

Chapter 7: Control & Coordination**B07****1. What is the need for a system of control and coordination in an organism?**

The maintenance of the body functions in response to changes in the body by working together of various integrated body systems is known as coordination. All the movements that occur in response to stimuli are carefully coordinated and controlled. In animals, the control and coordination movements are provided by nervous and muscular systems. The nervous system sends messages to and away from the brain. The spinal cord plays an important role in the relay of messages. In the absence of this system of control and coordination, our body will not be able to function properly.

For example, when we accidentally touch a hot utensil, we immediately withdraw our hand. In the absence of nerve transmission, we will not withdraw our hand and may get burnt.

2. How does a nerve impulse get transmitted?

The information acquired at the end of the dendrite tip of a nerve cell sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body and then along the axon to its end. At the end of axon, the electrical signal sets off the release of some chemical. Thus impulses are carried from neurons to other cells, muscles and glands,

3. Define neuron.

Neuron is the basic unit of the nervous system.

4. What is synapse?

The very fine gap between axon of one neuron and dendrite of another neuron is called synapse.

5. Identify the parts of a neuron.

The parts of a neuron are cyton or cell body, dendrites and axon.

6. Draw a neat diagram of neuron and label the parts.

7. In a neuron name the part a) where information is acquired? B) Through which information travels as an electrical impulse. C) Where the impulse is converted into chemical signal for onward transmission?

- a) Dendrite – It carries impulse towards cyton.
 b) Axon – It carries impulse from cyton to effector organs like muscles and glands.
 c) At the nerve endings of axons, it is converted in to chemical signal.

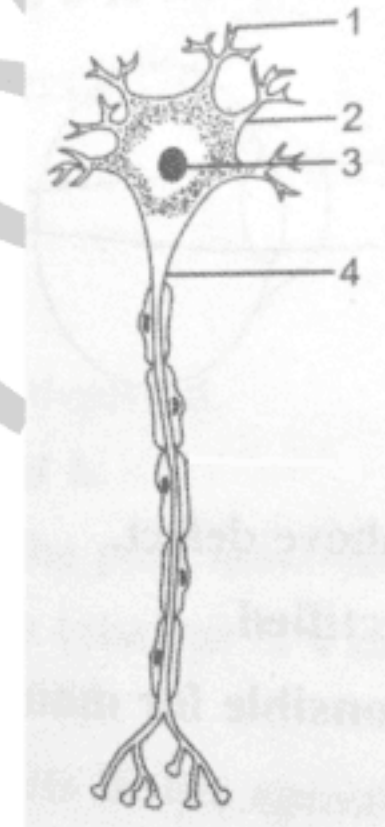
8. The figure alongside shows the diagram of a neuron. Study the diagram and answer the following questions.

- a) Label the parts 1 – 5.

- 1 – Dendrite; 2 – Cell body;
 3 – Nucleus; 4 - Axon

- b) State the function of parts labelled 1 and 4.

The function of axon is to transmit the impulse received by the cell body to another neuron.



9. What happens at the synapse between two neurons?

A very small gap that occurs between the last portion of axon of one neuron and the dendron of the other neuron is known as a synapse. It acts as a one way valve to transmit impulses in one direction only. This uni-direction transfer of impulses occurs as the chemicals are produced in only one side of the neuron i.e., the axon's side. From axon, the impulses travel across the synapse to the dendron of the other neuron.

10. What is the function of receptors in our body? Think of situations where receptors do not work properly. What problems are likely to arise?

Receptors are sensory structures (organs/tissues or cells) present all over the body. The receptors are either grouped in case of eye or ear, or scattered in case of skin.

11. Is there a difference in taste of food if the nose is blocked and eaten?

We smell food before we taste it. The smell hits the brain before the taste does. The smell prepares us for the taste. It tastes less when the nose is blocked.

12. How do we detect that we are touching a hot object?

All information from our environment is detected by the receptors. The receptors of skin sets off chemical reaction that creates an electric impulse. This impulse travels from neurons to other cells and reaches the brain or spinal cord.

13. What is reflex action?

Reflex action is a quick automatic response to a stimulus without the involvement of the brain.

14. What is reflex arc?

The path that an impulse takes in a reflex action is called reflex arc.

15. Why has reflex arc evolved in animals?

Reflex arcs have evolved in animals because the thinking process of the brain is not fast enough.

- 16. Trace the sequence of event which occur when a hot object is touched.**

Heat/pain receptors in the skin → Sensory neuron → Relay neuron → Motor neuron → muscle in the arms.

- 17. Trace the sequence of events which occur when a bright light is focused on the eye.**

Receptors in the eye → sensory neuron → relay neuron → motor neuron → muscle in the eye.

- 18. What is the difference between a reflex action and walking?**

A reflex action is a rapid, automatic response to a stimulus. It does not involve any thinking. Walking is a voluntary action. It is under our conscious control.

