SCIENCE
WORKSHEET_240824
CHAPTER 06 CONTROL AND COORDINATION
(ANSWERS)

SUBJECT: SCIENCE **MAX. MARKS : 40**

CLASS : X **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv). There is no overall choice.
(v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Which is the correct sequence of the components of a reflex arc?
(a) Receptors → Muscles → Sensory neuron → Motor neuron → Spinal cord
(b) Receptors → Motor neuron → Spinal cord → Sensory neuron → Muscle
(c) Receptors → Spinal cord → Sensory neuron → Motor neuron → Muscle
(d) Receptors → Sensory neuron → Spinal cord → Motor neuron → Muscle
Ans. (d) Receptors → Sensory neuron → Spinal cord → Motor neuron → Muscle
A stimulus received by the receptors present on skin, is transmitted to the sensory neuron first, which further carries it to the central nervous system (the spinal cord and brain). In the CNS, the response is generated accordingly which is passed on the muscles through the motor neurons. The motor neuron carries the message from the central nervous system to the effector which could be a muscle, a gland or both.

2. The main function of abscisic acid in plants is to:
(a) increase the length of cells
(b) promote cell division
(c) inhibit growth
(d) promote growth of stem.
Ans. (c) inhibit growth
Abscisic acid (ABA) is an example of a plant growth hormone which inhibits growth. Its effects also include wilting of leaves.

3. Which of the following statements are correct?
(I) Hormones are released directly into the bloodstream.
(II) Endocrine glands use electrical impulses.
(III) Sex hormones regulate changes associated with puberty.
Options:
(a) (I) and (II) (b) (I) and (III) (c) (II) and (III) (d) (I), (II) and (III)
Ans. (b) (I) and (III)
Hormones are secreted by endocrine glands and are released directly into the blood stream. Testosterone and estrogen are two sex hormones released by human males and females respectively. These hormones are associated with puberty.

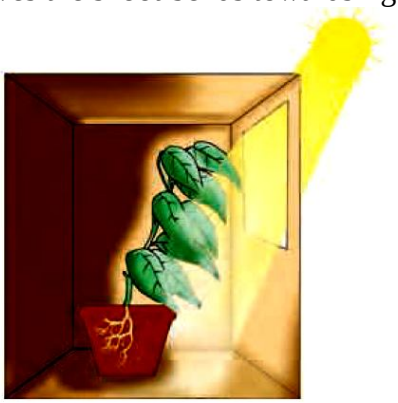
4. Select from the following the correct statement about tropic movement in plants.
(a) It is due to stimulus of touch and temperature.
(b) It does not depend upon the direction of stimulus received.

(c) It is observed only in roots and not in stems.
(d) It is a growth related movement.
Ans. (d) It is a growth related movement.
Tropic movement refers to a plant's movement in reaction to external factors. Growth in the roots and shoots is what causes this movement.

5. A wave of electrical activity that passes through nervous system neurons is called an electrical impulse. Specialized cells called neurons are in charge of information transmission throughout the body. What could be the possible limitation of electric impulse?
(a) The electric impulses travel slowly between the neurons.
(b) The electric impulses allow signal transmission in multiple directions.
(c) The electric impulses are transmitted to only those body parts that are connected to neurons.
(d) The electric impulses once generated needs to be transmitted quickly within the body.
Ans. (c) The electric impulses are transmitted to only those body parts that are connected to neurons.
Electrical impulses are transmitted to only those body parts that are connected to neurons. They will not coordinate with each and every cell in the animal body.

6. Height of a plant is regulated by:
(a) DNA which is directly influenced by growth hormone.
(b) genes which regulate the proteins directly.
(c) growth hormones under the influence of the enzymes coded by a gene.
(d) growth hormones directly under the influence of a gene.
Ans. (c) growth hormones under the influence of the enzymes coded by a gene.
Hormones control the growth and height in plants. Genes that affect the activity of the hormone-producing enzymes in turn control the synthesis of hormones.

