

Neural Control and Coordination Important Questions With Answers

NEET Biology 2023

1. Wax gland present in the ear canal is called:

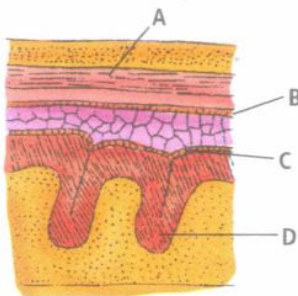
- a) sweat gland b) prostate gland c) cowper's gland **d) sebaceous gland/ceruminous gland.**

Solution : -

Ear canal is lined by hairy skin and ceruminous glands (wax glands). These glands secrete a waxy substance cerumen (ear wax) which prevents the foreign bodies entering the ear.

2. The given figure shows a section of brain. Identify the parts labelled as A, B, C and D and match them with the names (i - vii) given below.

- (i) Arachnoid membrane (ii) Subdural space (iii) Duramater (iv) Bone (v) White matter (vi) Grey matter (vii) Piamater



- | |
|------------------|
| a) |
| A B C D |
| (iii)(ii)(vi)(v) |
- | |
|------------------|
| b) |
| A B C D |
| (i)(ii)(iii)(vi) |
- | |
|--------------------------|
| c) |
| A B C D |
| (iii)(i)(vii)(vi) |
- | |
|------------------|
| d) |
| A B C D |
| (iv)(vii)(i)(ii) |

3. The correct sequence of meninges from inner to outer side is

- a) duramater → arachnoid membrane → pia mater
 b) duramater → pia mater → arachnoid membrane
c) piamater → arachnoid membrane → duramater
 d) arachnoid membrane → duramater → pia mater.

Solution : -

Meninges are the three connective tissue membranes that enclose the brain and spinal cord. Piamater is the innermost membrane which is thin, delicate and vascular. The next membrane is arachnoid which is thin and webby. Duramater is the outermost membrane which is tough, dense and fibrous in nature.

4. What is the correct path of a reflex arc?

- a) Sensory stimulus → Dendrite → Axon** b) Motor nerves → Acetylcholine → Adjustor neuron
 c) Efferent nerves → Connector nerves → Motor nerves
 d) Afferent nerves → Efferent nerves → Connector nerves

Solution : -

The correct pathway of reflex arc is: Sensory stimulus → Dendrite of sensory neuron → Axon of sensory neuron → CNS → Dendrite of motor neuron → Axon of motor neuron → Effector organ.

5. The human hind brain comprises three parts, one of which is _____
a) Spinal cord b) Corpus callosum **c) Cerebellum** d) Hypothalamus

Solution : -

The human hind brain comprises three parts, one of which is cerebellum.

6. Satiety centres of brain are present in
a) cerebral hemisphere **b) hypothalamus** c) cerebellum d) medulla oblongata.
7. **Assertion:** The space between the cornea and the lens is called the vitreous chamber.
Reason: The space between the lens and retina is called the aqueous chamber.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. **d) If both assertion and reason are false.**

Solution : -

The space between the cornea and the lens is called the aqueous chamber and contains a thin watery fluid called aqueous humor. The space between the lens and the retina is called the vitreous chamber and is filled with a transparent gel called vitreous humor.

8. Afferent nerve fibres carry impulses from _____
a) effector organs to CNS **b) receptors to CNS** c) CNS to receptors d) CNS to muscles

Solution : -

Afferent nerve fibres are formed of only sensory nerve fibres, conduct nerve impulses from sensory organs or receptors to central nervous system to produce sensation. e.g. optic nerve.