- 19. What is the role of the brain in reflex action?**

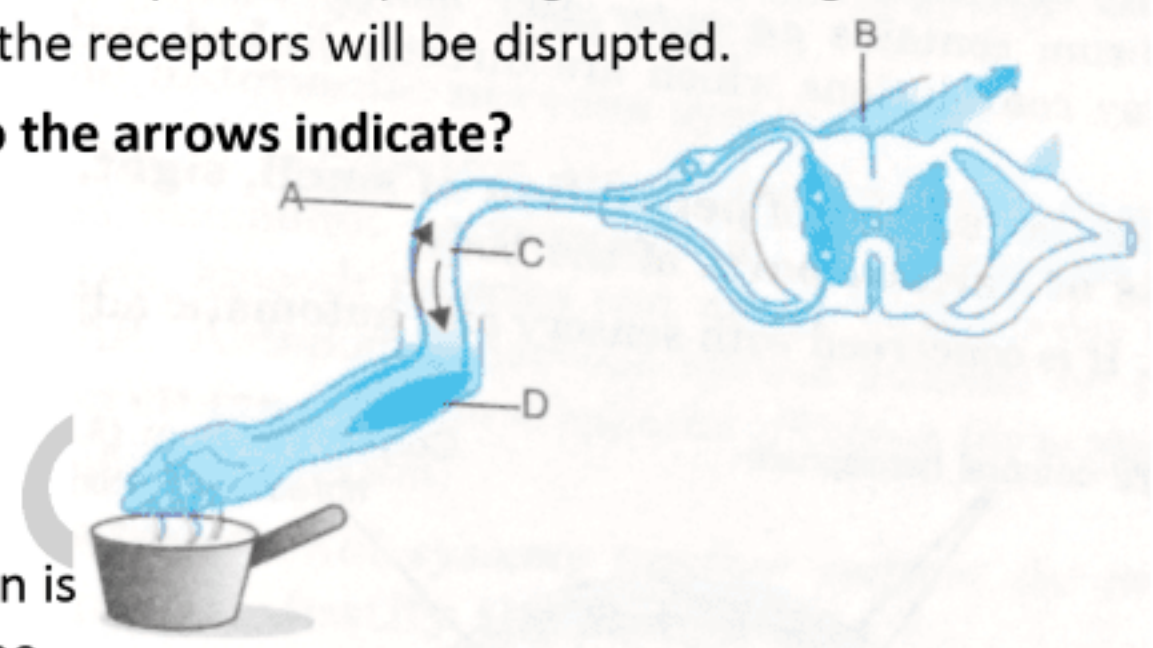
Reflex arcs are formed in the spinal cord and the information (input) reaches the brain. The brain is only aware of the signal and the response that has taken place. The brain has no role to play in the creation of the response.

- 20. Which signals will get disrupted in case of a spinal cord injury?**

The reflex arc connections between the input and output nerves meet in a bundle in the spinal cord. Nerves from all over the body meet in a bundle in the spinal cord on their way to the brain. In case of any injury to the spinal cord, the signals coming from the nerves as well as the signals coming to the receptors will be disrupted.

- 21. Name the parts A, B, C and D. What do the arrows indicate?**

- A – Sensory neuron
B – Spinal cord (CNS)
C – Motor neuron
D – Effector (muscle in arm)



The arrows indicate that sensory neuron is carrying the electric impulse towards the spinal cord and the motor neuron carrying the signal towards the effector.

- 22. The diagram given below is a representation of a certain phenomenon pertaining to the nervous system. Study the diagram and answer the following questions.**

- a) Name the phenomenon that is being depicted**

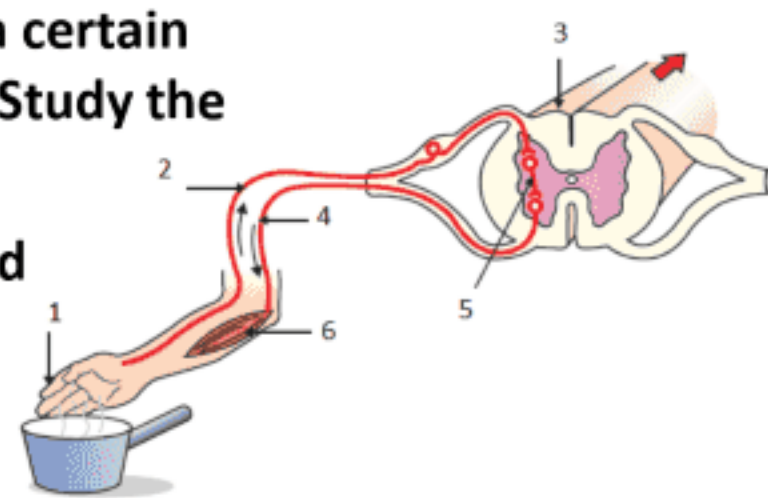
Reflex arc

- b) Give the technical term for the point of contact between the two nerve cells.**

Synapse

- c) Name the parts 1 – 6**

1 – Receptor, 2 – Sensory neuron, 3 – Spinal cord (CNS),
4 – Motor neuron, 5 – Relay neuron, 6 – Effector



- 23. Name the three divisions of the human nervous system.**

The human nervous system consists of three components namely

- a) Central Nervous System (CNS) b) Peripheral Nervous System (PNS)
c) Autonomic Nervous System (ANS)

24. What does the central nervous system consist of?

Central nervous system consists of brain and spinal cord.

25. What does the peripheral nervous system consist of?

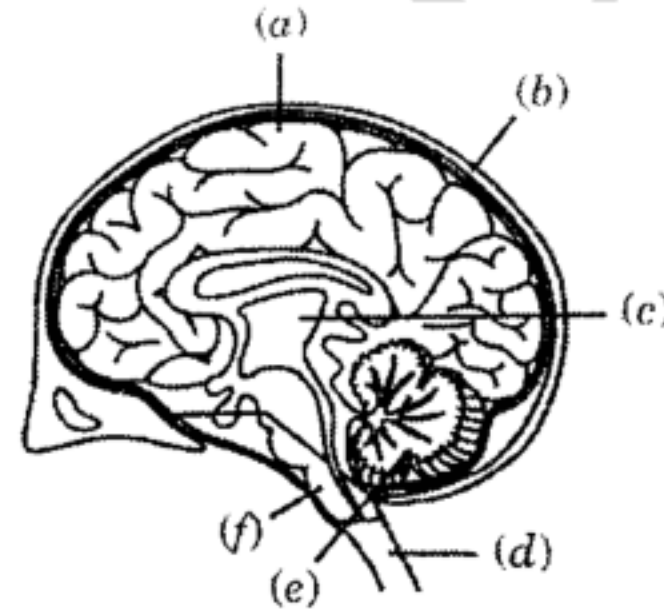
Peripheral nervous system consists of cranial nerves arising from the brain and spinal nerves arising from the spinal cord.