7. Akshay potted some germinated seeds in a pot. He put the pot in a cardboard box that was open from one side. He keeps the box in a way that the open side of box faces sunlight near his window. After 2-3 days, he observes the shoot bends towards light as shown in image.



Which type of tropism did he observe?
(a) Hydrotropism (b) Phototropism (c) Geotropism (d) Chemotropism
Ans. (b) Phototropism

8. Rajesh noticed that a potted plant kept in the window of his room shows bending towards sunlight. This could be due to:
(a) More growth in the well lit region due to diffusion of auxin hormone.
(b) More growth in the region away from light due to diffusion of auxin hormone.
(c) More growth in the well lit region due to diffusion of cytokinin hormone.
(d) More growth in the region away from light due to diffusion of cytokinin hormone.
Ans. (b) More growth in the region away from light due to diffusion of auxin hormone.

Greater growth on the shaded side of the stem is due to more accumulation of auxin on the shaded side than on the illuminates. Auxin causes bending of plant towards light. Phototropism is induced by auxin hormone

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

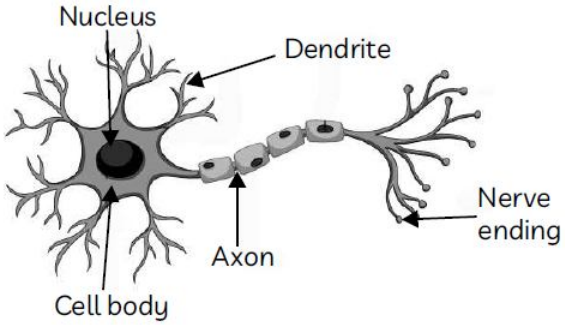
9. **Assertion (A):** Auxin helps the cells of stem grow longer.
Reason (R): Auxin is a growth inhibitor.
Ans. (c) (A) is true but (R) is false
Auxin is a plant growth hormone which is majorly responsible for the stem elongation. It is a growth promoter not inhibitor.

10. **Assertion (A):** The timing and amount of hormone released is regulated by feedback mechanisms.
Reason (R): Over-secretion and under- secretion of hormones is harmful for the body.
Ans. (a) Both (A) and (R) are true, and (R) is the correct explanation of (A)
Hormones should be secreted in precise quantities. For example, if blood sugar level rises, they are detected by cells of pancreas which respond by producing more insulin. As the blood sugar level falls, insulin secretion is reduced.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. (a) Draw the structure of a neuron and label the following on it: Nucleus, Dendrite, Cell body and Axon.
(b) Name the part of neuron:
(i) Where information is acquired.
(ii) Through which part information travels as an electrical impulse.
Ans. (a)



(b) (i) Information is acquired at dendrites.
(ii) From the dendrite to the cell body and then along the axon to it's end.

12. List two different functions performed by pancreas in our body.
Ans. (i) Pancreas act as a exocrine gland by secreting pancreatic juice which contains enzymes.
(ii) Secretes hormones like insulin/glucagon.

13. How do auxins promote the growth of a tendril around a support?
Ans. (i) When part of a tendril touches a support, the growth hormone, auxins, move to that side which is away from the support.
(ii) The side of tendril away from the support grows faster as it has more concentration of auxins.
(iii) This side becomes longer and makes the tendril curve and coil around the support.

14. (a) Name the endocrine gland which is responsible for causing Goitre.
(b) Which part of the human brain helps in eyeball movement?
(c) Classify the following movement as Tropic or Nastic.
Drooping of leaves of Mimosa pudica, on touching.
(d) Ram rides a bicycle maintaining posture and body equilibrium. Identify the part of brain which controls this activity.
Ans. (a) Malfunctioning of thyroid gland is responsible for causing Goitre.
(b) Midbrain
(c) Nastic Movement.
(d) Cerebellum

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Nervous and hormonal system together perform the function of control and coordination in human beings. Justify the statement.
Ans. For nervous and hormonal systems to control and coordinate in human beings, hypothalamus plays an important role in receiving the neural/nerve signals from brain and release hormones.
E.g. – In situation of iodine deficiency, hypothalamus releases hormones to stimulate pituitary gland, it further sends stimulating hormone to thyroid gland to secrete thyroxin that regulates carbohydrate metabolism.