9. The light striking the retina generates nerve impulse. Which of the following options correctly describes the path of light?
a) Photosensory cells → Bipolar neurons → Ganglionic cells → Sensory nerves
b) Sensory nerves → Bipolar neurons → Ganglionic cells → Photosensory cells
c) Sensory nerves → Ganglionic cells → Bipolar neurons → Photosensory cells
d) Photosensory cells → Ganglionic cells → Bipolar neurons → Sensory nerves
10. The shape of eye lens is changed by
a) pupil b) iris c) optic nerve **d) ciliary muscle**

Solution : -

Ciliary muscles are circular sheet of smooth muscle fibres present within the ciliary body. These muscles alter the shape of the lens during contraction.

11. Tree of life is
a) branchial tree b) lymphatic system **c) arbor vitae** d) loop of Henle

Solution : -

Arbor vitae is known as tree of life. Arbor vitae is a branching tree like arrangement of grey and white matter visible in the cross sectional area of cerebellar hemispheres.

12. The electrical potential difference between outside and inside of a nerve axon before excitation is known as
a) resting potential b) action potential c) spike potential d) reaction potential.

Solution : -

The electrical potential difference between outside and inside of a nerve fibre before excitation (polarised nerve fibre) is known as resting potential whose value is -70mV

13. Characteristic feature of human cornea _____
a) Secreted by conjunctiva and glandular b) It is lacrimal gland which secretes tears
c) Blood circulation is absent in cornea
d) In old age it becomes harden and white layer deposits on it which causes cataract

Solution : -

By nature, the outermost layer of the eye ball is fibrous. Two third part of this layer is opaque and lies inside the eyeorbit and is known as sclera. the remaining one- third of the outer layer is transparent and bulges out to form cornea. There is no supply of blood in cornea.

14. When a neuron is in resting state, i.e., not conducting any impulse, then axonal membrane is :
- a) Comparatively more permeable to Na^+ ions and nearly impermeable to K^+ ions
 - b) Equally permeable to both Na^+ and K^+ ions
 - c) Impermeable to both Na^+ and K^+ ions**
 - d) Comparatively more permeable to K^+ ions and nearly impermeable to Na^+ ions

Solution : -

When a neuron is not conducting any impulse, i.e., resting, the axonal membrane is comparatively more permeable to potassium ions (K^+) and nearly impermeable to sodium ions (Na^+).

15. The primary visual area is located in
- a) temporal lobe
 - b) occipital lobe**
 - c) frontal lobe
 - d) parietal lobe.

Solution : -

Occipital lobes are the primary visual areas of the brain. These are situated in the forebrain

16. Chemicals which are released at the synaptic Junction are called
- a) hormones
 - b) neurotransmitters**
 - c) cerebrospinal fluid
 - d) lymph.

Solution : -

A typical synapse consists of a bulbous expansion of a nerve terminal called a pre-synaptic knob lying close to the membrane of a dendrite. The cytoplasm of the synaptic knob contains mitochondria, smooth endoplasmic reticulum, microfilaments and numerous synaptic vesicles. Each vesicle contains neurotransmitter (chemical substance) responsible for the transmission of the nerve impulse across the synapse

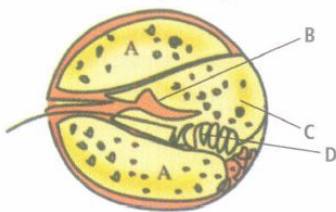
17. Receptor sites for neuro transmitters are present on _____
- a) Pre-synaptic membrane
 - b) lips of axons
 - c) Post synaptic membrane**
 - d) Membrane of synaptic vesicles

Solution : -

Receptor sites for neutro transmitters are present on post-synaptic membrane

18. Which of the following statements is correct regarding cerebellum?
- a) it is a part of hindbrain
 - b) it consists of two cerebellar hemisphere and a vermis
 - c) Arbor vitae is present in cerebellum.
 - d) All of these**
19. While travelling to higher altitudes, people can feel pain in the ear and dizziness. Which part, among the following is involved?
- a) Cochlea, ear ossides
 - b) Tympanic membrane
 - c) Eustachian tube, utricle, saccule and semicircular canals**
 - d) None of the above

20. A diagrammatic cross section of a single loop of human cochlea is shown in the given figure



Which one of the following options correctly represents the names of any three of the labelled parts?

