CHAPTER 7 – CONTROL & COORDINATION

KEY CONCEPTS & GIST OF THE LESSON

- Coordination-The working together of various organs of the body of an organism in a proper manner to produce appropriate reaction to a stimulus is called coordination.

- Stimulus- The changes in the environment to which an organism responds and reacts is called Stimulus

- Control & coordination in animals- takes place by (i) Nervous system & (ii) Endocrine system

- Nervous system

  Stimulus → Receptor organ → Sensory nerve → Brain/Spinal cord
  ↓
  Response ← Effector organ ← Motor nerve

- Endocrine system

  Stimulus → Endocrine organ → Secrete hormone → Hormone in blood
  ↓
  Response ← Target organ

- Parts of the Nervous system – (i) Brain (ii) Spinal cord (iii) Nerves (Neurons)

- A Neuron is the structural & functional unit of Nervous system

- Parts of a neuron- (i) Dendrites (ii) Cell body (iii) Axon

- Synapse- Space/junction between two adjacent nerves is called Synapse.

- Passing of information takes place –(i) By Electric impulse (inside the neuron) and (ii) In the form of chemicals (At synapse)

- Reflex action- Spontaneous, involuntary and automatic response to a stimulus to protect us from harmful situations. Eg. On touching a hot object unknowingly we instantly withdraw our hand.

- Reflex arc- The pathway of the reflex action is called Reflex arc.
  Stimulus → Receptor organ → Sensory nerve → Spinal cord →→Effector organ→ Response
  Refer to figure 7.2 page no. 117 of N.C.E.R.T Text book)

- Nervous system- (1) Central Nervous system (CNS) (2) Peripheral Nervous system (PNS)

(i) Brain	(i) Autonomic Nervous system
(ii) Spinal cord	(ii) Voluntary Nervous system

- Brain (i) Centre of coordination of all activities (ii) Thinking is involved (iii) Complex process
- Parts of brain- Refer to figure 7.3 page no. 118 of N.C.E.R.T Text book

Fore brain	Mid brain	Hind brain
(i) Cerebrum (ii) Thalamus (iii) Hypothallamus	----------	(i) Cerebellum (ii) Pons (iii) Medulla oblongata

- Fore brain
  Cerebrum- (i) Main thinking and largest part of the brain.
  (ii) It has 3 main areas-
  a. Sensory area- to receive impulses from sense organs via Receptors
  b. Motor area- control voluntary movements.
  c. Association areas- Reasoning, learning & intelligence.
  Thalamus – It relays sensory information to the Cerebrum
  Hypothallamus- It forms the link between Nervous system & Endocrine system

- Mid brain- It connects Fore brain and Hind brain. Controls reflex of eyes & ears

- Hind brain- Connects the Fore brain & Hind brain
  Cerebellum – Controls & coordinates muscular movements, maintaining body posture and equilibrium.
  Pons- Acts as a bridge between brain & spinal cord
  Medulla oblongata- Controls involuntary actions like blood pressure, salivation, vomiting, etc.

- Spinal cord- Cylindrical or tubular structure extending downwards from the Medulla oblongata.

- Protection of the brain & the spinal cord-
  (i) Bony outer covering: skull for the brain & vertebral column for the spinal cord.
  (ii) Cerebrospinal fluid present in between the three membranes.

- Action caused by Nervous tissue
  Information → Nervous tissue → Brain Muscles → Causes action
- Path or action-
  Nerve impulse → Muscle cell → Changes shape due to special proteins
  ↓
  Action caused ← Shorter form of muscles ← Change shape & arrangement of cell
- Chemical communication by hormones- (advantages)
  (i) Electrical impulses have their limitations because they reach only those cells connected to the nervous tissue.
  (ii) Also the nerve cells cannot generate & transmit impulses continuously.
  (iii)Electrical communication is slower.

- Hormones- (i) are chemical messengers secreted by endocrine glands
  (ii) Are secreted in small amounts & may act in nearby places or distant places.
  (iii) Do not take part in the reaction & are destroyed immediately.