16. A cheetah, on seeing a prey, moves towards him at a very high speed. What causes the movement of his muscles? How does the chemistry of cellular components of muscles change during this event?
Ans. A cheetah on seeing a prey generates a nerve impulse which reaches the muscles and the muscle fibre moves.
The muscle cell will then move by changing their shape so that muscle cells shorten.
Muscle cells have special proteins that change both shape and their arrangement in the cell in response to nervous electrical impulses.
When this happens new arrangements of these proteins give the muscle cells a shorter form.

17. What is feedback mechanism of hormonic regulation? Take the example of insulin to explain this phenomenon.
Ans. Normal functioning of endocrine glands and regulation of level of hormones in the body is the feedback mechanism. For example, after a meal, the glucose level of the blood rises which stimulates the pancreas to secrete insulin to act on it. Insulin stimulates target cells to take up extra glucose which is either utilised in respiration or is stored as glycogen. In this way, glucose level of blood is brought back to normal. When there is a fall in glucose level in blood, a decrease of insulin level takes place, insulin secretion by pancreas decreases. This checks further fall in the blood glucose level. In this way insulin maintains the blood-glucose homeostatis.

OR

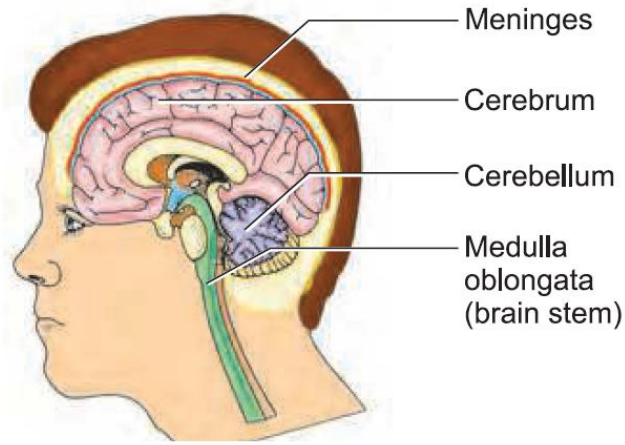
How do control and coordination in plants differ from that in animals? Give any FOUR points of difference.
Ans. Control and coordination in animals takes place with the help of nervous system and hormones that are secreted in the body. Plants do not have such kind of system.
Control and coordination in plants:
(i) It is simpler in plants.
(ii) Phytohormones, chemical substances in plants are responsible for control and coordination, as they help them in their growth and development.
(iii) Plants do not have specific glands for hormone secretion.
(iv) Plants do not respond too quickly because of the absence of nervous system.

Control and coordination in animals:
(i) It is more complicated in animals.
(ii) Animals have hormones along with nervous system for control and coordination.
(iii) Animals have endocrine glands for the secretion of hormones.
(iv) Animals respond quickly to the external stimuli as they have nervous system.

SECTION – D

Questions 18 carry 5 marks.