26. Name the parts of the human brain.

Brain is divided into three parts – Fore brain, Mid brain & Hind brain.

27. Identify the unlabelled parts of the brain in the diagram given

- a) Cerebrum
- b) Cranium (skull)
- c) Mid brain
- d) Spinal cord
- e) Medulla

**28. Write the functions of the brain.**

- a) Brain receives information from all parts of the body and integrates it.
- b) It is involved in the voluntary actions like writing, talking, etc.
- c) It sends messages to the muscles.
- d) The brain allows us to think and take actions based on that thinking.

29. Write the functions of the fore-brain.

- a) The fore-brain is the main thinking part of the brain.
- b) It has regions which receives sensory impulses from various receptors.
- c) It has separate areas for hearing, smell, sight, etc.

30. How do we detect the smell of an agarbatti (incense stick)?

The thinking part of our brain is the forebrain. It has separate areas that are specialized for hearing, smelling, sight, taste, touch, etc. The forebrain also has regions that collect information or impulses from the various receptors. When the smell of an incense stick reaches us, our forebrain detects it. Then, the forebrain interprets it by putting it together with the information received from other receptors and also with the information already stored in the brain.

31. How is the sensation of feeling full conveyed?

The sensation of feeling full is because of a centre associated with hunger which is in a separate part of the fore-brain.

32. Write the parts of the hind brain.

Pons, Medulla and cerebellum

33. What are the functions of the hind-brain?

All involuntary actions including blood pressure, salivation, vomiting are controlled by medulla in the hind-brain.

- 34. Mention the part of the brain which controls the involuntary actions like blood pressure, salivation etc.**

Medulla in the hind brain.

- 35. How are involuntary actions and reflex actions different from each other?**

Involuntary actions cannot be consciously controlled. For example, we cannot consciously control the movement of food in the alimentary canal. These actions are however directly under the control of the brain. On the other hand, the reflex actions such as closing of eyes immediately when bright light is focused show sudden response and do not involve any thinking. This means that unlike involuntary actions, the reflex actions are not under the control of brain.

- 36. Write the functions of the cerebellum.**

- Cerebellum controls activities like walking in a straight line, riding a bicycle, picking up a pencil, etc.
- It is responsible for precision of voluntary actions and maintaining the posture and balance of the body.

- 37. Which part of the brain maintains posture and equilibrium of the body?**

Cerebellum, a part of hindbrain is responsible for maintaining posture and equilibrium of the body.

- 38. How is the brain protected?**

- Brain sits inside a bony box.
- Brain is contained in a fluid-filled balloon which provides further shock absorption.

- 39. Mention the part of the brain involved in the following.**

- Walking in a straight line** - Cerebellum
- Picking up a pencil** - Cerebellum
- Blood pressure** – Hind brain
- A question is being asked by the teacher in a class** – cerebrum (fore brain)
- Change in size of the pupil in response to intensity of light** – Mid brain

- 40. Name the structure that protects the spinal cord.**

Vertebral column

- 41. How do animal muscle move?**

Muscle cells have special proteins that change both their shape and their arrangement in the cell in response to nervous electrical impulses. When this happens, new arrangements of these proteins give the muscle cells a shorter form.

- 42. State the two types of movements shown in plants.**

- Movement dependent on growth
- Movement independent of growth.

- 43. Give an example of movement dependent on growth.**

The directional movement of a seedling is caused by growth.

- 44. Give an example of movement independent of growth.**

The leaves of the sensitive plant move very quickly in response to touch.

45. How does the plant detect the touch and how do the leaves move in response?

In plants there is no specialized tissue in plants for the conduction of information. The plants use electrical-chemical means to convey this information from cell to cell.

Plant cells change shape by changing the amount of water in them, resulting in swelling or shrinking, and therefore in changing shapes.

46. Briefly explain how a pea plant grows

In plants like the pea plant climb up other plants or fences by means of tendrils. These tendrils are sensitive to touch. When they come in contact with any support, the part of the tendril in contact with the object does not grow as rapidly as the part of the tendril away from the object. This causes the tendril to circle around the object and thus cling to it.

47. State how concentration of auxins stimulates the cells to grow on the side of the shoot which is away from light.

When growing parts detect light, a hormone called auxin is synthesized at the shoot tip which helps the cells to grow longer. When the light is coming from one side of the plant, auxin diffuses towards the shady side of the shoot. This concentration of auxin stimulates the cells to grow longer on the side of the shoot which is away from light. Thus, the plant appears to bend towards light.

48. (Activity 7.2) Fill a conical flask with water. Cover the neck of the flask with a wire mesh. Keep two or three freshly germinated bean seeds on the wire mesh. Take a cardboard box which is open from one side. Keep the flask in the box in such a manner that the open side of the box faces light coming from a window. After two or three days, you will notice that the shoots bend towards light and roots away from light. Now turn the flask so that the shoots are away from light and the roots towards light. Leave it undisturbed in this condition for a few days.

Have the old parts of the shoot and root changed direction?

The old parts of the roots and shoots change directions.

Are there differences in the direction of the new growth?

New growth in shoot is in direction of sunlight.

What can we conclude from this activity?

Shoot shows growth towards the light.

49. What is meant by phototropic movements?

The growth in a plant part in response to light is called phototropic movement.

50. How does phototropism occur in plants?

The growth movement in plants in response to light stimulus is known as phototropism. The shoots show positive phototropism and the roots show negative phototropism. This means that the shoots bend towards the source of light whereas the roots bend away from the light source.

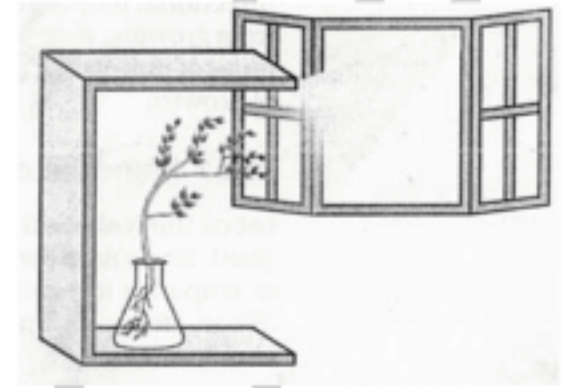
Some examples of phototropism are as follows:

(a) The flower head of sunflower is positively phototropic and hence it moves from east to west along with the sun.

(b) The ovary stalk of groundnut is positively phototropic before fertilization and becomes negatively phototropic after fertilization, so that the fruit is formed underground.

51. What does the given experimental set-up demonstrate?

The experimental set-up demonstrates the response of the plant to the direction of light.



52. What are tropic movements?

The growth in a plant part in response to the gravity is called geotropic movement.

53. What is positive geotropic movement and negative geotropic movement?

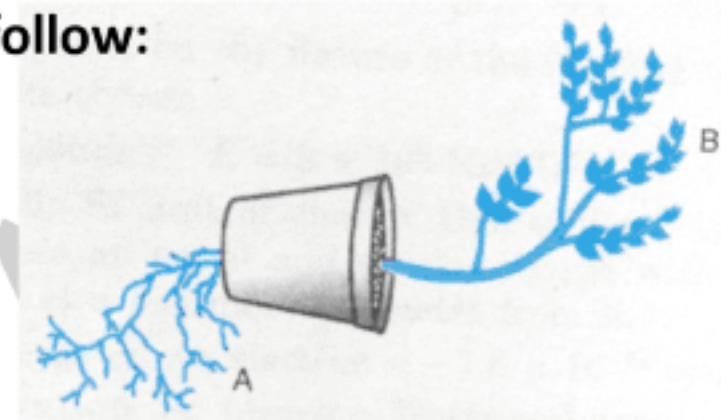
The growth of roots in the direction of the gravity is called positive geotropic movement. The growth of shoots upwards and away from the earth is called negative geotropic movement.

54. Study the given diagram and answer the questions follow:

a) Name the parts A and B.

A – Positive geotropism

B – Negative geotropism



b) What does the above set-up depict?

The upward and downward growth of shoots and roots in response to the pull of earth or gravity is geotropism.

55. Briefly explain how plants grow in the direction of light.

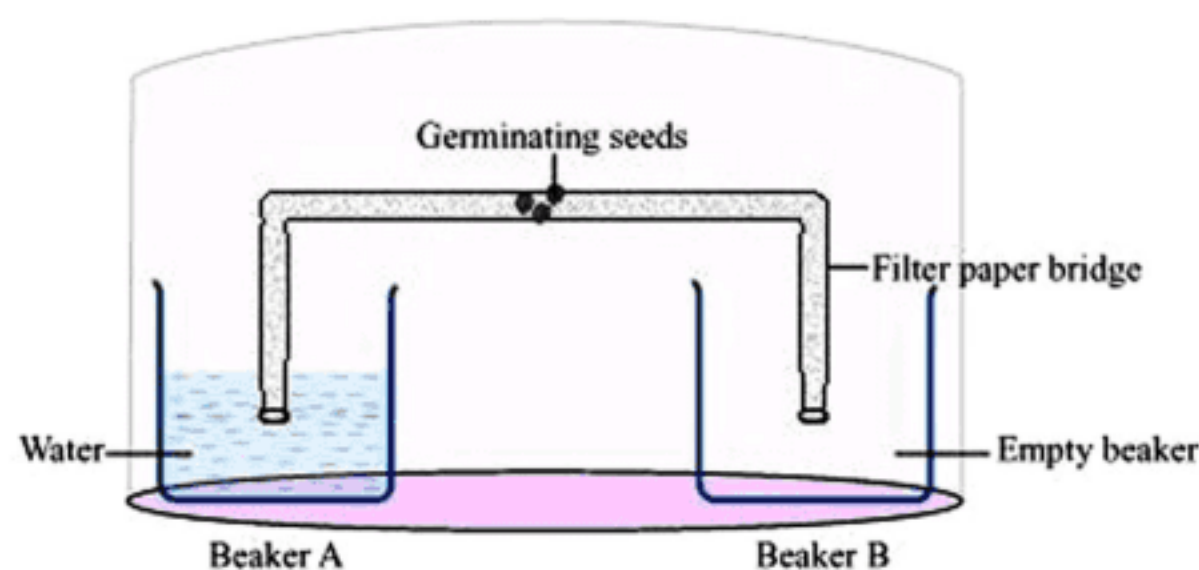
When growing plants detect light, a hormone called auxin, synthesized at the shoot tip, helps the cells to grow longer. When light is coming from one side of the plant, auxin diffuses towards the shady side of the shoot. This concentration of auxin stimulates the cells to grow longer on the side of the shoot which is away from light.

56. What is positive hydrotropism?

The growth of roots in the soil towards the nearest source of water is called hydrotropism.

57. Design an experiment to demonstrate hydrotropism.

Take two small beakers and label them as A and B. Fill beaker A with water. Now make a cylindrical-shaped roll from a filter paper and keep it as a bridge between beaker A and beaker B, as shown in the figure. Attach few germinating seeds in the middle of the filter paper bridge. Now, cover the entire set-up with a transparent plastic container so that the moisture is retained.



Observation:

The roots of the germinating seeds will grow towards beaker A. This experiment demonstrates the phenomenon of hydrotropism.

58. What is chemotropism?

The growth or movement of a plant or plant part in response to a chemical stimulus is called chemotropism.

59. Give an example of chemotropism.

The growth of pollen tubes towards ovules.

60. Give an example to show that movement to response in plants can be slow and fast.

The movement of the sensitive plant (touch-me-not) in response to touch is very quick. The movement of sunflowers in response to day or night is quite slow.

61. How does chemical coordination occur in plants?

Plants do not have a nervous system. Plants respond to stimuli by showing movements. The growth, development, and responses to the environment in plants is controlled and coordinated by a special class of chemical substances known as hormones. These hormones are produced in one part of the plant body and are translocated to other needy parts. For example, a hormone produced in roots is translocated to other parts when required. The five major types of phytohormone are auxins, gibberellins, cytokinins, abscisic acid, and ethylene. These phytohormones are either growth promoters (such as auxins, gibberellins, cytokinins, and ethylene) or growth inhibitors such as abscisic acid.

62. Give one example of the following plant parts:

a) Which is positively phototropic.

Movement of plant shoot towards the light

b) Which is negatively phototropic.

Movement of plant shoot against gravity.

c) Which is positively hydrotropic as well as positively geotropic.

Roots of plant.

d) Which synthesis auxin.

Stem of plants, buds and root tips.

63. Give an example to show that in animals there is controlled directions to growth.

Our arms and fingers grow in certain directions and not haphazardly.

64. Name the medium of transmission in animals for fast transfer of information.

Electrical impulses

65. Mention the limitations to the use of electrical impulses.

a) Electrical impulses will reach only those cells that are connected by nervous tissue. Not each and every cell in the animal body.

b) Cells cannot continually create and transmit electrical impulses.

66. Give reason: Cells cannot continually create and transmit electrical impulses.

Once an electrical impulse is generated in a cell and transmitted, the cell will take some time to reset its mechanisms before it can generate and transmit a new impulse.

- 67. Give reason: Most multicellular organisms use chemical communications rather than electrical impulses.**

Not each and every cell in the animal body can be reached by electrical impulse and cells cannot continually create and transmit electrical impulses.

- 68. Explain how chemical communication between the cells takes place.**

Stimulated cells release a chemical compound, this compound would diffuse all around the original cell. If other cells around are able to detect this compound using special molecules on their surfaces, then they would be able to recognize information and transmit it. This will be slower, but it can potentially reach all cells of the body, regardless of nervous connections, and it can be done steadily and persistently.

- 69. What is the advantage of chemical communication over electrical impulse communication?**

- Chemical communication can reach all cells of the body, regardless of nervous connections.
- It is steady and persistent.
- They act by diffusion to the area of action.

- 70. What are plant hormones?**

Hormones are chemical compounds which help to coordinate growth, development and responses to the environment.

- 71. State the function of a) Auxin b) Gibberellins c) Cytokinins d) Abscisic acid**

- Auxins help in the growth of shoot.
- Gibberellins help in the growth of stem.
- Cytokinins promote cell division.
- Abscisic acid inhibits growth. It also help in wilting of leaves.

- 72. How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?**

The movement of leaves of the sensitive plant, occurs in response to touch or contact stimuli. This movement is independent of growth. The movement of shoot towards light is directional and is growth dependent.

- 73. Give an example of a plant hormone that promotes growth.**

Auxin is an example of growth-promoting plant hormone.

- 74. How do auxins promote the growth of a tendril around a support?**

Auxin is synthesized at the shoot tip. It helps the cell grow longer. When a tendril comes in contact with a support, auxin stimulates faster growth of the cells on the opposite side, so that the tendril forms a coil around the support. This makes the tendrils appear as a watch spring.

- 75. How does chemical coordination take place in animals?**

Chemical coordination in animals takes place through hormones. There are several endocrine glands which secrete various kinds of hormones. These hormones regulate different functions in the body. These hormones are poured into blood through which they reach the target tissue or organ to act. For example; insulin is a hormone which regulates the blood sugar level.

76. What do squirrels, experience when they are in a scary situation?

The body of squirrel has to prepare for either fighting or running away. Both are very complicated activities that will use a great deal of energy in controlled ways. Many different tissue types will be used and their activities integrated together in these actions.

77. What are hormones?

Hormones are chemical messengers that regulate the biological processes in living organisms.

78. How are hormones secreted in animal?

Hormones in animals is directly released into the blood and carried to different parts of the body.

79. Mention the characteristics of hormones.

- Hormones are directly released into the blood.
- They are released in very little quantity.
- They act on specific tissues or organs.
- They are generally slow in action.
- They act away from the site of production.

80. What are target organs?

Target organ are the specific tissues on which hormones acts.

81. Differentiate between plant hormones and animal hormones.

| Plant hormones | Animal hormones |
|--|---|
| Plant hormones control directional growth | Animal hormones does not control directional growth |
| Growth of plant depend on light or gravity | Animal hormones do not depend on light or gravity |

82. How does our body respond when adrenaline is secreted into the blood?

Adrenaline secreted acts on the heart. As a result, the heart beats faster, resulting in supply of more oxygen to our muscles. The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs. This diverts the blood to our skeletal muscles. The breathing rate also increases because of the contractions of the diaphragm and the rib muscles. All these responses together enable the animal body to be ready to deal with the situation.

83. When a boy was followed by a stray dog, he got frightened and started running.**a) Name the hormone that prepared him to escape from the stray dog.**

Adrenaline

b) Locate the position of the gland in our body which secrets this hormone.

Adrenal gland is located on the upper part of each kidney.

c) Mention two effects of this hormone in human body.

The heart starts beating faster. More amount of oxygen is supplied to the muscles.

84. Why is the use of iodised salt advisable?

Iodine is necessary for the thyroid gland to make thyroxin hormone. Deficiency of iodine in our diet causes goitre. To reduce the occurrence of goitre, it is made mandatory to use iodised salt.

85. Write the functions of thyroxin.

Thyroxin regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth.

86. What is goitre?

Goitre is a disease caused due to low secretion of thyroxin. It is caused due to deficiency of iodine in our diet.

87. What is the symptom of goitre?

One of the symptoms in this disease is a swollen neck.

88. Give reason: There is a swelling in the neck region of a person suffering from goitre.

Goitre is caused due to low secretion of thyroxin. Thyroxin is produced by thyroid gland which is located in the neck region. A swelling in the neck is caused due to an enlarged thyroid gland.

89. Which gland produces the growth hormone?

Growth hormone is produced by pituitary gland.

90. Write the function of growth hormone.

Growth hormone regulates growth and development of the body.

91. What is dwarfism?

Dwarfism is a condition caused due to deficiency of growth hormone in childhood.

92. What is puberty?

Puberty is period (10 – 12 years of age) during which there are physical changes in boys and girls.

93. What is testosterone?

Testosterone is a hormone produced in males. It causes changes in the appearance during puberty.

94. What is oestrogen?

Oestrogen is a hormone produced in females. It causes changes in the appearance during puberty.

95. Name the hormones that are released in human males and females when they reach puberty.

Testosterone in human males and Oestrogen in females.

96. What is insulin?

Insulin is a hormone produced by the pancreas.

97. Write the function of insulin.

Insulin helps in regulating blood sugar levels.

98. How is the secretion of insulin regulated?

If the sugar levels in blood rise, they are detected by the cells of the pancreas which respond by producing more insulin. As the blood sugar level falls, insulin secretion is reduced.

99. Why are some patients of diabetes treated by giving injections of insulin?

Diabetes is a disease in which the level of sugar in the blood is too high. Insulin, a hormone secreted by the pancreas, helps in regulating the blood sugar levels. Hence diabetic patients are treated by giving injections of insulin.

100. How does our body maintain blood sugar level?

When blood sugar rise, the cells in the pancreas release respond by producing more insulin. When the blood sugar level falls, insulin secretion is reduced.

101. How does the feedback mechanism regulate the hormone secretion?

The feedback mechanism regulates the timing and amount of hormone to be secreted.

102. An old man is advised by his doctor to take less sugar in his diet.

Name the disease from which the man is suffering - Diabetes

Mention the hormone due to imbalance of which he is suffering from this disease.

Insulin

Which endocrine gland secretes this hormone? Pancreas

103. Name the disorder caused by the following situations:

- a) Under secretion of growth hormone – Dwarfism
- b) Over secretion of growth hormone – Extremely tall (giants)
- c) Under secretion of insulin – Diabetes
- d) Deficiency of iodine - Goitre

104. Name the hormone responsible for the following functions.

- a) Regulating the blood sugar level – Insulin
- b) Regulating the carbohydrates, proteins and fat metabolism in the body – Thyroxin
- c) Changes at puberty in human females – Oestrogen
- d) Regulating the growth and development of the body – Growth hormone

105. Name the gland and the hormone secreted by the gland, which are associated with the following

- a) A girl has grown extremely tall – Pituitary gland, Growth hormone.
- b) A woman has a swollen neck – Thyroid gland, Thyroxin
- c) A gland present in female but not in males – ovary
- d) A gland associated with kidneys – Adrenal gland

106. Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.

| Nervous system mechanism | Hormonal system mechanism |
|---|--|
| 1. The information is conveyed in the form of electric impulse. | 1. The information is conveyed in the form of chemical messengers. |
| 2. The axons and dendrites transmit the information through a coordinated effort. | 2. The information is transmitted or transported through blood. |
| 3. The flow of information is rapid and the response is quick. | 3. The information travels slowly and the response is slow. |
| 4. Its effects are short lived. | 4. It has prolonged effects. |

107. What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?

| Movement in sensitive plants | Movement in our legs |
|--|---|
| 1. The movement that takes place in a sensitive plant such as Mimosa pudica occurs in response to touch (stimulus). | 1. Movement in our legs is an example of voluntary actions. |
| 2. For this movement, the information is transmitted from cell to cell by electrochemical signals as plants do not have any specialized tissue for conduction of impulses. | 2. The signal or messages for these actions are passed to the brain and hence are consciously controlled. |
| 3. For this movement to occur, the plant cells change shape by changing the amount of water in them. | 3. In animal muscle cells, some proteins are found which allow the movement to occur. |

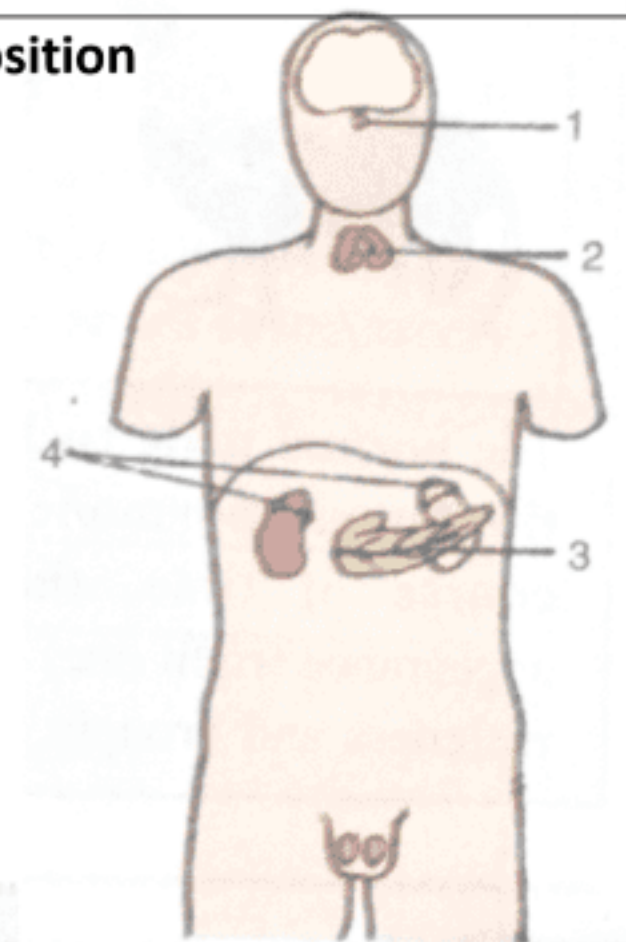
108. Given is an outline diagram of human body showing the position of endocrine glands.

a) Name the parts 1 – 4.

- 1 – Pituitary gland
- 2 – Thyroid gland
- 3 – Pancreas
- 4 – Adrenal gland

b) Name the nutrient which is essential for the normal working of part 2.

Iodine



109. The figure shows an endocrine gland.

a) Name the gland

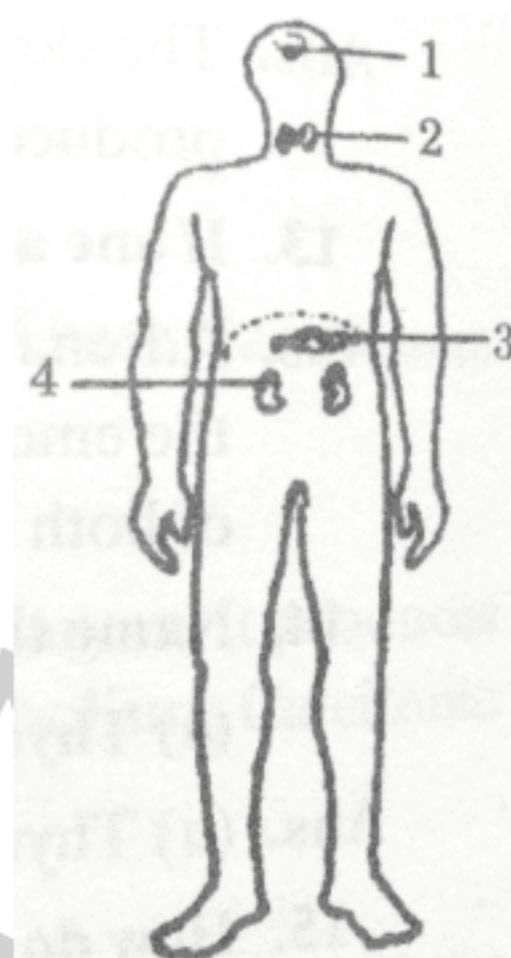
Adrenal gland

b) Name the hormone secreted by the gland

Adrenaline



110. Given alongside is the outline of the human body showing important glands.



a) Name the glands marked 1 – 4

- 1 – Pituitary gland
- 2 – Thyroid gland
- 3 – Pancreas
- 4 – Adrenal gland

b) Give one important function of part 2

Thyroxin regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth.

c) Name the gland that secretes the fight or flight hormone.

Adrenal gland

111.

Fill in the blanks:

- 1) The path that an impulse takes in a reflex action is called reflex arc.
- 2) The main coordinating centre of the body is the brain.
- 3) Central nervous system consists of brain and spinal cord.
- 4) The part which receives the information from all parts of the body and integrates is the central nervous system.
- 5) The communication between the central nervous system and the other parts of the body is facilitated by the peripheral nervous system.
- 6) Cranial nerves arise from the brain.
- 7) Spinal nerves arise from the spinal cord.
- 8) The thinking part of the brain is fore-brain.
- 9) Many of the involuntary actions are controlled by the mid-brain and hind-brain.
- 10) Blood pressure, salivation and vomiting are controlled by the medulla in the hind-brain.
- 11) Maintaining the posture and balance of the body is the function of cerebellum.
- 12) Spinal cord is protected by the vertebral column.
- 13) The plants use electrical-chemical means to convey information from cell to cell.
- 14) Plant cells change shape by changing the amount of water in them.
- 15) The upward and downward growth of shoots and roots in response to the pull of earth or gravity is called geotropism.
- 16) Growth of pollen tubes towards ovules is an example of chemotropism.
- 17) The plant hormone produced when growing plants detect light is auxin.
- 18) The plant hormone produced which helps in growth of stem is gibberellins.
- 19) The plant hormone which helps in cell division is cytokinins.
- 20) The plant hormone which inhibits growth is abscisic acid.
- 21) The plant hormone which is responsible for wilting of leaves is abscisic acid.

- 22) The specific tissues on which hormones acts are called target organs.
- 23) Thyroxin is produced by thyroid gland.
- 24) Deficiency of iodine in diet causes goitre.
- 25) Iodine is necessary for the synthesis of hormone thyroxin.
- 26) The animal hormone that regulates carbohydrate, protein and fat metabolism in the body is thyroxin.
- 27) Deficiency of iodine in the diet leads to goitre.
- 28) One of the symptoms in goitre is a swollen neck.
- 29) Growth hormone is one of the hormones secreted by the pituitary gland.
- 30) The hormone that regulates growth and development of the body is growth hormone.
- 31) Deficiency of growth hormone in childhood leads to dwarfism.
- 32) The period (10 – 12 years of age) during which there are physical changes in boys and girls is called puberty.
- 33) Puberty occurs in the age of 10 – 12 years.
- 34) Changes associated with puberty are because of the secretion of testosterone in males.
- 35) Changes associated with puberty are because of the secretion of Oestrogen in females.
- 36) The hormone insulin is produced in pancreas.
- 37) The hormone that helps in regulating blood sugar levels is insulin.
- 38) The timing and amount of hormone released are regulated by feedback mechanisms.

Multiple choice Questions:

1. Which of the following is a plant hormone?
(a) Insulin (b) Thyroxin (c) Oestrogen **(d) Cytokinin**
2. The gap between two neurons is called a
(a) dendrite. **(b) synapse.** (c) axon. (d) impulse.
3. The brain is responsible for
(a) thinking. (b) regulating the heart beat.
(c) balancing the body. **(d) all of the above.**
4. Which of the following statements is correct about receptors?
(a) Gustatory receptors detect taste while olfactory receptors detect smell
(b) Both gustatory and olfactory receptors detect smell
(c) Auditory receptors detect smell and olfactory receptors detect taste
(d) Olfactory receptors detect taste and gustatory receptors smell
5. Electrical impulse travels in a neuron from
(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

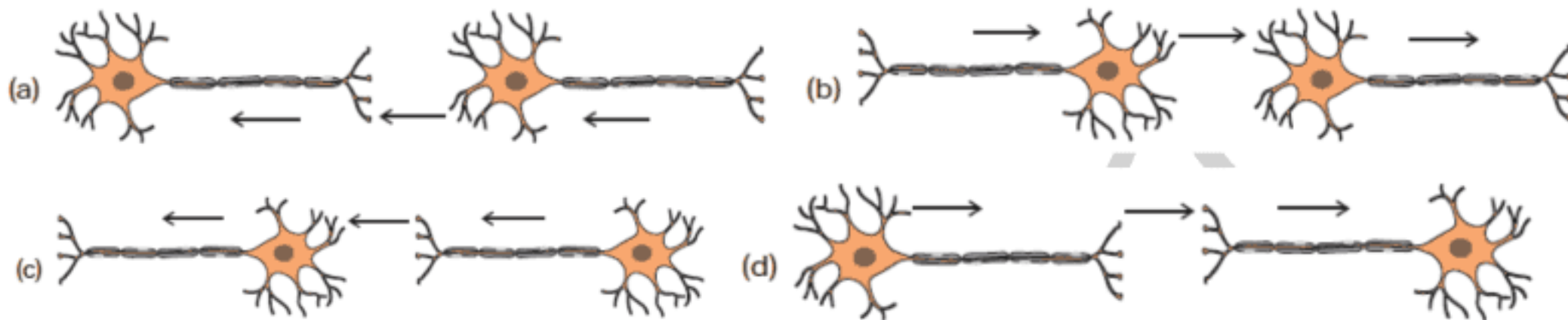
6. In a synapse, chemical signal is transmitted from
(a) dendritic end of one neuron to axonal end of another neuron
(b) axon to cell body of the same neuron
(c) cell body to axonal end of the same neuron
(d) axonal end of one neuron to dendritic end of another neuron
7. In a neuron, conversion of electrical signal to a chemical signal occurs at/in
(a) cell body **(b) axonal end** (c) dendritic end (d) axon
8. Which is the correct sequence of the components of a reflex arc?
(a) Receptors → Muscles → Sensory neuron → Motor neuron → Spinal cord
(b) Receptors → Motor neuron → Spinal cord → Sensory neuron → Muscle
(c) Receptors → Spinal cord → Sensory neuron → Motor neuron → Muscle
(d) Receptors → Sensory neuron → Spinal cord → Motor neuron → Muscle
9. Which of the following statements are true?
(i) Sudden action in response to something in the environment is called reflex action
(ii) Sensory neurons carry signals from spinal cord to muscles
(iii) Motor neurons carry signals from receptors to spinal cord
(iv) The path through which signals are transmitted from a receptor to a muscle or a gland is called reflex arc
(a) (i) and (ii) (b) (i) and (iii) **(c) (i) and (iv)** (d) (i) , (ii) and (iii)
10. Which of the following statements are true about the brain?
(i) The main thinking part of brain is hind brain
(ii) Centres of hearing, smell, memory, sight etc are located in fore brain.
(iii) Involuntary actions like salivation, vomiting, blood pressure are controlled by the medulla in the hind brain
(iv) Cerebellum does not control posture and balance of the body
(a) (i) and (ii) (b) (i), (ii) and (iii) **(c) (ii) and (iii)** (d) (iii) and (iv)
11. Posture and balance of the body is controlled by
(a) cerebrum **(b) cerebellum** (c) medulla (d) pons
12. Spinal cord originates from
(a) cerebrum **(b) medulla** (c) pons (d) cerebellum
13. The movement of shoot towards light is
(a) geotropism (b) hydrotropism (c) chemotropism **(d) phototropism**
14. The main function of abscisic acid in plants is to
(a) increase the length of cells (b) promote cell division
(c) inhibit growth (d) promote growth of stem
15. Which of the following is not associated with growth of plant?
(a) Auxin (b) Gibberellins (c) