

Neural Control and Coordination — NEET Biology PYQ (2005-2019)

Class 11 Biology · 24 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2019 · Q99

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

- (A) Cerebrum
- (B) Hypothalamus
- (C) Corpus callosum
- (D) Medulla oblongata

NEET 2018 · Q142

2. Which of the following structures or regions is incorrectly paired with its function?

- (A) Hypothalamus : production of releasing hormones and regulation of temperature, hunger and thirst.
- (B) Limbic system : consists of fibre tracts that interconnect different regions of brain; controls movement.
- (C) Medulla oblongata : controls respiration and cardiovascular reflexes.
- (D) Corpus callosum : band of fibers connecting left and right cerebral hemispheres.

NEET 2018 · Q169

3. Nissl bodies are mainly composed of

- (A) Nucleic acids and SER
- (B) DNA and RNA
- (C) Proteins and lipids
- (D) Free ribosomes and RER

NEET 2017 · Q83

4. Myelin sheath is produced by:

- (A) Schwann Cells and Oligodendrocytes
- (B) Astrocytes and Schwann Cells
- (C) Oligodendrocytes and Osteoclasts
- (D) Osteoclasts and Astrocytes

NEET 2017 · Q115

5. Receptor sites for neurotransmitters are present on:

- (A) membranes of synaptic vesicles
- (B) pre-synaptic membrane
- (C) tips of axons
- (D) post-synaptic membrane

NEET 2017 (Gujarati paper) · Q53

6. Which of the following ossicles is adhered to tympanic membrane of middle ear?

- (A) Incus
- (B) Stapes
- (C) Utricle
- (D) Malleus

NEET 2017 (Gujarati paper) · Q94

7. The Pacinian corpuscle responds to rapid changes in:

- (A) gravity
- (B) pressure
- (C) temperature
- (D) light intensity

8. Photosensitive compound in human eye is made up of:

- (A) Guanosine and Retinol
- (B) Opsin and Retinal
- (C) Opsin and Retinol
- (D) Transducin and Retinene

AIPMT 2015

9. A gymnast is able to balance his body upside down even in the total darkness because of:

- (A) Organ of corti
- (B) Cochlea
- (C) Vestibular apparatus
- (D) Tectorial membrane

AIPMT 2015

10. Which of the following regions of the brain is incorrectly paired with its function?

- (A) Cerebrum - calculation and contemplation
- (B) Medulla oblongata - homeostatic control
- (C) Cerebellum - language comprehension
- (D) Corpus callosum - communication between the left and right cerebral cortices

AIPMT 2014

11. Which one of the following statements is not correct?

- (A) In retina the rods have the photopigment rhodopsin while cones have three different photopigments
- (B) Retinal is a derivative of Vitamin C
- (C) Rhodopsin is the purplish red protein present in rods only
- (D) Retinal is the light absorbing portion of visual photo pigments

AIPMT 2014

12. Injury localized to the hypothalamus would most likely disrupt:

- (A) co-ordination during locomotion
- (B) executive functions, such as decision making
- (C) regulation of body temperature
- (D) short-term memory

AIPMT 2012 Prelims

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

- (A) Hypothalamus
- (B) Spinal cord
- (C) Corpus callosum
- (D) Cerebellum

AIPMT 2011 Prelims

14. When a neuron is in resting state i.e. not conducting any impulse, the axonal membrane is

- (A) Comparatively more permeable to K^+ ions and nearly impermeable to Na^+ ions
- (B) Comparatively more permeable to Na^+ ions and nearly impermeable to K^+ ions
- (C) Equally permeable to both Na^+ and K^+ ions
- (D) Impermeable to both Na^+ and K^+ ions

15. Select the answer with correct matching of the structure, its location and function

Structure - Location - Function

- (A) Eustachian tube – Anterior part of internal ear – Equalizes air pressure on either sides of tympanic membrane
- (B) Cerebellum – Mid brain – Controls respiration and gastric secretions
- (C) Hypothalamus – Fore brain – Controls body temperature, urge for eating and drinking
- (D) Blind spot – Near the place where optic nerve leaves the eye – Rods and cones are present but inactive here

