Vasoconstriction in most tissues**
  - **Breathing rate**
  - **Pupil dilation**
  -
- **Increase**
  - **Contraction of the gut**
  - **Release of digestive enzymes**
- **Other**
  - **SLUD: Salivation, Lacrimation, Urination, Defecation**

10. Which vertebral and cranial nerves go out to the sympathetic and parasympathetic divisions of the autonomic nervous system? (176 & 178)
Sympathetic: T1-T12 & L1 – L2
Parasympathetic: Cranial III, VII, IX & X and S2- S4

11. Explain the difference in the structure of the sympathetic and parasympathetic nervous systems.

	Sympathetic	**Parasympathetic**
Nerve Locations	**T1-T12 & L1 – L2**	**Cranial 3, 7, 9, 10 S2 – S4**
Preganglionic neurons	**Same**	**Same**
Ganglia location	**Paravertebral**	**Intramural (within organs)**

Postganglia neurons	**Cholinergic and Adrenergic**	**Cholinergic**

12. What four basic body functions are controlled by the parasympathetic nervous systems. (179)
Salivation
Lacrimation
Urination
Defecation

13. Which nerve junctions in the autonomic nervous system are cholinergic and which are adrenergic? What neurotransmitters are used by cholinergic and andrenergic nerves? (179 & 180)

	Preganglionic	**Postganglionic**
Sympathetic	**Cholinergic**	**Cholinergic/Adrenergic**
Parasympathetic	**Cholinergic**	**Cholinergic**

Cholinergic: Acetylcholine
Adrenergic: Norepinephrine

14. What gland produces the hormones epinephrine and norepinephrine? What causes the release of these hormones and what do they do?
The adrenal gland produces the hormones epinephrine and norepinephrine. They are releases when the sympathetic nervous system tells the adrenal gland to do so.

15. What is sensory adaptation? (182)
Certain sensory neurons (phasic sensory receptors; smell, temp, taste, etc) will quit firing if the stimulus remains constant.

16. Explain the touch reception of the following types of touch receptors in the skin? – Meissner's corpuscles, Merkel discs, Pacinian corpuscles, Ruffin's corpuscles, root hair plexuses. (186-187)

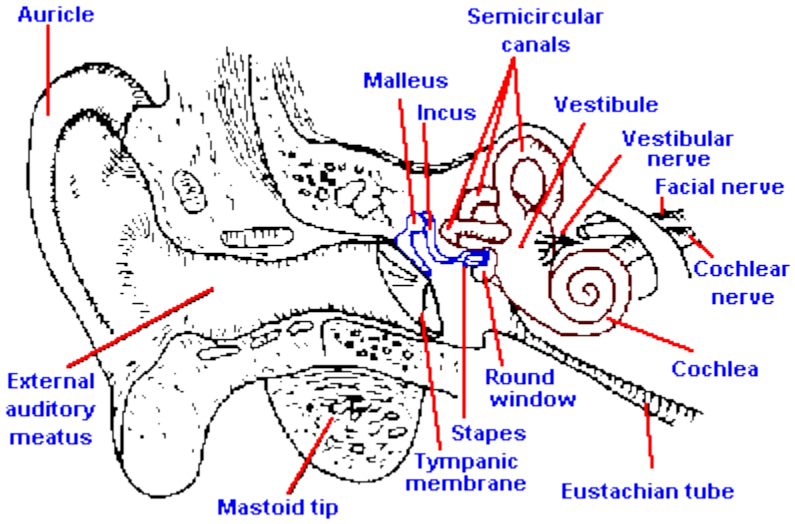
- **Meissner's corpuscles – Egg shaped receptors located in the dermal papillae near the epidermis. They are very sensitive to touch and respond rapidly. (most sensitive)**
- **Merkel discs – Beds of small receptor cells located in the dermis near the epidermis. Less sensitive then meissner's corpuscles and respond slower. (second most sensitive)**
- **Ruffin's corpuscle – Beds of small receptor cells located deep in the dermis. They are less sensitive then Meissner's corpuscles and respond slower. (third most sensitive)**
- **Pacinian corpuscles – Large oval receptors with many layers like an onion that are deep in the dermis. They sense pressure over large areas. (forth most sensitive)**

- **root hair plexuses – Nerve endings that wrap around the base of the hairs in the dermis and sense when hairs are moved.**

17. What is gestation? What are the four basic tastes? What is olfaction? (183-184)
Gustation – Sense of taste. Senses dissolved chemicals. Located on tongue.
Four basic tastes – Sweet, Sour, Salty, Bitter.
Olfaction – Sense of smell. Sense gaseous chemicals. Located at the top of the nasal passages.

