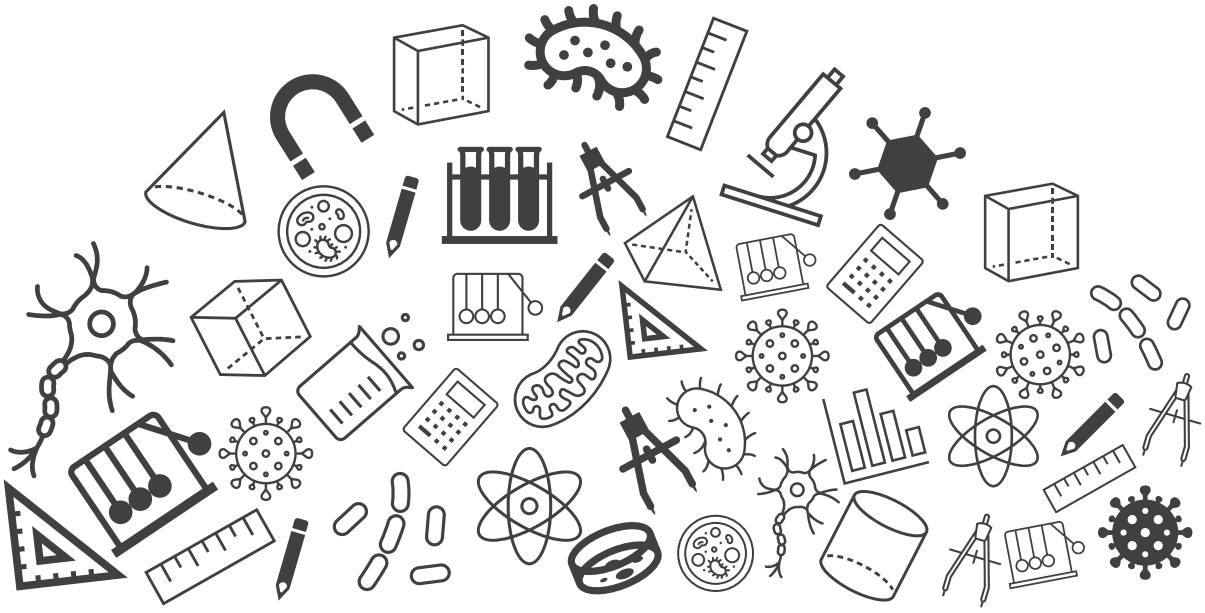
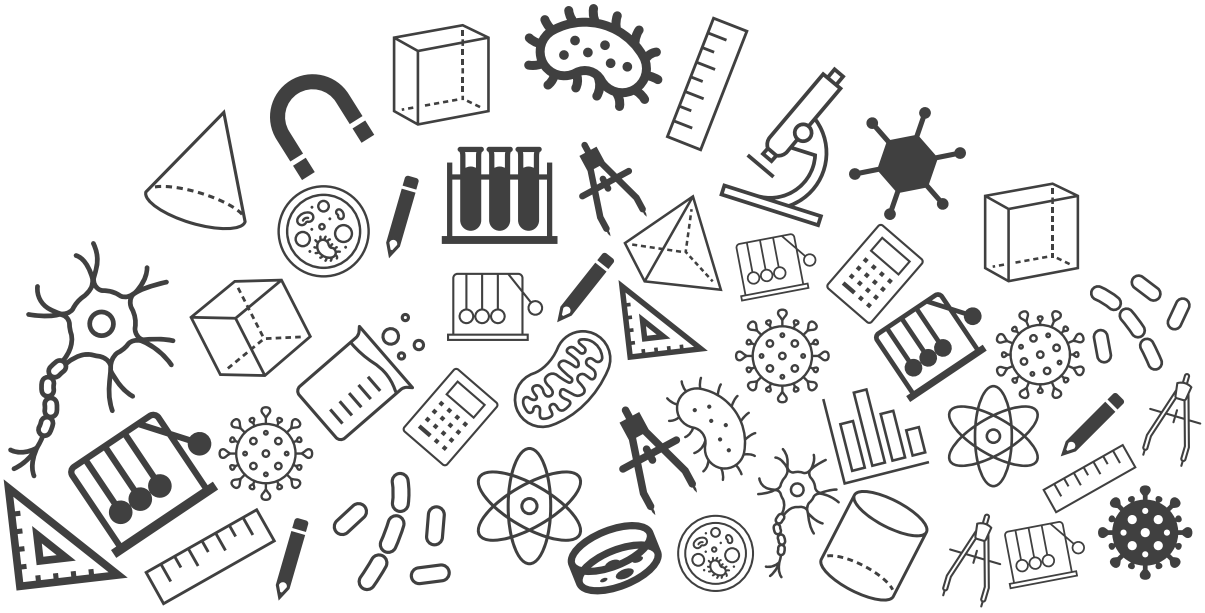
Grade 10: Science
Exam Important Questions