18. (i) What are cranial and spinal nerves? Describe a spinal nerve.
(ii) Draw a diagram of the human brain and label the following parts:
(a) Cerebrum (b) Meninges (c) Medulla oblongata (d) Cerebellum
Ans. (i) Cranial nerves are the nerves associated with the brain. These are 12 pairs in number and carries both sensory and motor nerves.
Spinal nerves are the nerves connected with the spinal cord. These are 31 pairs in number. Spinal nerve arises in the form of dorsal root and ventral root and both unite in the neural canal to form a single branch. It comes out of the vertebral column through intervertebral canal and then divides into dorsal, ventral and visceral branches.
(ii)

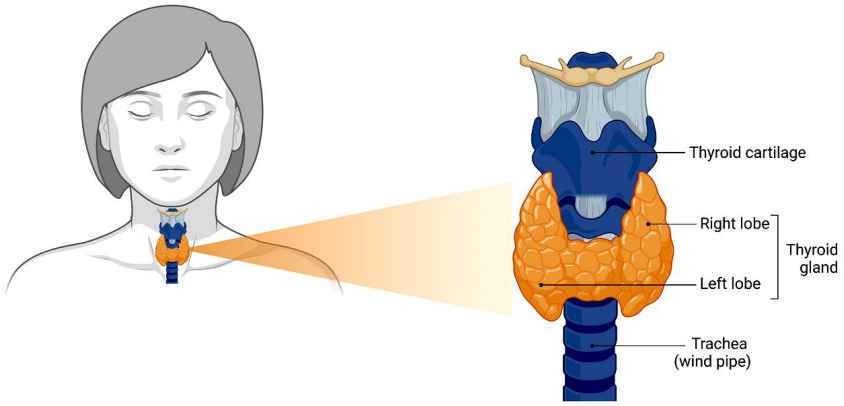


Structure of Human Brain

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Read the given passage and answer the questions based on passage and related studied concepts.
Thyroid gland is a bilobed structure situated in our neck region. It secretes a hormone called thyroxine. Iodine is necessary for the thyroid gland to make thyroxine. Thyroxine regulates carbohydrate, protein and fat metabolism in the body. It promotes growth of body tissues also.



When there is an excess of thyroxine in the body, a person suffers from hyperthyroidism and if this gland is underactive it results in hypothyroidism. Hyperthyroidism is diagnosed by blood

tests that measure the levels of thyroxine and Thyroid Stimulating Hormone (TSH). Hypothyroidism is caused due to the deficiency of iodine in our diet resulting in a disease called goitre.

(a) Where is thyroid gland situated in our body? [1]

(b) State the function of thyroxine in human body. [1]

(c) What is hyperthyroidism? How can we control hypothyroidism? [2]

Ans. (a) Thyroid gland is situated at the front of the neck, just below the larynx (Adam's apple).

(b) Thyroxine hormone is secreted by the thyroid gland. Thyroxine plays vital roles in increasing the basal metabolic rate, regulating long bone growth, increasing body's sensitivity to hormone adrenaline, digestive functions, etc.

(c) Hyperthyroidism occurs when the thyroid gland produces excessive amount of hormone thyroxine.

We can control hypothyroidism by including iodised salt in our diet. Deficiency of iodine in our diet reduces the levels of TSH and causes a disease called goitre.

20. Rajesh accidentally touched a thorn but quickly withdrew his hand. He later realized that he did this without even thinking about it! So, his reflexes were quite quick.

(a) What is the main centre for such reflex actions of Rajesh?

(b) In a neuron, the conversion of electrical signal to a chemical signal occurs at which part?

(c) What are electrical impulses? Write any two limitations of electrical impulses.

Ans. (a) The main centre for such reflex actions of Rajesh is spinal cord.

(b) At the end of the axon, the electrical impulse sets off the release of some chemicals that cross the gap and start a similar electrical impulse in a dendrite of the next neuron.

(c) Electrical impulse is a signal which is transmitted along a nerve fibre. Any environmental change is detected by the specialized tips of nerve cells known as dendrites in the form of a message. The message acquired sets off a chemical reaction which creates an electrical impulse.

Electrical impulses have following limitations:

(i) They will reach only those cells which are connected by nervous tissue.

(ii) Electrical impulses acts for only a short period of time and the message is only sent in the presence of the stimulus.

(iii) Nerve cells cannot continuously create and transmit electrical impulses.