DPP - Daily Practice Problems

Chapter-wise Sheets

Date : _____ **Start Time :** _____ **End Time :** _____

BIOLOGY CB21

SYLLABUS : Neural Control and Co-ordination

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Afferent nerve fibres carry impulses from
(a) effector organs to CNS (b) receptors to CNS
(c) CNS to receptors (d) CNS to muscles

2. The nerve centres which control the body temperature and the urge for eating are contained in:
(a) hypothalamus (b) pons
(c) cerebellum (d) thalamus

3. Rods and cones of eyes are modified
(a) multipolar neuron (b) unipolar neuron
(c) bipolar neuron (d) None of these

4. The nerve transmitter, produced at the synapse and neuromuscular junction, is
(a) GTP (b) ATP
(c) acetylcholine (d) phosphokinase

5. Alzheimer disease in humans is associated with the deficiency of:
(a) glutamic acid
(b) acetylcholine
(c) gamma aminobutyric acid (GABA)
(d) dopamine

6. Which is the example of conditioned reflex ?
(a) Eyes closed when anything enter into it.
(b) Hand took up when piercing with needle.
(c) Salivation in a hungry dog in response to ringing of a bell.
(d) Digestion food goes forward in alimentary canal.

7. The black pigment in the eye which reduces the internal reflection is located in
(a) retina (b) iris
(c) cornea (d) sclerotic

8. Which one of the following does not act as a neurotransmitter ?
(a) Epinephrine (b) Norepinephrine
(c) Cortisone (d) Acetylcholine

RESPONSE GRID					
1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ	8. ⓐⓑⓒⓓ		

Space for Rough Work

9. During the propagation of a nerve impulse, the action potential results from the movement of :
(a) K^+ ions from extracellular fluid to intracellular fluid.
(b) Na^+ ions from intracellular fluid to extracellular fluid.
(c) K^+ ions from intracellular fluid to extracellular fluid.
(d) Na^+ ions from extracellular fluid to intracellular fluid.

10. The cochlea of ear contains
(a) perilymph
(b) aqueous humour
(c) perilymph and endolymph
(d) only endolymph

11. Eustachian tube connects
(a) External ear with middle ear
(b) External ear with internal ear
(c) Middle ear with pharynx
(d) Internal pharyax

12. Mark the incorrect statement
(a) The ear ossicle attached to tympanic membrane is malleus
(b) Opsin (of Rhodopsin) develops from vitamin A
(c) The pressure on ear drum is equalized by eustachian tube
(d) Otolith organ consists of saccule and utricle

13. Frequency of sound is discriminated by
(a) The intensity of movement of basilar fibres of cochlea
(b) The type of fluid - perilymph or endolymph
(c) The site at the cochlear coil
(d) All of these

14. Which one of the following is the correct difference between rod cells and cone cells of our retina?

		Rod Cells	Cone Cells
(a)	Distribution	More concentrated in centre of retina	Evenly distributed all over retina
(b)	Visual activity	High	Low
(c)	Visual pigment contained	Iodopsin	Rhodopsin
(d)	Over all function	Vision in poor light	Colour vision and detailed vision in bright light

15. Saltatory conduction of nerve impulse takes place through :
(a) Myelinated fibre
(b) Non-myelinated fibre
(c) Grey fibres
(d) None of these

16. In which part of the brain corpora quadrigemina is located?
(a) Diencephalon (b) Mesencephalon
(c) Prosencephalon (d) Rhombencephalon

17. A person entering an empty room suddenly finds a snake right in front on opening the door. Which one of the following is likely to happen in his neuro-hormonal control system ?
(a) Sympathetic nervous system is activated releasing epinephrine and norepinephrine from adrenal medulla.
(b) Neurotransmitters diffuse rapidly across the cleft and transmit a nerve impulse.
(c) Hypothalamus activates the parasympathetic division of brain.
(d) Sympathetic nervous system is activated releasing epinephrine and norepinephrine from adrenal cortex.

