

Great — here are 60 very difficult, comprehension-based questions (all in English) derived strictly from CNS Lec 3.pdf.

They are all together: 30 multiple-choice (circle one) followed by 30 True/False. Answers are at the end (Questions 1–60). Good luck studying — these push beyond recall into applying and reasoning with the lecture material.

Multiple Choice — choose the best answer (1–30)

1. The lateral horn of the spinal cord contains the cell bodies of which neurons and is located primarily in which segments?

A. Parasympathetic postganglionic neurons — S2–S4

B. Sympathetic preganglionic neurons — T1–L2

C. Somatic motor neurons — C5–T1

D. Sensory interneurons — L3–S1

2. A myelinated autonomic fiber leaves the spinal cord, enters a white ramus and then the sympathetic trunk. Which of the following is NOT a possible fate of that preganglionic neuron described in the lecture?

A. Synapse at the same level with postganglionic neuron and exit via gray ramus.

B. Travel within the trunk to synapse at a different level.

C. Leave the trunk without synapsing to form a splanchnic nerve.

D. Directly innervate skeletal muscle without synapsing.

3. Which anatomical feature of the sympathetic trunk allows sympathetic preganglionic neurons to influence target tissues at multiple vertebral levels?

A. Presence of white and gray rami communicantes only at lumbar levels

B. Long ascending and descending axonal pathways within the trunk

C. Direct connections to cranial nerves III, VII, IX, and X

D. Preaortic ganglia embedded in the trunk

4. Preganglionic fibers that leave the sympathetic trunk to form splanchnic nerves ultimately synapse primarily in which ganglia?

A. Paravertebral chain ganglia only

B. Preaortic ganglia such as celiac and superior mesenteric

C. Intramural ganglia of the heart

D. Dorsal root ganglia

5. Which statement best explains why sympathetic activation produces widespread effects compared to parasympathetic activation, according to the lecture?

A. Sympathetic preganglionic neurons are unmyelinated and spread slowly.

B. Sympathetic preganglionic neurons synapse with many postganglionic neurons across levels.

C. Parasympathetic preganglionic neurons usually synapse with only 4–5 postganglionic neurons supplying a single effector.

D. Sympathetic postganglionic neurons release only acetylcholine which diffuses widely.

6. Which cranial nerves contain parasympathetic preganglionic fibers as listed in the lecture?

A. I, II, V, and X

B. III, VII, IX, and X

C. III, IV, VI, and VIII

D. V, VII, IX, and XI

7. The lacrimal apparatus is responsible for all the following EXCEPT:

A. Producing tears to moisten the cornea

B. Spreading tears across the eye surface

C. Raising the upper eyelid during wakefulness

D. Draining tears into the nasal cavity

8. Which structural statement about the cornea is correct per the lecture?

A. It is the posterior, opaque, protective part of the fibrous tunic.

B. It is the main refractory structure allowing light entry and bending.

C. It contains ciliary processes that produce aqueous humor.

D. It houses the retinal photoreceptors.

9. The choroid's melanin-producing melanocytes primarily serve which functional role?

A. Produce aqueous humor for intraocular pressure

B. Absorb stray light to improve image sharpness on the retina

C. Anchor the extrinsic eye muscles to the sclera

D. Generate the zonular fibers that hold the lens

10. Ciliary processes and the ciliary muscle belong to which layer of the eyeball and perform which paired functions?

A. Fibrous tunic — protect and maintain shape

B. Vascular tunic — produce aqueous humor and change lens shape

C. Inner neural tunic — transduce light into neural signals

D. Accessory tunic — control eyelid movement

11. Which description of the iris muscles and their autonomic control is consistent with the lecture?

A. Radial sphincter muscle constricts pupil under sympathetic stimulation.

B. Circular sphincter pupillae constricts the pupil and is influenced by parasympathetic activity.

C. Iris muscles are skeletal and under voluntary control.

D. Pupil diameter is unaffected by vascular tunic structures.

12. Which is the best functional summary of the levator palpebrae superioris discussed in the lecture?

A. It produces tears and drains them into the lacrimal canaliculi.

B. It raises the upper eyelid to expose the eyeball.

C. It dilates the pupil during low light.

D. It retracts the eyeball into the orbit.

13. Taste buds are comprised of three cell types. Which pairing correctly matches a cell type to its role?

A. Basal cells — transduce chemical stimuli via gustatory hair

B. Gustatory cells — have gustatory hairs projecting through taste pore

C. Supporting cells — generate action potentials sent to cortex

D. Basal cells — function as extrinsic muscles of the tongue

14. Olfactory receptors are best characterized as:

A. Multipolar neurons with microvilli called taste hairs

B. Bipolar neurons with cilia named olfactory hairs projecting into mucus

C. Epithelial supporting cells that secrete aqueous humor

D. Non-neuronal gland cells forming the olfactory glands

15. Which of these is true about the arrangement of general vs special senses as described?

A. General senses are concentrated in the head in complex organs; special senses are scattered.

B. General senses employ anatomically distinct, complex neural pathways; special senses use simple structures.

C. General senses (tactile, thermal, pain, proprioception) are scattered and simple; special senses (vision, hearing, taste, smell) are concentrated and complex.