- Hormones are secreted by- Endocrine glands & Exocrine glands

S. No.	Endocrine glands	Exocrine glands
1.	Ducts absent	Ducts present
2.	Secrete hormones	Secrete enzymes
3.	Secreted in blood	Secreted in ducts of glands
4.	Situated away from the site of action	Situated near the site of action

- Some glands which act as both endocrine & exocrine

Gland	Endocrine function	Exocrine function
Pancreas	Produces insulin & Glucagon hormone.	Produces digestive enzyme. (pancreatic amylase)
Testes	Produces hormone Testosterone	Produces male gametes (reproductive cells)
Ovaries	Produces hormone Oestrogen	Produces female gametes (reproductive cells)

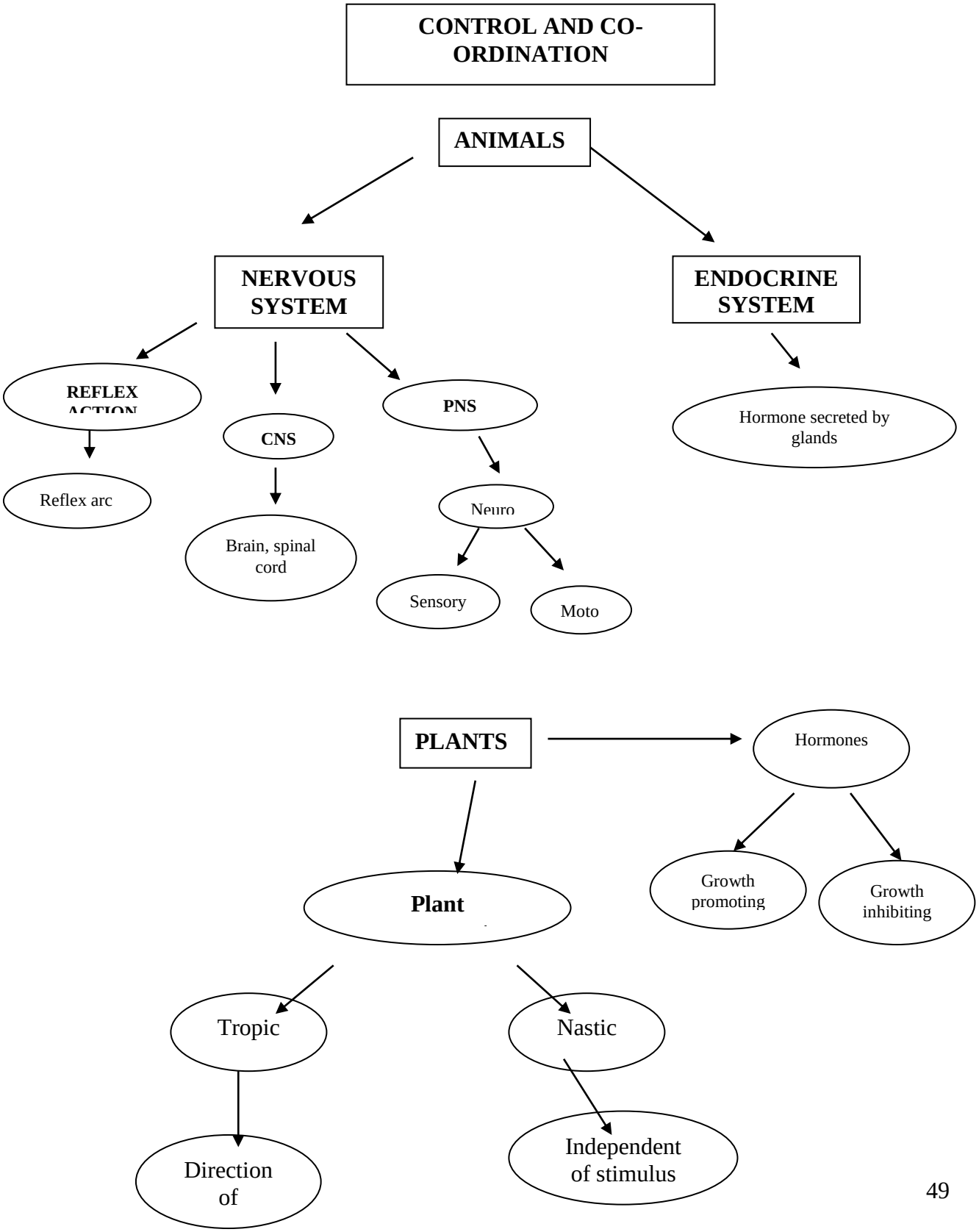
- Important Endocrine glands, the hormone they secrete & their function
  Refer to figure 7.7 page no. 124 of N.C.E.R.T Text book)