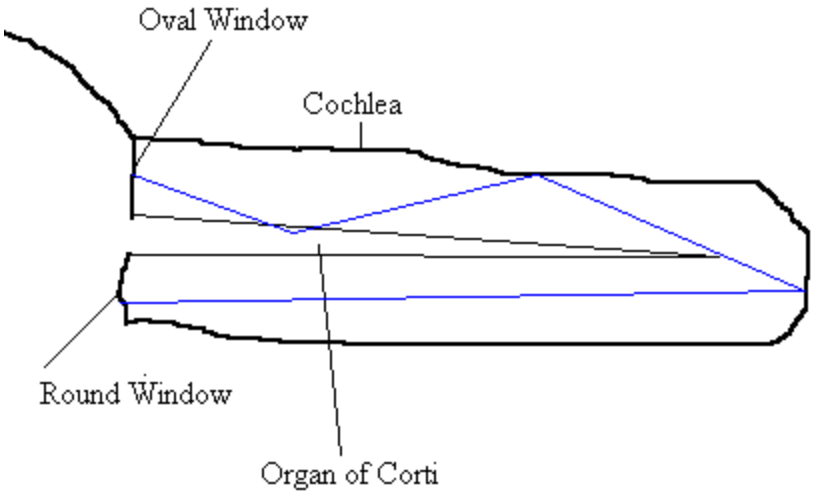
18. What is sound? Explain how frequency and amplitude of sound waves affect sound. (188-189)
Sound: Pressure waves that move in air.
Frequency: The number of wave lengths per unit time, usually measured in hertz (wave lengths per second), related to pitch, high frequency = high pitch, low frequency = low pitch
Amplitude = height of the waves, higher waves = louder.

19. Be able to identify the parts of the ear on a diagram. (189-192)



The sound wave enters the external auditory canal, where it vibrates the ear drum (tympanic membrane). The tympanic membrane vibrates, which causes the malleus (hammer), incus (saddle) and then the stapes (stirrup) to vibrate, which causes the oval window of the cochlea to vibrate. The oval window vibrating causes the fluid in the organ of corti to vibrate bending certain hairs. The hair it bends depends on the frequency (pitch) of the sound and the length of time it bends the hair depends on the amplitude (loudness). The hair is connected to a nerve which transmits the signal to the brain.

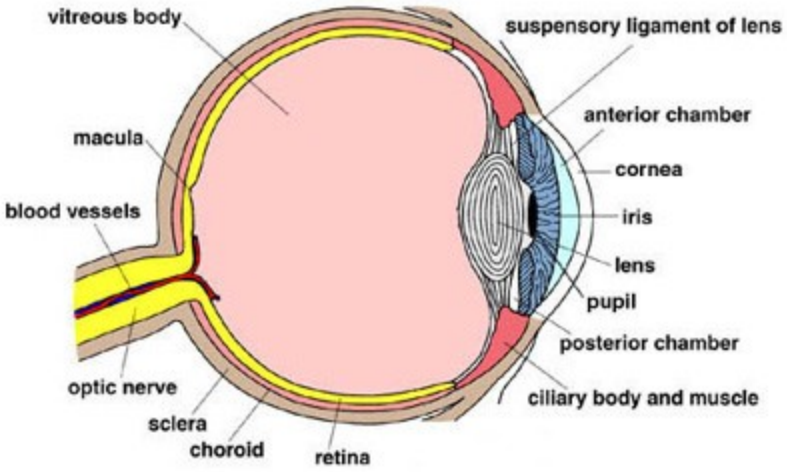
20. Draw a diagram of the cochlea and the organ of corti and clearly explain how the ear detects high and low frequency sounds. How does the ear detect higher amplitude sound waves? (193)

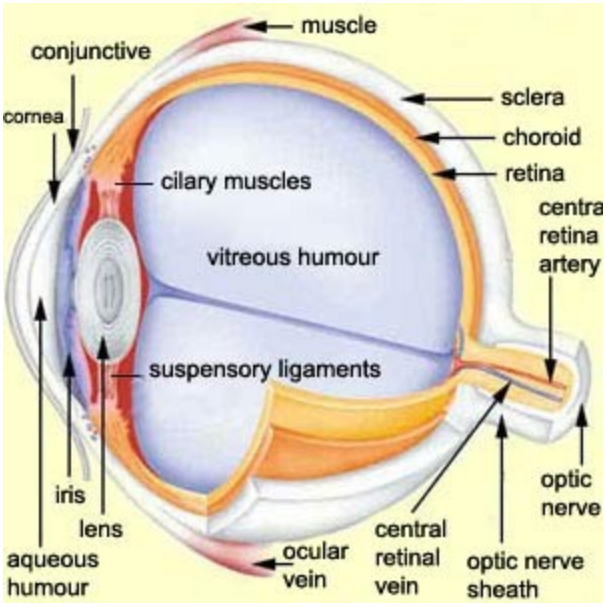


Explanation is above. The blue line is the sound wave moving through the cochlea and passing into the organ of corti where it bends the hair sending the nerve signal.