18. The blind spot is the region where
(a) Image is formed
(b) Cones are numerous
(c) The optic nerve leaves out
(d) Image is formed during the dark

19. In myopia or short sightedness
(a) Image is formed slightly in front of retina because eye ball is longer
(b) Eye ball is normal but image is formed over blind spot
(c) Eye ball is normal but images is formed slightly behind the retina due to faulty lens
(d) Curvature of cornea becomes irregular

20. Sequence of meninges from inner to outside is
(a) Duramater – Archnoid – Piamater
(b) Duramater – Piamater – Arachnoid
(c) Arachnoid – Duramater - Piamater
(d) Piamater- Arachnoid - Duramater

21. Among which one of the following groups of chemicals, all are neurotransmitters?
(a) Glycine, dopamine, melatonin
(b) Somatostatin, serotonin, acetylcholine
(c) Noradrenaline, somatostatin, threonine
(d) Acetylcholine, noradrenaline, dopamine

RESPONSE GRID

9. ⓐⓑⓒⓓ	**10.** ⓐⓑⓒⓓ	**11.** ⓐⓑⓒⓓ	**12.** ⓐⓑⓒⓓ	**13.** ⓐⓑⓒⓓ
14. ⓐⓑⓒⓓ	**15.** ⓐⓑⓒⓓ	**16.** ⓐⓑⓒⓓ	**17.** ⓐⓑⓒⓓ	**18.** ⓐⓑⓒⓓ
19. ⓐⓑⓒⓓ	**20.** ⓐⓑⓒⓓ	**21.** ⓐⓑⓒⓓ		

Space for Rough Work

22. The enzyme required for the conduction of nerve impulse across synapse is:
(a) peroxidase (b) choline acetylase
(c) ascorbic acid oxidase (d) succinic dehydrogenase

23. The purplish red pigment rhodopsin contained in the rods type of photoreceptor cells of the human eye, is a derivative of
(a) Vitamin A (b) Vitamin B_1
(c) Vitamin C (d) Vitamin D

24. During stress condition which of the following nerves start working?
(a) Sympathetic nerves
(b) Parasympathetic nerves
(c) Autonomic nerves
(d) Cranial nerves

25. The gelatinous membrane covering the sensorys hair cells of the ear is known as
(a) Reissner's membrane
(b) tectorial membrane
(c) basilar membrane
(d) neuro-sensory membrane

26. Nerve cells do not divide because they do not have
(a) nucleus (b) centrosome
(c) Golgi body (d) mitochondria

27. Reflex arcs, which involve no processing in the brain, are beneficial because they permit
(a) instantaneous signaling to motor neurons.
(b) avoidance of dangerous stimuli, even without a previously "learned" response.
(c) immediate response to dangerous stimuli.
(d) All of the above

28. Drugs that alter the permeability of the plasma membrane of a neuron have which of the following effects on nerve impulse conduction?
(a) They prevent movement of sodium and potassium ions into and out of the cell, thereby stopping the transmission of the impulse.
(b) They primarily affect conduction along the axon.
(c) They prevent the release of neurotransmitters at synapses.
(d) All of the above

29. The local depolarization of a receptor-cell membrane is called as
(a) inhibitory postsynaptic potential (or IPSP).
(b) action potential.
(c) resting potential.
(d) threshold potential.

30. Action potentials travel along a neuron because _____.
(a) the neuron cytoskeleton conducts electricity as long as an ion gradient is maintained by the sodium-potassium pump
(b) of cytoplasmic streaming within the neuron
(c) they are pulled along by positive-negative attraction
(d) depolarization of the membrane at one point causes an increase of permeability to sodium at the next point

31. Which one of the following structures constitutes the mammalian forebrain?
(a) Cerebrum and cerebellum
(b) Olfactory bulb
(c) Cerebellum and medulla
(d) Thalamus, hypothalamus, and cerebrum

32. If you electrically stimulate a resting neuron in the middle of its axon and cause it to fire an action potential, which of the following will happen ?
(a) The action potential will propagate toward the axon terminal.
(b) The action potential will propagate toward the cell body.
(c) The action potential will propagate toward both the axon terminal and the cell body.
(d) The action potential will not propagate at all.