16. The nerve centres which control the body temperature and the urge for eating are contained in

- (A) Thalamus
- (B) Hypothalamus
- (C) Pons
- (D) Cerebellum

17. Which part of human brain is concerned with the regulation of body temperature?

- (A) Cerebellum
- (B) Cerebrum
- (C) Hypothalamus
- (D) Medulla Oblongata

18. During the propagation of a nerve impulse, the action potential results from the movement of

- (A) Na^+ ions from extracellular fluid to intracellular fluid
- (B) K^+ ions from extracellular fluid to intracellular fluid
- (C) Na^+ ions from intracellular fluid to extracellular fluid
- (D) K^+ ions from intracellular fluid to extracellular fluid

19. During the transmission of nerve impulse through a nerve fibre, the potential on the inner side of the plasma membrane has which type of electric change?

- (A) first positive, then negative and continue to be positive
- (B) first negative, then positive and continue to be positive
- (C) first positive, then negative and again back to positive
- (D) first negative, then positive and again back to negative

20. Which one of the following pairs of structures distinguishes a nerve cell from other types of cells?

- (A) vacuoles and fibres
- (B) flagellum and medullary sheath
- (C) nucleus and mitochondria
- (D) perikaryon and dendrites

21. Which one of the following not act as a neurotransmitter ?

- (A) Acetylcholine
- (B) Epinephrine
- (C) Nor epinephrine
- (D) Cortisone

22. In a man, abducens nerve is injured. Which one of the following functions will be affected ?

- (A) Movement of the eye ball
- (B) Swallowing
- (C) Movement of the tongue
- (D) Movement of the neck

23. Parkinson's disease (characterized by tremors and progressive rigidity of limbs) is caused by degeneration of brain neurons that are involved in movement control and make use of neurotransmitter :

- (A) acetylcholine
- (B) norepinephrine
- (C) dopamine
- (D) GABA

24. Four healthy people in their twenties got involved in injuries resulting in damage and death of a few cells of the following. Which of the cells are least likely to be replaced by new cells ?

- (A) Osteocytes
- (B) Malpighian layer of the skin
- (C) Liver cells
- (D) Neurons

Answer key and explanations

1. Answer: (B) Hypothalamus

The hypothalamus contains centres that control body temperature, hunger and thirst. The medulla controls respiration and cardiovascular reflexes, not temperature.

2. Answer: (B) Limbic system : consists of fibre tracts that interconnect different regions of brain; controls movement.

The limbic system (amygdala, hippocampus and related structures) regulates emotion, sexual behaviour and motivation, not movement; movement is coordinated by the cerebellum and motor cortex. The hypothalamus, medulla oblongata and corpus callosum are paired with their correct roles.

3. Answer: (D) Free ribosomes and RER

Nissl granules in the cell body and dendrites of neurons are clusters of rough endoplasmic reticulum with attached and free ribosomes, reflecting active protein synthesis. They do not contain smooth ER or DNA.

4. Answer: (A) Schwann Cells and Oligodendrocytes

Myelin is formed by Schwann cells around axons in the peripheral nervous system and by oligodendrocytes in the central nervous system. Astrocytes support neurons but do not make myelin, and osteoclasts are bone-resorbing cells.

5. Answer: (D) post-synaptic membrane

Neurotransmitters released into the synaptic cleft bind to specific receptors on the post-synaptic membrane, opening ion channels there. The synaptic vesicles and pre-synaptic axon terminal store and release the transmitter but do not carry its receptors.

6. Answer: (D) Malleus

The malleus is attached to the tympanic membrane, the incus links it to the stapes, and the stapes sits on the oval window of the cochlea. The utricle is part of the vestibular apparatus of the inner ear, not an ossicle.

7. Answer: (B) pressure

Pacinian corpuscles are lamellated mechanoreceptors deep in the dermis that respond to deep pressure and vibration. Temperature is sensed by thermoreceptors, light by photoreceptors and gravity by the vestibular apparatus.

8. Answer: (B) Opsin and Retinal

Rhodopsin, the photopigment of rods (and the cone pigments), consists of the protein opsin bound to retinal, an aldehyde of vitamin A. Retinol is vitamin A alcohol, not the bound chromophore, and transducin is a G-protein in the signalling cascade.