Endocrine gland	Hormone	Function
Pituitary gland	Growth hormone	Body growth, development of bones & muscles (If excess- Gigantism) (If less- Dwarfism)
Thyroid gland	Thyroxine	Regulates carbohydrate, protein & fat metabolism(If less- Goitre_
Pancreas	Produces insulin & Glucagon hormone	Regulates blood sugar levels (if less diabetes is caused)
Testes in males	Produces hormone Testosterone	Development of secondary male characters like deep voice, beard, etc.
Ovaries in females	Produces hormone Oestrogen	Development of secondary female characters like mammary glands, menstrual cycle, maintenance of pregnancy.

- Coordination in plants- Only chemical coordination is present in plants.
- Tropic movements- The movements of plants in the direction of stimulus (positive) or away from it (negative) are called tropic movements. E.g. Phototropism, Geotropism. Chemotropism.
  Refer to figure 7.4 & 7.5 page no. 121 of N.C.E.R.T Text book)
- Nastic movements -The movements of plants independent of stimuli are called nastic movements. E.g.- Touch me not plant leaves close when touched.
- Plant hormones (Phytohormones)
  Examples- 1. Auxins- Help in growth of root & shoot tips.
  2. Gibberellins- Help in vegetative growth
  3. Cytokinins- Promote cell division
  4. Abscissic acid - Inhibits growth & causes wilting (falling) of leaves
- Important diagrams-
  1. Structure of neuron (nerve cell)2.Reflex arc 3.Human brain4.Endocrine glands .

- Important activities-
  1. To compare taste of sugar and food with open & blocked nostrils.
  2. To demonstrate the response of a plant to the direction of light.
  3. To demonstrate hydrotropism.

MIND MAP



CONTROL AND CO - ORDINATION
FORMATIVE ASSESSMENT I
Q. PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1. Which endocrine gland is unpaired?
2. Which part of the brain controlled posture and balance of the body?
3. Where in a neuron, conversions of electrical signal to a chemical signal occur?
4. Which gland secretes digestive enzyme as well as hormones?
5. We suddenly withdraw our hand when a pin pricks. Name the type of response involved in this action.
6. What is a tropic movement? Explain with an example.
7. What will happen if intake of iodine in our diet is low?
8. Draw the structure of neuron and label the following on it:
    a. Nucleus
    b. Dendrite
    c. Cell body
    d. Axon
9. Why are some patients of diabetes treated by giving injections of insulin?
10. Why is the flow of signals in a synapse from axonal end of one neuron but not the reverse?
11. What are reflex actions? Explain reflex arc.
12. What are the major parts of the brains? Mention the functions of each.
13. How does chemical co – ordination take place in animals?
14.
    a. Name the various plant hormones.
    b. Give physiological effects of hormones on plant growth and development.

HOTS QUESTIONS (SOLVED / UNSOLVED)

Q1. Which hormone:

1. prepares the body for action?

2. controls the amount of sugar (glucose) in blood?

3. brings about changes in boys at puberty?

4. brings about changes in girls at puberty?

Ans. a) Adrenaline b) Insulin

c) Testosterone d) Oestrogen

Q2. i) Name the hormone produced by thyroid gland.

ii Which mineral is necessary for the synthesis of the above hormone?

iii Name the disease suffer from the deficiency of this mineral.

iv Write the function of the above hormones?

Q3. What is chemotropism? Give one example of chemotropism.

ORAL QUESTIONS

1. What is the basic unit of nervous system?
2. How do neuron conduct message from brain to other parts?
3. What do you mean by CNS?
4. What are its main parts?
5. Which part controls reflex action?
6. What are endocrine glands?
7. What is the secretion of endocrine gland called?
8. Name a gland of human body which secretes both enzymes and hormone.
9. Which plant hormone helps in cell division?
10. Which hormones help on stem elongation?