33. The resting membrane potential for neuron A is –70mV, while the resting potential for neuron B is –50mV. The threshold voltage for the production of an action potential is –35mV for both neurons. Which of the following statements is *false* ?
(a) Neuron A must depolarize by 35mV to reach the threshold voltage.
(b) Neuron B must hyperpolarize by 15mV to reach the threshold voltage.
(c) The inside of both neurons is negatively charged with respect to the outside.
(d) A single EPSP received by neuron A would cause it to depolarize slightly.

RESPONSE GRID					
	22. ⓐⓑⓒⓓ	23. ⓐⓑⓒⓓ	24. ⓐⓑⓒⓓ	25. ⓐⓑⓒⓓ	26. ⓐⓑⓒⓓ
	27. ⓐⓑⓒⓓ	28. ⓐⓑⓒⓓ	29. ⓐⓑⓒⓓ	30. ⓐⓑⓒⓓ	31. ⓐⓑⓒⓓ
	32. ⓐⓑⓒⓓ	33. ⓐⓑⓒⓓ			

Space for Rough Work

34. You are sitting in biology class daydreaming. Your intrinsic heartbeat is controlled by .....
(a) the spinal cord.
(b) the cerebrum.
(c) the medulla.
(d) levels of adrenaline in the blood.

35. The threshold of a neuron is
(a) The amount of inhibitory neurotransmitter required to inhibit an action potential.
(b) The membrane voltage at which an axon potential will be suppressed.
(c) the amount of excitatory neurotransmitter required to elicit an action potential.
(d) The membrane voltage at which the membrane potential develops into an action potential.

36. Which of the following statements about gap juctions or electrical synapses is *false*?
(a) Connexons form molecular tunnels between two cells.
(b) Electrical synapses cannot be inhibitory
(c) Electrical synapses do not allow for temporal summation.
(d) Electrical transmission is very slow and is bidirectional.

37. All but one of the following chemicals are neurotransmitters that function in the human brain. Select the *exception*.
(a) Dopamine (b) Glycine
(c) Atropine (d) Glutamic acid

38. Which of the following cell stop dividing after birth ?
(a) Epithelium (b) Neuron
(c) Glial cells (d) Liver

39. Arbor vitae is composed of
(a) Neuroglea cells (b) Grey matter
(c) White matter (d) All of these

40. Twilight vision is also called
(a) Scotopic vision and is the function of rods
(b) Scotopic vision and is the function of cones
(c) Photopic vision and is the function of rods
(d) Photopic vision and is the function of cones

41. The white matter of the CNS is always
(a) deep to the grey matter
(b) unmyelinated
(c) arranged into tracts
(d) composed of sensory fibers only

42. The pneumotaxic centre in the body is
(a) Heart (b) Lung
(c) Medulla (d) Liver

43. Identify the organ/innervation mismatch
(a) Glossopharyngeal nerve-tongue
(b) Optic nerve-Eye
(c) Facial nerve-Olfactory epithelium
(d) Cochlear nerve-Spiral organ

44. Our ear can hear the frequency of sound waves
(a) 20 to 20,000 cycles/sec
(b) 1000 to 2000 cycles/sec
(c) 5000 to 7000 cycles/sec
(d) 5000 to 10,000 cycles/sec

45. Fenestra ovalis is the opening of –
(a) Cranium (b) Tympanum
(c) Tympanic cavity (d) Brain

RESPONSE GRID					
	34. ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ	**36.** ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ
	39. ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ	**41.** ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ
	44. ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ			

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 21 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP /CB21

1. (b) Afferent nerve fibres – sensory nerve fibres which carry senses from receptors to brain or spinal cord (CNS).
Efferent nerve fibres – motor nerve fibres that carry orders or responses from CNS to effectors (muscles and glands).

2. (a) Hypothalamus contains important nerve centres that controls the body temperature, thirst, hunger, eating, water balance and sexual function.

3. (c) The rods and cones are exceptionally specialized bipolar neurons which have developed some structural features to carry out the transduction of light energy into neuronal signals.

4. (c) The transmission of nerve impulse through synapse requires a chemical neuro transmitter. The most common neurotransmitter is acetylcholine.