- a) A-endolymph, B-tectorial membrane, D-sensory hair cells
 - b) A-perilymph, B-tectorial membrane, C-endolymph**
 - c) B-tectorial membrane, C-perilymph, D-secretory cells
 - d) A-serum, C-endolymph, D-sensory hair cells
21. In a man, abducens nerve is injured. Which one of the following functions will be affected?

- a) Movement of the eye ball b) Movement of the tongue c) Swallowing **d) Movement of the neck**

Solution : -

Abducens nerve is the sixth cranial nerve. It innervates the extraocular muscle (superior oblique) of eyeball, therefore controls movement of the eyeball.

22. In the resting state of the neural membrane, diffusion due to concentration gradients, if allowed, would drive

- a) K^+ into the cell b) K^+ and Na^+ out of the cell **c) Na^+ into the cell** d) Na^+ out of the cell

Solution : -

Na^+ concentration in a resting state of the neural membrane is higher on the outer side and K^+ concentration is more inside the cell. This concentration gradient is maintained by voltage gated channels. Thus if diffusion is allowed Na^+ would enter the cell and K^+ would leave.

23. The size of pupil is controlled by the

- a) ciliary muscles b) suspensory ligaments c) cornea **d) iris muscles**

Solution : -

The size of pupil is controlled by two types of muscles of iris, circular muscles and radial muscles. Radial muscles contract in dim light and circular muscles contract in bright light.

24. Which of the following statements is incorrect?

- a) Sympathetic neural system controls and coordinates organs which are under voluntary control.**
b) Deficiency of vitamin A can causes night blindness c) Malleus is the largest ear ossicle
d) Cranial nerve IX is a mixed nerve

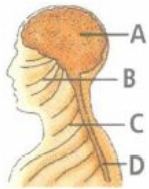
Solution : -

Sympathetic neural system is a part of autonomic nervous system. It controls and coordinates organs which are under involuntary control

25. Which of the following statements are correct regarding $Na^+ - K^+$ pump?

- (i) Needs energy (ATP) to work
(ii) Expels 3 Na^+ for every 2 K^+ ions imported
(iii) Works against a concentration gradient
(iv) Maintains resting potential
a) (i) and (iv) b) (ii) and (iii) c) (i) and (iii) **d) All of these**

26. In the accompanying diagram of a part of the human body, the structures belonging to the central neural system are labelled as



- a) A and C b) B and C **c) A and D** d) C and D

Solution : -

In the given figure, structures A and D are brain and spinal cord respectively, and these structures belong to central neural system. Structures 'B' and 'C' are the nerves arising from brain and spinal cord respectively and thus they belong to peripheral neural system.

27. Which of the following is not a reflex action?

- a) Salivation **b) Sweating** c) Withdrawal of hand when pinched by needle d) None of these

Solution : -

An automatic (involuntary) neuromuscular action elicited by a defined stimulus is called reflex action. Sweating is not a reflex action. It is primarily a means of temperature regulation.

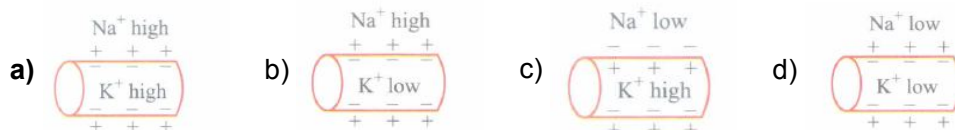
28. Which part of the brain is responsible for thermoregulation?

- a) **Hypothalamus** b) Corpus callosum c) Medulla oblongata d) Cerebrum

Solution : -

Hypothalamus in the thermoregulatory centre of our brain. It is responsible for maintaining constant body temperature.

29. Which of the following options illustrates the distribution of Na^+ and K^+ ions in a section of non-myelinated axon which is at resting potential?