Control and Coordination



Control and Coordination

Topic : Exam Important Questions

1. What is the need for a system of control and coordination in an organism?

[3 Marks]

- There are various organs and organ systems in a complex organism. These organ systems must be carefully controlled and coordinated for the organism's survival. Lack of coordination between these systems can lead to chaos and mismanagement.

[1 Mark]

- For instance, humans have more than a trillion cells, more than a billion nerve cells and an elaborate skeletal system which support them in their locomotion and movement.

[1 Mark]

- To command a complex set of tissues like this, control and coordination between hormones secreted by the endocrine glands and the central nervous system is a must as it ensures the survival of the organism.

[1 Mark]

2. Trace the sequence of events that occur in your body when a bright light is focused on your eyes. [2 Marks]

When a bright light is focused on eye, the receptor cell receives the stimulus, and an impulse is generated. This impulse is passed on to the sensory neuron, then it goes to the spinal cord, spinal cord sends the impulse to the motor neuron which contracts the pupil. [1.5 Marks]

Sequence of events can be summarised as :

Photoreceptors in the eye → Sensory (Receptor) neuron → Spinal cord → Motor (Effector) neuron → Eye muscle → Contraction of the pupil. [0.5 Marks]

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3. What are reflex actions? Give two examples. Explain a reflex arc.
[5 Marks]

Reflex actions are quick, sudden, immediate response of the body to a certain stimuli that mostly involves spinal cord and the spinal nerves.
[0.5 Marks]

For example: when our hand touches a very hot electric iron, we move away our hand with a jerk. [0.5 Marks]

Reflex Arc: The path through which nerve signals involved in a reflex action travel is called the reflex arc. The following flowchart shows the flow of the signal in a reflex arc.
[1 Mark]

Receptor $\rightarrow$ Sensory neuron $\rightarrow$ Relay neuron $\rightarrow$ Motor neuron $\rightarrow$ Effector (muscle)
[0.5 Marks]

The receptor is an organ which comes in contact with the danger zone. The sensory neurons pick signals from the receptor and send them to the relay neuron. The relay neuron is present in the spinal cord. The spinal cord sends signals to the effector via the motor neuron. The effector comes into action and moves the receptor away from the danger. [2.5 Marks]

4. (a) Explain forebrain in humans.
(b) Give some information regarding spinal cord of humans.
[5 Marks]

(a) Forebrain is the largest part of the human brain. It is the main thinking part of the brain. It has regions which receive sensory impulses from various receptors. Separate areas of the fore-brain are specialised for hearing, smell, sight and speech.
There are separate areas of association where the sensory information is interpreted by putting it together with information from other receptors as well as with information that is already stored in brain. [3 Marks]

(b) Spinal cord is a tubular structure made of nervous tissue extending from the base of the brain and down to the spine. It is protected by the vertebral column. Cerebro Spinal Fluid (CSF) flows around the spinal cord to help cushion them from injury and provide nutrients. [2 Marks]