D. Special senses never rely on cranial nerves.

16. After a preganglionic sympathetic neuron synapses in a same-level paravertebral ganglion, the unmyelinated postganglionic fiber that supplies skin structures typically exits via which route?

A. White ramus to re-enter the spinal nerve

B. Gray ramus to re-enter the spinal nerve

C. Directly via the anterior root to the peripheral nerve

D. Via splanchnic nerve to preaortic ganglia

17. The major refractive elements and structures that adjust focus in the eye mentioned in the lecture are:

- A. Cornea for refraction; ciliary muscle and zonular fibers for changing lens shape
- B. Iris for refraction; retina for accommodation
- C. Sclera for refraction; choroid for accommodation
- D. Lens and vitreous humor only; cornea plays no role

18. Which best explains why the parasympathetic division's effects are described as "limited" in the lecture?

- A. Parasympathetic fibers are absent in cranial nerves.
- B. A single parasympathetic preganglionic neuron typically synapses with only 4–5 postganglionic neurons that all supply one visceral effector.
- C. Parasympathetic postganglionic neurons are located only in the sympathetic trunk.
- D. Parasympathetic actions are always excitatory and therefore brief.

19. Which extrinsic eye muscles are supplied by cranial nerves III, IV, and VI respectively as given in the lecture?

- A. Superior oblique — CN III; Lateral rectus — CN IV; Medial rectus — CN VI
- B. Superior rectus — CN IV; Lateral rectus — CN VI; Inferior oblique — CN III
- C. Most extrinsic muscles — CN III; Superior oblique — CN IV; Lateral rectus — CN VI
- D. All extrinsic muscles — CN V

20. If a preganglionic sympathetic fiber ascends in the trunk to synapse in a cervical ganglion, which target is it most likely to supply according to lecture pathways?

- A. Lower limb blood vessels
- B. Skin structures of the head (sweat glands, arrector pili)
- C. Intrinsic muscles of the eye only via cranial nerve X
- D. Intestinal viscera via pelvic splanchnic nerves

21. Which statement about olfactory glands (Bowman's glands) is supported by the lecture content?
- A. They are responsible for phototransduction in the retina.
 - B. They secrete fluids that help keep the olfactory epithelium surface moist.
 - C. They create the zonular fibers attaching the lens.
 - D. They are the same as taste buds.
22. In the sympathetic two-neuron pathway figure and explanation, where do the preganglionic fibers originate before reaching the sympathetic trunk?
- A. Autonomic centers in the medulla only
 - B. Cell bodies in the lateral horn of T1–L2 spinal segments
 - C. Cranial nerve nuclei III, VII, IX, and X
 - D. Basal cells of sensory epithelia
23. Which description of the sclera in the fibrous tunic is accurate as per the lecture?
- A. The cornea and sclera are both transparent and allow light to pass.
 - B. The sclera is the posterior white portion, is strong and protects the eye, and serves as attachment for extrinsic muscles.
 - C. The sclera secretes aqueous humor.
 - D. The sclera contains the ciliary processes.
24. A lesion destroying the zonular fibers (suspensory ligaments) would directly prevent which ocular function described in the lecture?
- A. Production of tears by lacrimal glands
 - B. Adjustment of pupil diameter by iris muscles
 - C. Transmission of visual signals from retina to cortex
 - D. Changing lens shape during accommodation
25. Which of the following best describes the location and main role of taste buds per the lecture?

- A. Concentrated in the nasal roof; detect airborne odors
- B. Oval structures mainly within tongue papillae; detect dissolved chemicals via gustatory hairs
- C. Located on the retina; responsible for color detection
- D. Embedded in the choroid; regulate intraocular pressure

26. The pathway of sympathetic neurons in the lecture includes which correctly ordered sequence for a fiber that synapses in a different level paravertebral ganglion?

- A. Lateral horn → anterior root → white ramus → sympathetic trunk → ascend/descend → synapse → ramus → spinal nerve → target
- B. Dorsal root ganglion → posterior root → white ramus → synapse in dorsal horn → target
- C. Lateral horn → cranial nerve → intramural ganglion → target
- D. Nucleus ambiguus → vagus nerve → paravertebral ganglion → target

27. Which statement best reflects the anatomical distinction between general and special senses given in the lecture?

- A. General senses use complex organs and are concentrated in the head; special senses use simple receptors scattered widely.
- B. Special senses include tactile, thermal, pain, and proprioception.
- C. Special senses are anatomically distinct structures localized in the head and use complex neural pathways; general senses are scattered and simple.
- D. General senses do not project to the CNS.

28. The pupil allows light to pass to the lens. Which pair correctly links iris muscle type to its muscle arrangement and effect on pupil diameter?