Solution : -

When a neuron is at resting potential, i.e., not conducting any impulse, the axonal membrane is comparatively more permeable to K^+ ions and nearly impermeable to Na^+ ions. Consequently, the axoplasm inside the axon contains high concentration of K^+ ions. In contrast, the fluid outside the axon has a high concentration of Na^+ ions and thus, forms a concentration gradient.

30. **Assertion :** The inner ear contains three ossicles (malleus, incus and stapes) which are attached to one another in a chain-like fashion.

Reason : The stapes is attached to the tympanic membrane and the malleus is attached to the oval window of the cochlea.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. **d) If both assertion and reason are false.**

Solution : -

The middle ear contains three ossicles called malleus, incus and stapes which are attached to one another in a chain-like fashion. The malleus is attached to the tympanic membrane and the stapes is attached to the oval window of the cochlea. The ear ossicles increase the efficiency of transmission of sound waves to the inner ear.

31. Which of the following is regarded as a unit of nervous tissue?

- a) Myelin sheath b) Axons c) Dendrites **d) Neurons**

Solution : -

The nervous tissue is made up of nerve cells (the repeating units) also called neurons. Each neuron has a cell body or cyton and two kinds of cell processes

- (a) Dendrons, come out from cyton.
 (b) Axon, an elongated nerve fibre.

32. Read the given paragraph. In the resting state, the axonal membrane is (i) with more (ii) charged ions outside than inside. This unequal distribution of ions is due to (1) the selective permeability of the membrane, which forms an almost impenetrable barrier to (iii) and (2) the action of the (iv), which pumps (v) Na^+ out of the neuron for every (vi) K^+ brought in.

Select the option that correctly fills the blanks in the paragraph.

a)

(i)	(ii)	(iii)	(iv)	(v)	(vi)
depolarised	positively	Na ⁺	potassium pump	three	two

b)

(i)	(ii)	(iii)	(iv)	(v)	(vi)
depolarised	negatively	Na ⁺	potassium pump	three	two

c)

(i)	(ii)	(iii)	(iv)	(v)	(vi)
polarised	negatively	Na ⁺	potassium pump	three	two

d)

(i)	(ii)	(iii)	(iv)	(v)	(vi)
polarised	positively	Na⁺	potassium pump	three	two

33. The transparent lens in the human eye is held in its place by _____ .

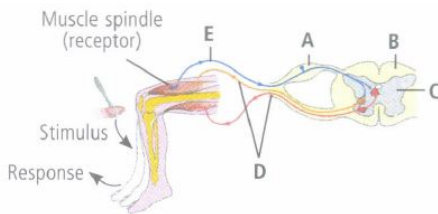
- a) smooth muscles attached to the iris b) ligaments attached to the iris
c) ligaments attached to the ciliary body d) smooth muscles attached to the ciliary body

Solution : -

The lens in the human eye is held in place by the suspensory ligaments attached to the ciliary body. The function of other components are as follows:

1. The smooth muscles attached to the ciliary body helps to control the shape of lens.
2. Smooth muscles of iris help in regulating the diameter of pupil.
3. Pactinate ligament attached to iris is involved in the drainage of aqueous humor because it contains spaces between the fibres.

34. The given diagrammatic representation of reflex action shows knee jerk reflex.



Identify the parts labelled as A to E and select the correct option.

a)

A	B	C	D	E
Dorsal root ganglion	White matter	Grey matter	Afferent pathway	Efferent pathway

b)

A	B	C	D	E
Dorsal root ganglion	White matter	Grey matter	Efferent pathway	Afferent pathway

c)

A	B	C	D	E
Ventral root ganglion	Grey matter	White matter	Efferent pathway	Afferent pathway

d)

A	B	C	D	E
Ventral root ganglion	White matter	Grey matter	Efferent pathway	Afferent pathway

35. Human body temperature is maintained by
a) hypothalamus b) medulla oblongata c) pituitary d) cerebral cortex.

Solution : -

Hypothalamus is a part of forebrain. It is the thermoregulatory centre of the brain. It keeps body temperature at roughly 37°C by means of a complex thermostat system.

