PRACTICE PAPER (2026–27)

Chapter 06: Control and Coordination

CLASS: X **SUBJECT: SCIENCE** **DURATION: 1½ hrs** **MAX. MARKS: 40**

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five Sections: **A**, **B**, **C**, **D**, and **E**.
3. **Section A** comprises 10 Multiple Choice Questions (including Assertion-Reason) of 1 mark each.
4. **Section B** comprises 4 questions of 2 marks each.
5. **Section C** comprises 3 questions of 3 marks each.
6. **Section D** comprises 1 question of 5 marks (with internal choice).
7. **Section E** comprises 2 Case Study Based Questions of 4 marks each.
8. Use of calculators is strictly prohibited.

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. The electrical impulse in a neuron travels in the direction:
   (a) Dendrite → Axon → Axonal end → Cell body
   (b) Cell body → Dendrite → Axon → Axonal end
   (c) Dendrite → Cell body → Axon → Axonal end
   (d) Axonal end → Axon → Cell body → Dendrite

2. Which plant hormone is primarily responsible for inhibiting growth and causing the wilting and falling of leaves?
   (a) Auxin
   (b) Gibberellin
   (c) Cytokinin
   (d) Abscisic acid

3. The microscopic gap between the axonal ending of one neuron and the dendrite of the adjacent neuron is known as:
   (a) Synapse
   (b) Myelin sheath
   (c) Node of Ranvier
   (d) Neuromuscular junction

4. Involuntary actions like salivation, vomiting, and blood pressure are controlled by the:
   (a) Cerebrum in the forebrain
   (b) Medulla in the hindbrain
   (c) Cerebellum in the hindbrain
   (d) Pons in the hindbrain

5. Which of the following endocrine glands is referred to as a dual or composite gland because it functions as both an exocrine and an endocrine gland?
   (a) Thyroid gland
   (b) Adrenal gland
   (c) Pancreas
   (d) Pituitary gland

6. The movement of sunflower towards the direction of light and the bending of shoot tips toward sunlight are examples of:
   (a) Geotropism
   (b) Hydrotropism
   (c) Chemotropism
   (d) Phototropism

7. Iodine is an essential dietary component required for the normal synthesis of which hormone?
   (a) Insulin
   (b) Thyroxin
   (c) Adrenaline
   (d) Estrogen

8. Posture and balance of the human body are maintained and coordinated by the:
   (a) Cerebrum
   (b) Cerebellum

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(c) Medulla (d) Hypothalamus

Directions for Q9 and Q10: In each question, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Mark the correct choice as:
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

9. **Assertion (A):** Reflex arcs have evolved in animals because the thinking process of the brain is not fast enough.
   Reason (R): Reflex arcs allow an extremely quick, automatic response to dangerous stimuli by routing signals directly through the spinal cord.

10. **Assertion (A):** Cytokinins are present in greater concentrations in regions of rapid cell division, such as in fruits and seeds.
    Reason (R): Cytokinins are plant hormones that promote active cell division.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. What happens at the synapse between two neurons? Explain how an electrical impulse is transmitted across this microscopic gap.

12. Distinguish between tropic movements and nastic movements in plants with one example of each.

13. Name the hormone secreted by the adrenal glands. State two physiological changes it brings about in the human body during a "fight or flight" emergency situation.

14. Why is the use of iodised salt advisable in our daily cooking? Name the deficiency disease associated with a chronic lack of dietary iodine.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Trace the pathway of a reflex arc when a person accidentally touches a hot plate. List all the anatomical components in their correct sequence from stimulus to response.

16. Name the specific plant hormones responsible for each of the following physiological actions:
    a. Bending of a shoot toward a unilateral source of light
    b. Promoting longitudinal stem elongation and growth
    c. Promoting rapid cell division in developing seeds and fruits

17. How are the central nervous system (brain and spinal cord) protected against mechanical injuries, shocks, and external displacement inside the human body?

SECTION – D

Question 18 carries 5 marks.

18. a. Draw a neat schematic diagram of the human brain and label the following parts:
    (i) Cerebrum (ii) Cerebellum (iii) Medulla (iv) Pons.
    b. State one key function of each of the following brain regions:
    (i) Forebrain (Cerebrum)

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(ii) Cerebellum
(iii) Medulla oblongata.

c. Why does a blow to the back of the neck (medulla region) frequently prove fatal?

OR

a. What is an endocrine feedback mechanism? Explain how the secretion of insulin by the pancreas is regulated via a negative feedback mechanism when blood glucose levels fluctuate.

b. State the source gland and primary physiological function of:
(i) Growth Hormone (GH)
(ii) Testosterone
(iii) Estrogen.

c. What condition develops if there is a severe hyposecretion of growth hormone during childhood?

SECTION – E (Case Study Based Questions)

Questions 19 and 20 carry 4 marks each.

19. **Read the passage given below and answer the questions that follow:**

> *Unlike animals, plants do not possess a nervous system or muscular tissue, yet they respond to environmental cues like light, gravity, touch, and water. Plant movements are broadly grouped into two categories: growth-independent movements (such as the rapid folding of leaflets in the sensitive plant Mimosa pudica upon touch) and growth-dependent movements (such as the directional bending of tendrils around a support). In Mimosa pudica, electrical-chemical signals travel through cells, causing target cells at the base of leaflets to alter their internal water volume, collapsing the leaves through turgor pressure changes without any actual growth.*

a. What type of movement is shown by the leaves of the sensitive plant (*Mimosa pudica*)? **[1 Mark]**

b. How do plant cells change their shape to cause immediate folding of leaves in the absence of muscle proteins? **[1 Mark]**

c. Explain how pea plant tendrils coil securely around a support upon making physical contact. Which plant hormone facilitates this directional growth? **[2 Marks]**

OR

c. Describe an experimental setup with a potted seedling to demonstrate positive geotropism in roots and negative geotropism in shoots. **[2 Marks]**

20. **Read the passage given below and answer the questions that follow:**

> *Hormones are chemical messengers secreted in minute quantities by ductless endocrine glands directly into the bloodstream, which transports them to specific target organs. In humans, coordination is achieved through the integrated operation of the nervous and endocrine systems. While nervous transmission relies on electrical impulses traveling along axons for rapid, localized responses, its effect is short-lived and restricted only to cells connected by nerve fibers. In contrast, hormonal coordination is comparatively slower, but can reach every cell in the body, coordinating wide-scale physiological events like metabolism, growth, and sexual maturation.*

a. Why are endocrine glands referred to as "ductless glands"? **[1 Mark]**

b. State one major advantage of chemical (hormonal) communication over electrical nervous communication in multicellular organisms. **[1 Mark]**

c. A patient visits a clinic with persistent fatigue, extreme thirst, and excessive urination. Diagnostic blood tests reveal abnormally high blood glucose concentrations.
(i) Name the medical disease the patient is suffering from.
(ii) Which hormone is deficient, and which organ is malfunctioning? **[2 Marks]**

OR

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c. Distinguish between nervous coordination and chemical coordination on the basis of:

(i) Speed of transmission

(ii) Duration and range of response. **[2 Marks]**

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