Class 10 Science Chapter 6: Control and Coordination - Notes, Important Questions and MCQs (2026-27)

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These Class 10 Science Chapter 6 PDF Notes cover Control and Coordination fully: the nervous system, neurons and synapses, reflex actions, the human brain, movement and hormones in plants, and the endocrine glands in animals.

Expect questions on the reflex arc, parts of the brain, plant hormones and the role of hormones such as insulin and thyroxin. A labelled neuron diagram is a common board question.

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Chapter Overview

Living organisms respond to changes around them. Animals use the nervous system and hormones to control and coordinate their activities, while plants respond with movements and plant hormones.

The chapter explains how nerve impulses travel, how reflexes protect us, what each part of the brain does, how plants show tropic and quick movements, and how endocrine glands keep the body in balance using feedback.

Important Topics and Concepts

The neuron and nerve impulse

A neuron has dendrites (receive information), a cell body and a long axon (carries the impulse). Information is picked up at dendrites, travels as an electrical impulse along the axon, and at its end releases chemicals that cross the gap (synapse) to start an impulse in the next neuron or a muscle/gland.

Reflex action and reflex arc

A reflex is a quick, automatic response to a stimulus, such as pulling your hand away from a flame. Path of a reflex arc: receptor → sensory neuron → relay neuron in the spinal cord → motor neuron → effector (muscle). Reflex arcs work through the spinal cord so the response is fast; the brain is informed afterwards.

Human brain

- Forebrain: main thinking part; receives sensory impulses (hearing, smell, sight), and controls voluntary actions; has a centre for hunger.
- Midbrain and hindbrain control involuntary actions.
- Medulla (hindbrain): controls blood pressure, salivation, vomiting.
- Cerebellum (hindbrain): maintains posture and balance and coordinates precise voluntary movements such as walking in a straight line or picking up a pencil.
- Pons (hindbrain): involved in regulating breathing (with medulla).
- Protection: the brain is in the skull and surrounded by fluid; the spinal cord is protected by the vertebral column.

How the nervous system makes muscles move

Muscle cells contain special proteins that change their shape and arrangement in response to nerve impulses, making the muscle contract and move the body part.

Coordination in plants: movements

- Immediate response (not growth): the leaves of the touch-me-not plant (Mimosa) fold on touch because cells change shape by changing water content.
- Movement due to growth (tropism): phototropism (shoots towards light), geotropism (roots towards gravity), hydrotropism (roots towards water), chemotropism (pollen tube towards the ovule).
- Tendrils of a pea plant coil around supports because the side away from the support grows faster.

Plant hormones

- Auxin: made at shoot tips; promotes cell elongation; on the shaded side, it makes the shoot bend towards light.
- Gibberellins: help in stem growth.
- Cytokinins: promote cell division; high in fruits and seeds.
- Abscisic acid: inhibits growth; causes wilting of leaves.

Hormones in animals

Hormones are chemical messengers secreted by endocrine (ductless) glands directly into the

Feedback mechanism

The timing and amount of hormone release is controlled by feedback. For example, when blood sugar rises, the pancreas releases more insulin; as sugar falls, insulin secretion reduces.

Endocrine Glands and Hormones

Gland	Hormone	Function
Pituitary	Growth hormone	Regulates growth and development
Thyroid	Thyroxin	Regulates metabolism; needs iodine
Pancreas	Insulin	Lowers blood sugar level
Adrenal	Adrenaline	Prepares body for emergencies ("fight or flight")
Testes	Testosterone	Male changes at puberty
Ovaries	Oestrogen	Female changes at puberty
Hypothalamus	Releasing hormones	Stimulates the pituitary

Important Definitions and Terms

Term	Meaning
Stimulus	A change in the environment that an organism responds to
Receptor	A specialised cell or organ that detects a stimulus
Effector	A muscle or gland that responds to an impulse
Neuron	Structural and functional unit of the nervous system
Synapse	Gap between two neurons where chemicals pass the impulse
Reflex action	Sudden, automatic response to a stimulus
Reflex arc	Pathway of a reflex: receptor → sensory neuron → spinal cord → motor neuron → effector
Tropism	Directional growth movement of a plant in response to a stimulus
Phototropism	Growth movement towards or away from light
Geotropism	Growth movement in response to gravity
Hormone	Chemical messenger secreted by an endocrine gland into the blood
Endocrine gland	Ductless gland that releases hormones into the blood
Feedback mechanism	Control of hormone release based on its effect

Short Answer Questions

Q1. What is the difference between a reflex action and walking?

A reflex action is automatic and involuntary, controlled by the spinal cord. Walking is voluntary and is controlled by the brain (with the cerebellum maintaining balance).

Q2. What happens at the synapse between two neurons?

At the end of the axon, the electrical impulse releases chemicals. These cross the synaptic gap and start a new electrical impulse in the dendrite of the next neuron.

Q3. Which part of the brain maintains posture and balance?

The cerebellum, a part of the hindbrain, maintains posture and balance.

Q4. How do auxins promote the growth of a tendril around a support?

When a tendril touches a support, auxin moves to the side away from the contact. That side grows faster, so the tendril coils around the support.

Q5. Why is the use of iodised salt advisable?

Iodine is needed by the thyroid gland to make thyroxin. A lack of iodine can cause goitre (swollen neck), so iodised salt helps prevent it.

Q6. How does a touch-me-not plant respond to touch?

Its cells change shape by changing the amount of water in them, so the leaves fold up quickly. This is not a growth movement.

Q7. Why are some patients of diabetes treated with insulin injections?