21. Explain the functions of the utricle, saccule and semicircular canals. What do they detect? What is the information from these structures used for? (196-197)
Utricle & Saccule: Chambers below the semicircular canals that hold the otoliths (ear stones). The otoliths are imbedded in a mass of gelatinous material and sit on top of hairs that extend out of a number of sensory neurons. They help detect changes in gravity and straight line acceleration.
Semicircular Canals: Three fluid filled canals at three different angles (vertical, horizontal, 45º). At the base of each canal is a structure called the copula that contains sensory neurons with hairs that detect when the copula is bent. Determines rotational acceleration in any of the three angles.

22. Be able to identify the parts of the eye on a diagram. (199-200)





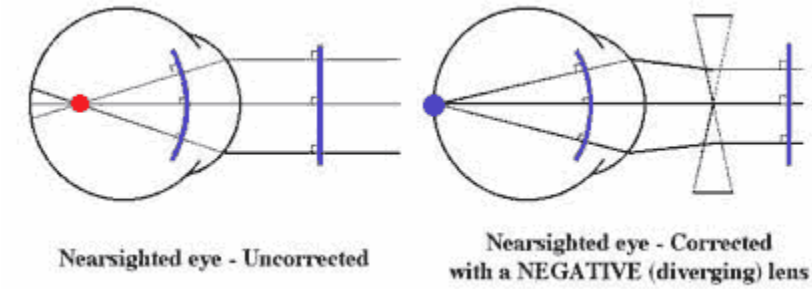
23. What is the difference in acuity and sensitivity between rods and cones in the eye? Be sure to define acuity and sensitivity. (205-209)

Acuity: The ability to resolve (see) fine detail.
Sensitivity: The ability to see at low light levels.
Rods: low acuity and high sensitivity, usually through summation.
Cones: require 50-100 times more light then rod cells (low sensitivity), produce color vision. Much higher acuity.

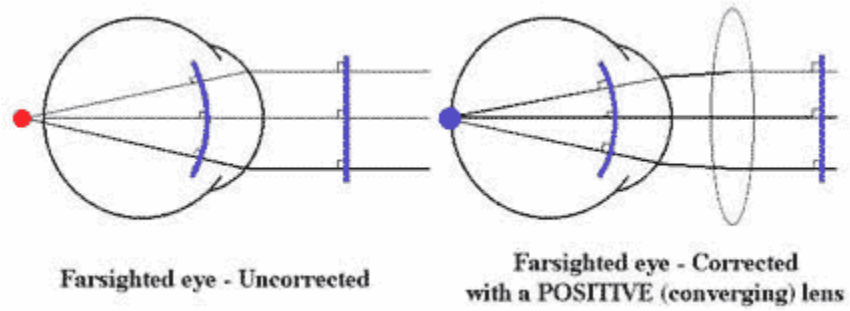
24. Explain how the eye focuses on objects and the changes that occur in the eye to focus on objects close up and far away (201-202)

When the ciliary muscle is not contracted, everything from 20 ft. out is in focus. As objects are brought closer then 20 ft., then the ciliary muscle contracts causing the lens to be compressed and more convex focusing the image back on the retina.

25a. Draw a diagram of the eye and clearly explain why a person would have myopia, hypermetropia, or astigmatism. Be sure to show on your diagram where the image is going to reference to the retina when a person can't see up close or far away. (202-204)



25b. Draw another diagram of the eye of a person with myopia, hypermetropia, or astigmatism and explain how this problem could be corrected with corrective lens. Note, be sure to explain why the person can see up close and far away. (202-204)



26. Be able to explain what the vision numbers from a Snellen eye test chart mean? (e.g. 20/10, 20/20, 20/100)? (204-205)

Snellen eye test: From 20 ft, an eye chart is read, Results are reported as the distance you are from the chart over the distance the average person can read that line from. I.e. 20/20 means you were at 20 ft away and the average person can read the chart from 20 ft away. 20/10 means you were 20 ft away and the average person can only read that line from 10 ft away. 20/30 means the average person could read that line from 30 ft.

27. Explain how color vision is created by cone cells and why color blindness occurs. Why is color blindness more common in men? (209)

Color vision is produced by three cone cells (green sensitive, blue sensitive, and red sensitive). Light that is within the proper wavelength is picked up by each specific cone cells and the brain then can determine the color by merging these three values.

28. Define and explain flicker fusion theory. (210)

The number of pictures that the eye/brain can process in a unit of time. The more pictures per period of time one can process the faster they can react to those images. Humans process 15-50 images per second, flies process 250-300 per second.