5. (b) Alzheimer disease in humans is associated with the deficiency of acetylcholine. Acetylcholine is the neurotransmitter produced by neurons (referred to as cholinergic neurons). Acetylcholine plays a role in skeletal muscle movement, as well as in the regulation of smooth muscle and cardiac muscle. Acetylcholine is synthesized from choline and acetyl coenzyme-A through the action of the enzyme choline acetyltransferase and becomes packaged into membrane-bound vesicles.

6. (c) Conditioned reflexes are acquired reflexes and are dependent on past experiences, training and learning. I.R. Pavlov demonstrated conditioned reflexes in a hungry dog. He called food and salivation in response to it as unconditioned stimulus and sound of bell and salivation in response to bell as conditioned reflexes.

7. (a) The inner layer of the posterior two-thirds of the eyeball consists of a light sensitive layer, called retina that possesses two types of photoreceptors called the rods and the cone cells. Retina reduces the internal reflection, so any damage to it leads to greater internal reflection of light often causing an increase in light sensitivity.

8. (c) Epinephrine or adrenaline, norepinephrine or noradrenaline and acetylchloline are the neurotransmitters. These are released by the nerve fibres to transmit the impulse to the next neurone. Cortisone is not a neurotransmitter.

9. (d) Total sum of physio-electrochemical changes that takes place along the length of nerve fibre is known as nerve impulse.
Change in potential due to stimulation of nerve fibre is called action potential. During propagation of nerve impulse, Na^+ enters inside so (+ve) change is formed inside the membrane. K^+ ions come out.

10. (c) **11. (c)** **12. (b)**

13. (c) The intensity of movement of basilar fibres regulates the loudness or amplitude of sound.

14. (d) **15. (a)** **16. (b)**

17. (a) Epinephrine and norepinephrine are secreted by adrenalmedulla in response to stress of any kind and during emergency situations and are called emergency hormones or hormones of flight, or fight.

18. (c) **19. (a)** **20. (d)** **21. (d)** **22. (b)**

23. (a)

24. (a) During stress condition, stimulation of the sympathetic nerves to adrenal medulla causes large quantities of adrenaline to be released into the blood circulation and then this hormone is carried to the specific tissues of the body where it produces its effect e.g., increase in heart beat.

25. (b) Tectorial membrane is a gelatinous membrane covering the sensory hair cells in the scala media of cochlea.

26. (b) Once differentiated, nerve cells do not divide as they lack mitotic activity. Lack of mitotic activity indicates that they do not have centrosome.

27. (d) Reflex arcs allow for rapid processing and response.

28. (d) These drugs alter perception of stimuli and work mainly at the axon or the synapse

29. (b) An action potential is a localized electrical event—a membrane depolarization at a specific point of stimulation.

30. (d) An influx of sodium depolarizes the membrane and opens more sodium channels, causing still more depolarization, an example of positive feedback.

31. (c) The embryonic forebrain gives rise to the telencephalon and the diencephalon. The thalamus and the hypothalamus develop from the diencephalon; the cerebral cortex develops from the telencephalon.

32. (c) Since the action potential started in the middle of the axon, rather than at the axon hillock as typically occurs, there is no previous patch of membrane currently undergoing a refractory period. The action potential is thus free to propagate in both directions.

33. (b) Hyperpolarizing neuron B by 15 mV would make its membrane potential –65mV, actually taking it further away from the threshold voltage needed to fire an action potential.

34. (d) The medulla oblongata contains centers that control several visceral functions, such as breathing, heart and blood vessel activity, swallowing, vomiting, and digestion.

35. (d) For an action potential to occur in an axon, the membrane must be depolarized above a certain level. This level is known as the threshold.

36. (d) Electrical synapses join two cells with protein tunnels known as connexons. The junctions that are formed provide for very fast transmission between cells.

37. (c) Atropine is a substance that blocks the inhibitory effects of muscarinic receptors in muscle tissue, especially the heart.

38. (b)

39. (c) Arbor vitae is composed of white matter.

40. (a)

41. (c) The white matter in the CNS consists of tracts that convey sensations from one structure or region to another.

42. (c)

43. (c) The olfactory epithelium lining the superior border of the nasal cavity is innervated by the olfactory (first cranial) nerve.

44. (a) These are called the limits of audibility. Actual value is 20 to 20000 cycles/sec.

45. (c)