Insulin lowers blood sugar. In diabetes, the pancreas does not make enough insulin, so injections help control the sugar level.

Q8. What is the role of adrenaline in an emergency?

Adrenaline increases heart rate and breathing and diverts blood to the muscles, preparing the body to react quickly.

Long Answer Questions

Q1. What is a reflex arc? Explain with a labelled flow diagram using the example of touching a hot object.

A reflex arc is the path followed by a nerve impulse in a reflex action.

When we touch a hot object, receptors in the skin detect heat. A sensory neuron carries the impulse to the spinal cord. A relay neuron passes it to a motor neuron, which carries the impulse to muscles in the arm (effector). The muscles contract and the hand is pulled away.

Flow: Receptor (skin) → Sensory neuron → Relay neuron (spinal cord) → Motor neuron → Effector (arm muscle)

Reflex arcs are found in the spinal cord so the response is very quick. The information also reaches the brain, so we become aware of the pain afterwards.

Q2. Compare nervous and hormonal coordination in animals.

Nervous responses are very fast and short-lived; hormonal responses are slower but last longer.

Nerve impulses reach only the cells connected to neurons; hormones can reach all cells through the blood.

Nervous control is used for quick actions such as reflexes; hormonal control manages growth, metabolism, development and long-term balance.

Q3. Explain the role of plant hormones with examples.

Auxin is made at the shoot tip and helps cells grow longer. In light from one side, auxin moves to the shaded side, which grows faster, so the shoot bends towards light.

Gibberellins help the stem grow.

Cytokinins promote cell division and are found in high amounts in fruits and seeds.

Abscisic acid inhibits growth and causes leaves to wilt and fall.

Together, these hormones coordinate growth, development and responses to the environment.

MCQs with Answers

1. The gap between two neurons is called(a) Dendrite (b) Axon (c) Synapse (d) ImpulseAnswer: (c) Synapse

2. Which part of the brain controls blood pressure and vomiting?(a) Cerebrum (b) Cerebellum (c) Medulla (d) PonsAnswer: (c) Medulla

3. A reflex arc is formed in the(a) Brain (b) Spinal cord (c) Heart (d) MusclesAnswer: (b) Spinal cord

4. The bending of a shoot towards light is(a) Geotropism (b) Phototropism (c) Hydrotropism (d) ChemotropismAnswer: (b) Phototropism

5. Which plant hormone inhibits growth?(a) Auxin (b) Gibberellin (c) Cytokinin (d) Abscisic acidAnswer: (d) Abscisic acid

6. Iodine is needed for the synthesis of(a) Insulin (b) Adrenaline (c) Thyroxin (d) Growth hormoneAnswer: (c) Thyroxin

7. Dwarfism is caused by deficiency of(a) Thyroxin (b) Growth hormone (c) Insulin (d) OestrogenAnswer: (b) Growth hormone

8. Pollen tube growing towards the ovule is an example of(a) Phototropism (b) Chemotropism (c) Geotropism (d) HydrotropismAnswer: (b) Chemotropism

9. Which gland secretes adrenaline?(a) Thyroid (b) Pituitary (c) Adrenal (d) PancreasAnswer: (c) Adrenal

10. The main thinking part of the brain is the(a) Forebrain (b) Midbrain (c) Hindbrain (d) Spinal cordAnswer: (a) Forebrain

Quick Revision Points

- Neuron: dendrite → cell body → axon → synapse.
- Reflex arc: receptor → sensory neuron → spinal cord → motor neuron → effector.
- Forebrain = thinking; medulla = involuntary (BP, vomiting); cerebellum = balance.
- Mimosa: quick movement without growth; tropisms are growth movements.
- Auxin (bending to light), gibberellin (stem), cytokinin (cell division), abscisic acid (inhibits).
- Thyroxin needs iodine; insulin controls sugar; adrenaline for emergencies.
- Hormone levels are controlled by feedback.

Chapter Summary

Animals coordinate their activities through the nervous system and hormones. Neurons carry electrical impulses and pass them on across synapses; reflex actions are fast responses handled by the spinal cord, while the brain controls thinking, voluntary actions, balance and vital involuntary functions.

Plants respond through quick movements and slow growth movements called tropisms, controlled by hormones such as auxin, gibberellins, cytokinins and abscisic acid. In animals, endocrine glands release hormones like thyroxin, insulin, adrenaline and growth hormone, and feedback mechanisms keep their levels balanced.

Exam Tips and PYQ Pattern

- Draw and label a neuron; it is one of the most frequently asked diagrams.
- The reflex arc (flow or diagram) appears often for 3 marks.
- Match-the-following on glands and hormones is common in competency-based questions.
- Explain phototropism using auxin movement for full marks.

Frequently Asked Questions

What is the difference between tropic and nastic movements?

Tropic movements are directional growth movements; quick movements like those of Mimosa do not depend on direction or growth.

Why is the reflex arc in the spinal cord?

Processing in the spinal cord is faster than sending signals to the brain, so the body can react quickly to danger.

Which hormone controls blood sugar?

Insulin, secreted by the pancreas.

Conclusion

Control and Coordination shows how the body and plants respond smartly to their surroundings. Learn the neuron, reflex arc and brain parts with diagrams, memorise the hormones table, and you will be ready for every question type from this chapter.

Author Bio: Written and reviewed by the Nextoper Editorial Team, a group of CBSE science educators who build chapter notes directly from the NCERT textbook and past board paper patterns.

Freshness Note: These notes follow the NCERT Class 10 Science textbook (Reprint 2026-27) and the CBSE syllabus for the 2026-27 session. Last checked on 7 November 2026.