Ch-6 Control and Coordination

1. **Control and Coordination –** Systematic working of the various organs of an organism (plants or animals) producing a proper response to the stimulus is called co-ordination.
2. **Coordination in Plants –** Not so elaborate, controlled by phytohormones and external stimulus.
    a. **Phytohormones –**
        i. Control and coordination in plants is done by phytohormones.
        ii. They are naturally occurring chemical substances which control one or other aspect of growth.
        iii. Auxin – Cell enlargement and differentiation.
        iv. Gibberellins – In presence of auxin, promotes cell enlargement and differentiation.
        v. Cytokinin – Promotes cell division, opening of stomata, etc.
        vi. Abscisic acid – Closing of stomata, wilting and falling of leaves, etc.
    b. **Tropic Movements –**
        i. Directional plant growth movement in response to an external stimulus.
        ii. Growth of a plant may be towards the stimulus (positive tropism) or away from it (negative tropism).
        iii. Phototropism – movement in response to light.
        iv. Chemotropism – in response to chemicals.
        v. Hydrotropism – in response to water.
        vi. Geotropism – in response to gravity.
    c. **Nastic Movements –**
        i. Non-directional movement of a plant part in response to an external stimulus.
        ii. May or may not be a growth movement.
        iii. All parts of the organ of a plant are affected equally irrespective of the direction of the stimulus.
        iv. Thigmotactic – Nastic movement in response to touch of an object.
        v. Photo nasty – Nastic movement in response to light.
3. **Coordination in Animals –** Elaborate, very complex and is controlled by neuroendocrine system.
    a. **Endocrine (chemical) Coordination –**
        i. Consists of hormones (chemical messengers) regulating biological processes and secreted by endocrine glands.
        ii. Homeostasis is maintained by hormones by their integrated action and feedback control.
    b. **Nervous Coordination –**
        i. Neuron forms the fundamental unit.
        ii. Sensory neurons in sense organs receive stimulus and transmit impulses to CNS.
        iii. Motor neurons transmit impulses from CNS to effectors.
        iv. Relay or connector neurons serve as links between sensory and motor neurons.
    c. **Nervous System (Human) –**
        i. **CNS** – Consists of brain and spinal cord.

ii. **Brain** – Controls various voluntary (walking, riding, running, etc.) and involuntary actions (sneezing, coughing, etc). Also controls thinking, reasoning, and intelligence.
iii. **Spinal Cord** – Controls reflex action.
iv. **PNS** – Consists of cranial nerves (12 pairs) and spinal nerves (31 pairs).
v. **ANS** – Two set of nerves (parasympathetic and sympathetic) supplying visceral organs which are antagonistic to each other.