

Chapter 17**Short Questions****1. What is innate behavior? (LB-2016)**

It is a collection of responses that are predetermined by the inheritance of specific nerve or cytoplasmic pathways in multicellular or unicellular (acellular) organisms. As a result of the built in pathways, a given stimulus would invariably produce the same response.

Examples

All plant behavior is innate.

2. What is the role of hypothalamus? (LB-2016)

It is a part of the forebrain. It is here that many of the sensory stimuli of nervous system are converted into hormonal responses.

3. What is synapse? (LB-2011)

Consecutive neurons are so arranged that the axon endings of one neuron are connected to the dendrites of the next neuron. There is no cytoplasmic connection between the two neurons and microscopic gaps are left between them. Each of these contact points is known as synapse.

4. What is habituation? Give an example. (LB-2013)

Habituation is the simplest form of learning and involves modification of behavior through a diminution of response to repeated stimuli. A loss of receptivity to repetitious stimuli can be useful in preventing a drain of energy and attention for trivial purposes.

For example:

- (i) A snail crawling on a sheet of glass retracts into its shell when glass is tapped. After a pause, it emerges and continues moving. A second tap causes retraction again but it emerges more quickly. Ultimately, tapping has no effect and snail ceases to respond.
- ii) Rodents respond to alarm calls by others in their group, if these calls are continued and no danger is confirmed, further calls may be ignored

5. What is the role of thyroxine?

- Thyroxine acts on the basal metabolic rate by stimulating the breakdown of glucose and release of heat and generation of ATP.
- They also act in conjunction with somatotropin in bringing about growth, and act directly on brain cells causing them to differentiate.
- In amphibians, they bring about the process of metamorphosis.
- If secretion of thyroid is deficient, tadpole larva of frog does not metamorphose to develop into frog, but instead grow to a large sized tadpole.

6. What is the role of vasopressin/ADH and oxytocin hormone?**1. Antidiuretic hormone (ADH) or Vasopressin:**

Its secretion is caused by decrease in blood pressure, blood volume, and osmotic pressure of the blood which is detected by osmoreceptors in hypothalamus. External sensory stimuli also influence hypothalamic neurosecretory cells. Increased levels cause increased water reabsorption in distal parts of nephron. A lack of this hormone produces diabetes insipidus, characterized by production of large quantities of dilute urine and great thirst.

2. Oxytocin:

Its release is stimulated by distension of cervix, decrease in progesterone level in blood, and neural stimuli during parturition and suckling. Primary action is on smooth muscle, particularly in the uterus during childbirth, and causes milk ejection from mammary glands.

7. What is the function of estrogen and progesterone?**1. Oestrogen:**

- Oestrogen is secreted by ripening follicles (and, in many species, by interstitial cells of the ovary) whose development has been initiated by FSH from the pituitary.
- Oestrogens bring about the development of the secondary sexual characters in the female,
- causes thickening of the uterine wall and,
- at a point during the estrous or menstrual cycle, exert positive feedback which results in a sharp rise in LH output by the pituitary.
- Deficiency of the sex hormones, for one reason or another, leads in the young of failure to mature sexually and sterility in the adult.

2. Progesterone :

- Produced by the ruptured follicle in response to LH from the pituitary.
- Progesterone inhibits further FSH secretion from the pituitary, thus preventing any more follicles from ripening.
- It also affects the uterus, causing further thickening and vascularization of its wall, and other areas of the female body, preparing it for maintaining the state of pregnancy.
- It suppresses ovulation. That is why it is a major constituent of birth control pill.

8. What is the commercial application of cytokinins? (LB-2016)

- Cytokinins delay aging of fresh leaf crops, such as cabbage and lettuce (delay of senescence) as well as keeping flowers fresh.
- They can also be used to break the dormancy of some seeds.

9. What are androgens?

- Androgens are cortical hormones secreted by adrenal cortex.
- They cause development of the secondary male characteristics.
- Very small amounts of androgens are secreted in both male and female by adrenal glands.

10. What are sensory neurons? (LB-2016)

Sensory neurons are the types of neurons that carry impulse to 'brain' or Central nervous system.

11. What are axons and dendrites? (OR) How axons differ from dendrites. (LB-2009, 2010, 2014)

Axon	Dendrite
The fibers which carry impulse towards cell body is called dendron,	The processes conducting impulses away from cell body are termed axons.
If it is a single fiber but if smaller fibers, they are called dendrites (singular: dendrite).	These may be more than a meter long in some neurons.

12. What is reflex arc? (OR) Differentiate between reflex action and reflex arc. (LB-2012, 2014, 2018)

Reflex arc is the pathway of passage of impulse during a reflex action. Reflex action is a type of involuntary action. The direction of stimulus is from receptors to sensory neuron to associative (association / relay) neuron and then through motor neuron to the effectors.