9. Answer: (C) Vestibular apparatus

The vestibular apparatus (semicircular canals and otolith organ) senses body position and movement and keeps balance without needing vision. The organ of Corti, cochlea and tectorial membrane are parts of the hearing mechanism.

10. Answer: (C) Cerebellum - language comprehension

The cerebellum coordinates movement, posture and balance; language comprehension is a function of the cerebral cortex. The other pairings, including corpus callosum linking the two hemispheres, are correct.

11. Answer: (B) Retinal is a derivative of Vitamin C

Retinal, the light-absorbing part of visual pigments, is an aldehyde derived from vitamin A, not vitamin C, so that statement is incorrect. The other statements about rhodopsin in rods and three photopigments in cones are true.

12. Answer: (C) regulation of body temperature

The hypothalamus contains the centres that regulate body temperature (as well as hunger, thirst and pituitary control), so its injury would disrupt thermoregulation. Coordination during locomotion is a cerebellar function, and decision making and short-term memory depend on the cerebrum.

13. Answer: (D) Cerebellum

The hindbrain consists of the pons, cerebellum and medulla oblongata. The hypothalamus is part of the forebrain (diencephalon), the corpus callosum connects the cerebral hemispheres, and the spinal cord is not part of the brain.

14. Answer: (A) Comparatively more permeable to K^+ ions and nearly impermeable to Na^+ ions

At rest the axonal membrane is far more permeable to K^+ ions than to Na^+ ions and nearly impermeable to negatively charged proteins. With the Na^+/K^+ pump, this keeps the inside negative, giving the resting potential.

15. Answer: (C) Hypothalamus - Fore brain - Controls body temperature, urge for eating and drinking

The hypothalamus lies at the base of the forebrain (diencephalon) and has centres for body temperature, hunger and thirst. The Eustachian tube connects the middle ear (not internal ear) with the pharynx, the cerebellum is part of the hindbrain and controls balance, and the blind spot has no rods or cones at all.

16. Answer: (B) Hypothalamus

The hypothalamus contains centres that control body temperature, hunger and thirst. The thalamus is mainly a relay centre for sensory signals, and the cerebellum coordinates movement and balance.

17. Answer: (C) Hypothalamus

The hypothalamus contains centres that control body temperature, hunger and thirst. The cerebellum coordinates movement and balance, and the medulla controls breathing and heart rate.

18. Answer: (A) Na^+ ions from extracellular fluid to intracellular fluid

At the stimulated site voltage-gated Na^+ channels open and Na^+ rushes in from the extracellular fluid, reversing the polarity and producing the action potential. K^+ moving outward causes repolarisation afterwards, not the action potential itself.

19. Answer: (D) first negative, then positive and again back to negative

At rest the inside of the axon is negative (about -70 mV); during the action potential Na^+ influx makes it positive, and K^+ efflux during repolarisation returns it to negative. It does not stay positive after the impulse passes.

20. Answer: (D) perikaryon and dendrites

A neuron has a cell body (perikaryon/cyton) with Nissl granules and branched dendrites, features found only in nerve cells. Nucleus and mitochondria are present in almost all cells, so they cannot distinguish a neuron.

21. Answer: (D) Cortisone

Cortisone is a steroid hormone of the adrenal cortex, not a neurotransmitter. Acetylcholine, epinephrine and norepinephrine are all released at synapses.

22. Answer: (A) Movement of the eye ball

The abducens (VI cranial) nerve supplies the lateral rectus muscle, which turns the eyeball outward, so eye movement is affected. The tongue is moved by the hypoglossal nerve, swallowing involves the glossopharyngeal and vagus nerves, and the neck by the accessory nerve.

23. Answer: (C) dopamine

Parkinson's disease results from the loss of dopamine-producing neurons in the substantia nigra, which regulate movement through the basal ganglia. Treatment therefore replaces dopamine (L-DOPA). Loss of acetylcholine neurons is linked mainly to Alzheimer's disease.

24. Answer: (D) Neurons

Mature neurons are permanently out of the cell cycle (G_0) and are generally not replaced. The Malpighian layer of the skin divides all the time, liver cells can regenerate, and bone is remodelled by osteoblasts.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.