Control and Coordination

5. Hypothalamus is a super master endocrine gland. Elaborate.
[3 Marks]

Hypothalamus is a super master endocrine gland as it secretes hormones that regulate the synthesis and secretion of the pituitary gland which is the master gland. It is connected to the anterior lobe of the pituitary gland by hypo physical portal veins.
[2 Marks]

The hormones which are secreted by hypothalamus are:
1 Growth hormone-releasing hormone (GHRH)
2. Thyrotropin-releasing hormone (TRH)
3. Growth hormone inhibitory hormone (GHIH)
[1 Mark]

6. Write a short note on thyroid gland. [5 Marks]

Each point: [1 Mark]

1. Thyroid is a butterfly-shaped gland located at the base of the neck.
2. It is regulated by TSH (thyroid stimulating hormone) secreted by the pituitary gland.
3. It secretes thyroxin hormone which requires iodine for its synthesis.
4. This hormone regulates growth and development by controlling rate of metabolism.
5. Iodine deficiency in the diet causes decreased thyroxin in the body causing goitre.

7. What are the functions of adrenal glands and adrenaline?
[3 Marks]

The adrenal glands are endocrine glands that produce a variety of hormones including adrenaline and the steroids aldosterone and cortisol. They are found above the kidneys.

Functions of adrenaline:
(Any 3 points)
1. Acceleration of metabolism.
2. Increase in blood sugar levels.
3. Increase in heart rate as well as vasoconstriction i.e. constriction of blood vessels and reduced supply of blood to the skin and other surfaces.
4. Increases blood supply to muscle.
5. Dilation of pupil and relaxation of iris muscles. [3 Marks]

Control and Coordination

8. Match the following:

A	B
(1) Growth of sunflower towards a light source	(i) Chemotropism
(2) Growth of tree roots towards earth	(ii) Hydrotropism
(3) Growth of plant roots towards or away from moisture	(iii) Phototropism
(4) Growth of a plant part in response to a chemical stimulus	(iv) Geotropism

- ✗ **A.** 1 - ii, 2 - iii, 3 - iv, 4 - i
- ✓ **B.** 1 - iii, 2 - iv, 3 - ii, 4 - i
- ✗ **C.** 1 - iv, 2 - i, 3 - ii, 4 - iii
- ✗ **D.** 1 - iv, 2 - iii, 3 - i, 4 - ii

Growth of sunflower towards a light source is termed as phototropism (growth in the direction of light).

Growth of tree roots in the direction of gravitational pull is termed as geotropism (growth towards the earth).

Growth of plant roots towards or away from moisture is hydrotropism.

Growth of plant parts in response to a chemical stimuli is called chemotropism. (For example, the growth of pollen tube towards the ovule).

9. Rahul sprayed chemical ‘X’ on plant 1 and chemical ‘Y’ on plant 2. After a few days he observed a sudden growth of stem in plant 1, while leaves in plant 2 started wilting. Identify the chemicals X and Y.

- ✗ **A.** X - Auxin; Y - Cytokinin
- ✗ **B.** X - Cytokinin; Y - Auxin
- ✓ **C.** X - Gibberellins; Y - Abscisic Acid
- ✗ **D.** X - Gibberellins; Y - Auxin

• Chemical 'X' led to an increase in growth of stem. Both auxin and gibberellins promote stem growth.
• Chemical 'Y' resulted in wilting of leaves. Abscisic acid is a plant growth inhibitor. Its effects include wilting of leaves.
• Cytokinins promote cell division.
• So, we can say that X is gibberellin and Y is abscisic acid. Hence, option c is correct.

10. Give one example of plant part. [2 MARKS]

A. Which is positively hydrotropic as well as geotropic.

B. Which is positively phototropic but negatively geotropic.

Each point: 1 Mark

A. Roots - Roots grow downwards and towards water.

B. Stem - Stem grows towards the light and upwards.