- A. Sphincter pupillae — radial arrangement — dilates pupil
- B. Dilator pupillae — circular arrangement — constricts pupil
- C. Sphincter pupillae — circular arrangement — constricts pupil; Dilator pupillae — radial arrangement — dilates pupil
- D. Both muscles are skeletal and contract voluntarily to change pupil size

29. Which among these is NOT listed as an accessory structure of the eye in the lecture?

A. Eyelids

B. Lacrimal apparatus

C. Retina

D. Extrinsic eye muscles

30. Considering the cells in taste buds, which process is essential for a gustatory cell to relay taste information to the nervous system?

A. Release of aqueous humor into the taste pore

B. Extension of a gustatory hair (microvillus) through the taste pore to interact with dissolved chemicals

C. Ciliary muscle contraction to propel tastants

D. Melanin pigment absorption of taste molecules

True / False — mark True (T) or False (F) (31–60)

31. The autonomic nervous system (ANS) is a part of the peripheral nervous system and operates unconsciously to control cardiac muscle, smooth muscle, and glands. (T/F)

32. All autonomic preganglionic fibers arise from autonomic centers in the cerebellum and pass solely through cranial nerves. (T/F)

33. The sympathetic trunk is a chain of ganglia located on each side of the vertebral column. (T/F)

34. Gray rami communicantes carry myelinated preganglionic sympathetic fibers into the sympathetic trunk. (T/F)

35. Preganglionic sympathetic fibers can pass through the sympathetic trunk without synapsing and form splanchnic nerves that synapse in preaortic ganglia. (T/F)

36. Parasympathetic preganglionic neurons are described as craniosacral because their fibers exit the CNS via cranial nerves III, VII, IX, X and sacral segments S2–S4. (T/F)

37. A single parasympathetic preganglionic neuron typically synapses with many dozens of postganglionic neurons producing a diffuse effect. (T/F)

38. General senses include visceral sensations and proprioception and are detected by simple, scattered

red receptors throughout the body. (T/F)

39. Special senses are concentrated in the head, anatomically distinct, and involve complex neural pathways. (T/F)

40. Olfactory receptor neurons are bipolar cells with olfactory cilia called olfactory hairs projecting into the mucus layer. (T/F)

41. Olfactory glands produce secretions that help to dry and harden the olfactory epithelium. (T/F)

42. Gustatory cells possess a gustatory hair (microvillus) that projects through a taste pore to detect dissolved tastants. (T/F)

43. The cornea is posterior and pigmented and functions mainly to absorb stray light. (T/F)

44. The sclera is the white, protective posterior part of the fibrous tunic and serves as an attachment site for extrinsic eye muscles. (T/F)

45. Ciliary processes produce aqueous humor; zonular fibers (suspensory ligaments) attach the lens to the ciliary body. (T/F)

46. The ciliary muscle is a smooth muscle that alters the shape of the lens for accommodation. (T/F)

47. The iris dilator and sphincter muscles are innervated only by somatic motor fibers. (T/F)

48. The pupil is simply an opening in the iris; the amount of light entering the eye is regulated by muscular changes in the iris. (T/F)

49. The levator palpebrae superioris elevates the lower eyelid during sleep. (T/F)

50. Extrinsic eye muscles originate outside the eyeball in the bony orbit and insert on the sclera's outer surface. (T/F)

51. The choroid's melanin-producing cells help sharpen the retinal image by absorbing stray light. (T/F)

52. The cornea is the major refractive structure of the eye and is opaque. (T/F)

53. Parasympathetic preganglionic fibers travel in cranial nerve X (vagus) to supply thoracic and most abdominal viscera. (T/F)

54. Postganglionic sympathetic fibers that supply skin appendages typically rejoin the spinal nerve via the gray ramus. (T/F)

55. Taste buds are found primarily on the papillae of the tongue and are composed of gustatory cells, supporting cells, and basal cells. (T/F)

56. The palpebral fissure is the muscle that spreads tears across the eye surface. (T/F)

57. Special senses always share identical receptive cell types and developmental origins across smell, taste, vision, hearing, and equilibrium. (T/F)

58. The white ramus contains myelinated preganglionic sympathetic fibers connecting the spinal nerve to the sympathetic trunk. (T/F)

59. The sympathetic division is also referred to as the thoracolumbar division. (T/F)

60. A preganglionic parasympathetic neuron that exits through S2–S4 forms pelvic splanchnic nerves which contribute to pelvic organ innervation. (T/F)

Answers — correct choice for each question (1–60)

1. B

2. D

3. B

4. B

5. C

6. B

7. C

8. B

9. B

10. B

11. B

12. B

13. B

14. B

15. C

16. B

17. A

18. B

19. C

20. B

21. B

22. B

23. B

24. D

25. B

26. A

27. C

28. C

29. C

30. B

31. T

32. F

33. T

34. F

35. T

36. T

37. F

38. T

39. T

40. T

41. F

42. T

43. F

44. T

45. T

46. T

47. F

48. T

49. F

50. T

51. T

52. F

53. T

54. T

55. T

56. F

57. F

58. T

59. T

60. T

If you want these exported as a single printable file (PDF or Word) with a clean layout and answer key at the end, I can generate that now and provide a download link. Do you want a PDF or a Word doc?