36. Saltatory conduction of impulse occurs in:

- a) liver cells b) non-myelinated nerve fibres **c) myelinated nerve fibres** d) none of these

Solution : -

The fatty myelin sheath of myelinated nerve fibres prevents the flow of ions between external fluid and fluid present within the axon. At the node of Ranvier, the insulating myelin sheath is absent and thus, the ionic flow occurs at these points only. Therefore, the action potential jumps from node to node, due to which the

transmission of impulse is more rapid in myelinated fibres. This is called the saltatory conduction of nerve impulse.

37. Match column I with column II and select the correct option from the given codes

	Column I		Column II
A.	Pinna	(i)	Collects vibrations in the air which produces sound
B.	Ear canal	(ii)	Passage for sound wave from pinna to ear drum
C.	Tympanic membrane	(iii)	Transfers sound wave to ear ossicles
D.	Ear ossicles	(iv)	Increases the efficiency of transmission of sound waves to the inner ear
E.	Cochlea	(v)	Has hearing receptors
F.	Eustachian tube	(vi)	Equalises the pressure on both sides of ear drum
G.	Auditory nerves	(v)	Impulse transfer from organ of Corti to auditory cortex in temporal lobe of cerebrum

- a) A-(i), B-(ii), C-(iii), D-(iv), E-(v), F-(vi), G-(vii) b) A-(vii), B-(vi), C-(v), D-(iv), E-(iii), F-(ii), G-(i)
 c) A-(i), B-(ii), C-(iv), D-(iii), E-(v), F-(vi), G-(vii) d) A-(i), B-(ii), C-(iii), D-(iv), E-(v), F-(vii), G-(vi)

38. Match column I with column II and select the correct option from the codes given below.

	Column I		Column II
A.	Cornea	(i)	Provides opening for light to enter
B.	Iris	(ii)	Transduces blue, green and red light
C.	Lens	(iii)	Controls the amount of light that enters
D.	Optic nerves	(iv)	Alters the shape of lens
E.	Pupil	(v)	Transmit information to the CNS
F.	Ciliary muscles	(vi)	Focus light directly on retina
G.	Fovea	(vii)	Bends light and protects inner eye

- a) A-(vii), B-(iii), C-(vi), D-(v), E-(i), F-(iv), G-(ii) b) A-(i), B-(ii), C-(iii), D-(iv), E-(v), F-(vi), G-(vii)
 c) A-(vii), B-(vi), C-(v), D-(iv), E-(iii), F-(ii), G-(i) d) A-(vii), B-(iv), C-(vi), D-(v), E-(i), F-(iii), G-(ii)

39. **Assertion:** Medulla contains centres which control respiration, cardiovascular reflexes and gastric secretions

Reason: Medulla contains several neurosecretory cells which secrete hormones.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.
 c) If assertion is true but reason is false. d) If both assertion and reason are false.

Solution : -

The medulla contains centres which control respiration, cardiovascular reflexes and gastric secretions. The hypothalamus is the basal part of diencephalon (forebrain) which contains several groups of neurosecretory cells called nuclei that produce hormones and nerve fibre.

40. Vagus nerve is _____

- a) X b) **IX** c) VII d) V

Solution : -

Vagus nerve is Xth cranial nerve. It is mixed in nature having both sensory and motor fibres.

41. Resting membrane potential is maintained by

- a) hormones b) neurotransmitters c) **ion pumps** d) none of the above

Solution : -

The concentration gradients across the resting membrane are maintained by the active transport of ions by the sodium-potassium pump which transports 3 Na⁺ outward for 2 K⁺ into the cell

42. Read the given statements and select the correct ones.

- (i) Autonomic neural system transmits impulses from the CNS to the voluntary organs and striated muscles of the body.
 - (ii) Unmyelinated nerve fibres do not have Schwann cells which form the myelin sheath.
 - (iii) Axonal membrane of a neuron while not conducting any impulse is comparatively more permeable to potassium ions (K^+) than to sodium ions (Na^+).
 - (iv) A synapse is formed by the membranes of a presynaptic neuron and a post synaptic neuron.
- a) (i) and (ii) b) (ii) and (iii) **c) (iii) and (iv)** d) (i) and (iv)

Solution : -

Autonomic neural system controls and coordinates such organs which are under involuntary control and unstriated muscles of the body. Unmyelinated nerve fibres have Schwann cells which do not form myelin sheath.

43. **Assertion :** When all the three types of cones are stimulated equally, a mosaic of red, green and blue lights is produced.

Reason: Cones are responsible for twilight or scotopic vision.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true but reason is not the correct explanation of assertion.
- c) If assertion is true but reason is false. **d) If both assertion and reason are false.**

Solution : -

In the human eye, there are three types of cones which possess their own characteristic photopigments that respond to red, green and blue lights. The sensations of different colours are produced by various combinations of these cones and their photopigments. When these cones are stimulated equally, a sensation of white light is produced. The daylight (photopic) vision and colour vision are functions of cones and the twilight (scotopic) vision is the function of the rods.

44. What is the space between arachnoid and piamater called?

- a) Supra-arachnoid space **b) Sub-arachnoid space** c) Subdural space d) Meninges

Solution : -

Piamater is the innermost membrane of the brain and arachnoid is the middle membrane. The space between arachnoid and piamater is called sub-arachnoid space. This space is filled with cerebrospinal fluid.

45. Myelin sheath is produced by _____

- a) Astrocytes and Schwann cells b) Oligodendrocytes and Osteoclasts c) Osteoclasts and AskocYtes
- d) Schwann cells and Oligodendrocltes**

Solution : -

Myelin sheath is produced by Schwann cells and Oligodendrocl.tes. Myelin sheath is a greatly extended and modified plasma membrane wrapped around the nerve axon in a spiral fashion. It is secreted by Schwann cells in the peripheral nervous system and oligodendroglial cells in the central nervous system.

46. One of the examples of the action of the autonomous nervous system is _____

- a) swallowing of food b) pupillary reflex **c) peristalsis of the intestine** d) knee-jerk response

Solution : -

Autonomic nervous system is a control system that regulates and coordinates involuntary activities like heart beat, homeostasis, body temperature, breathing, gut peristalsis and secretion of glands. Human intestine shows movements during digestion known as peristalsis

47. **Assertion :** Choroid layer is thick over the posterior two-third of the eye ball but it becomes thin in the anterior part.

Reason : Choroid layer lacks blood vessels. It forms ciliary body in the anterior part of the eye ball.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.
- b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false. **d) If both assertion and reason are false.**

Solution : -

The middle layer, choroid, contains many blood vessels and looks bluish in colour. The choroid layer is thin over the posterior two-third of the eye ball, but it becomes thick in the anterior part to form the ciliary body.

48. Cornea is covered externally by a thin transparent membrane which is called
a) sclerotic **b) conjunctiva** c) choroid d) none of these

Solution : -

Cornea is covered externally by a thin transparent membrane called conjunctiva. This membrane helps to protect the eye ball and keeps it moist

49. Human eye ball consists of three layers and it encloses
a) lens, iris, optic nerve **b) lens, aqueous humor and vitreous humor** c) cornea, lens, iris
d) cornea, lens, optic nerve

50. The respiratory and cardiac centres are located in
a) cerebrum b) diencephalon c) crura cerebri **d) medulla oblongata.**

Solution : -

Medulla oblongata is the posterior most part of the brain. It contains centres which control respiration, salivation, sneezing cardiovascular reflexes and gastric secretions