13. What are the symptoms of Alzheimer's disease? (LB-2013)

Alzheimer's disease was first described by Alois Alzheimer in 1907.

It is characterized by the decline in brain function. Its symptoms are like those diseases that cause dementia (memory loss). There is also a decline in brain function with age.

14. What is the difference between CNS and PNS? (LB-2012, 2016)

CNS	PNS
The CNS consists of brain and spinal cord.	THE PNS comprises of sensory neurons and motor neurons, which may form ganglia and the nerves. Ganglia are the concentrations of cell bodies of neurons.
It has associative neurons.	The nerves are the bundles of axons or dendrites, bounded by connective tissue. They may be sensory motor or mixed nerves depending upon the direction of impulse they conduct.

15. What is the function of parathyroid gland or parathormone? (LB-2008, 2013, 2016)

- These produce a hormone called parathormone. Low levels of blood Ca^{++} ions stimulate the parathyroid directly to increase parathormone production whereas high levels of Ca^{++} ions suppress its release.
- Under-activity causes a drop in blood Ca^{++} ions which in turn leads to muscular tetany.

Over-activity would lead to a progressive demineralization of the bones similar to rickets, as well as to the formation of massive kidney stones. Both conditions may be fatal.

16. What is Parkinson's disease? (OR) Differentiate between Parkinson's and Epilepsy. (LB-2009, 2012, 2018)

Parkinson's disease : It is a nervous disorder, characterized by involuntary tremors, diminished motor power and rigidity. The mental faculties are not affected. The disease is believed to be caused by cell death in a brain area that produces dopamine. Onset of disease is usually in 50's and 60's. The disease is slowly progressive; the patient may live for many years. The disease may result from head trauma. Effective drugs are available such as L- dopa.

Epilepsy: It is one of the convulsive disorders of nerves which are characterized by abrupt transient symptoms of motor, sensory, psychic, or autonomic nature, frequently associated with changes in consciousness. These changes are believed to be secondary to sudden transient alterations in brain function associated with excessive rapid electric discharges in the gray matter. The onset of epilepsy is usually before age 30. Later age onset suggests organic disease. In some patients, emotional disturbances play a significant "trigger" role.

Electroencephalography is the most important test in the study of epilepsy.



Anticonvulsant drugs are used. Alcohol aggravates epilepsy, so people suffering from epilepsy should avoid alcohol.

17. What is neuroglia? 18. What are Nissl's granules? (OR) What are neuroglia and Nissl's granules?

Neuroglia are cells, in higher animals, and in humans, which make up as much as half of the nervous system. Neuroglia plays a vital role in the nutrition of neurons and their protection by myelin sheath.

Nissl's granules are groups of ribosomes associated with rough E.R, and Golgi apparatus are present in the cell body.

19. What are gastrin and secretin? (OR) Give the functions of secretin and gastrin. (OR) Name the two hormones of the gut. (LB-2010, 2013)

1. Gastrin: Gastrin is the hormone produced by mucosa of the pyloric region of the stomach. It stimulates the secretion of gastric juice. It is produced under the influence of protein food in the stomach after it is partially digested.

2. Secretin: It is produced from the duodenum when acid food touches its lining. It affects the pancreas to produce and release pancreatic juice and also affects the rate of bile production in the liver.

20. Write function of photoreceptors and nociceptors. (LB-2014)

- **Photoreceptors (electromagnetic receptors):**
These respond to stimuli of light, for example in eyes, rods and cones.
- **Nociceptors:** (Undifferentiated endings) These produce the sensation of pain, when stimulated.

21. Compare Circadian and Circannual rhythms

Biorhythms may occur showing periodicity of about 24-hours. These are called circadian (Latin circa =about, dies =day) which means about one day, so they are also called diurnal rhythms. If the biorhythms are of about 365 days, these rhythms in activity are called circannual.

22. Define saltatory impulse. (OR) Define saltatory impulse and synapse. (LB-2001, 2011)

In myelinated neurons the impulse jumps from node to node (node of Ranvier). This is called saltatory impulse.

Consecutive neurons are so arranged that the axon endings of one neuron are connected to the dendrites of the next neuron. There is no cytoplasmic connection between the two neurons and microscopic gaps are left between them. Each of these contact points is known as synapses.

23. Define the term hormone, give one example? (LB-2012)

Hormones are organic compounds of varying structural complexity. They are poured directly and are transported to blood to respective target tissues. The hormones affect the target cells. Hormones may also control some long-term changes, such as rate of growth, rate of metabolic activity and sexual maturity.

Examples: insulin and glucagon regulate the blood sugar level.

24. Define feedback mechanism. (LB-2018)

It is a type of interaction in which a controlling mechanism is itself controlled by the products of reactions it is controlling.

For proper body functions, two opposing systems are needed, if there are accelerators, there must be inhibitors. If one hormone in the body promotes or stimulates a reaction, another hormone would be checking the same. In the body, interaction is mainly maintained due to feedback mechanism.

25. Differentiate between biorhythms and diurnal rhythms. (LB-2014)

In living things, the behavioral activities occur at regular intervals which are called biorhythms or biological rhythms. Biorhythms may occur showing periodicity of about 24-hours. These are called

circadian (Latin circa =about, dies =day) which means about one day, so they are also called diurnal rhythms

26. Differentiate between etiolation and chlorosis. (OR) What is chlorosis? (LB-2018)

If plants are grown without light, they become extremely long and fail to form chlorophyll. They are said to be etiolated. Many plants take on a yellowish hue when they fail to form sufficient chlorophyll. This condition, known as chlorosis. It usually arises from short supplies of mineral nutrients in the soil.

27. Differentiate between calluses and galls.

Callus	Galls
If plants are wounded, they often develop masses of amorphous material with very poor differentiation known as calluses.	Galls are growths on a plant that are induced by parasites and usually have highly organized growth e.g., the tumors induced by bacteria. They are usually less differentiated than other types of galls.

28. Differentiate between sympathetic and parasympathetic nervous system.

Sympathetic system.	Parasympathetic system
Most ganglion fibers of the sympathetic system arise from the middle portion of the spinal cord and almost terminate in ganglia that lie near the cord.	A few cranial nerves including the vagus nerve together with the nerves from the bottom portion of spinal cord, form the parasympathetic nervous system.
This system is important during emergency situations and is associated with "fight or flight." This system accelerates the heartbeat, dilates the pupil and inhibits the digestion of food etc.	It promotes all the internal responses which are associated with the relaxed state i.e., contraction of the pupils, promotes digestion of food, retards heartbeat etc.

29. Differentiate between active and resting membrane potential. (LB-2018)

A typical neuron at rest is more positive electrically outside than inside the cell membrane. This net difference in charge between the inner and the outer surface of a non-conducting neuron is called the resting membrane potential.

Action or active membrane potential is in the form of impulse. During this state, the inner membrane surface becomes more positive than the outside. This change is so brief (for perhaps a millisecond) that only a portion of the neuron is in the active membrane potential state.

30. Give role of 2, 4 Dichlorophenoxyacetic Acid. (LB-2014)

- Selective weed killer kills broad leaved species (dicots).
- Used in cereal crops and lawns to eliminate weeds.
- Inhibits sprouting of potatoes.
- Prevents premature fruit drop (retards abscission).

31. Give two commercial applications of Gibberellins. (LB-2011, 2014, 2018)

- GA promotes fruit setting e.g., in tangerines and pears and are used for growing seedless grapes (parthenocarpy) and increase the berry size.
- GA3 is used in the brewing industry to stimulate α -amylase production in barley, and this promotes malting.
- To delay ripening and improve storage life of bananas and grapefruits.

32. Name and define different types of tropisms. (LB-2008)

1. **Geotropism:** the movement under the influence of the stimulus of gravity.
2. **Phototropism:** the movement under the influence of the stimulus of light.

33. Give effects of nicotine on blood vascular system and digestive system in man. (OR) What is the action of nicotine on coordination? (LB-2011-2015)

Nicotine affects post synaptic membrane in CNS and PNS. It mimics the action of acetylcholine on nicotine receptors, so it is stimulant of nerve impulse. It increases the heartbeat rate, blood pressure and digestive tract mobility. Nicotine may induce vomiting and diarrhea and may even cause water retention relation by kidneys.

34. Explain the functions of two hormones secreted by Islets of Langerhans. (OR) What is the role of insulin and glucagon in the body? (LB- 2013)

Insulin depresses blood glucose levels, in a variety of ways which include increasing glycogen synthesis and increasing cell utilization of glucose. It also stimulates conversion of glucose into lipid and protein, which in turn reduces glucose levels.

Glucagon helps in regulating blood glucose (sugar) levels by increasing blood sugar level and prevents it from dropping too low.

35. Explain imprinting? (LB-2010, 2012)

Imprinting is a form of learning which is best known in birds such as geese, ducks, and chickens, which are all precocial birds. Shortly after hatching, ducklings and other young birds tend to follow moving objects in their surroundings. They show a brief sensitive period during which the shape of form of objects can be 'imprinted', with the result that the young birds will follow them.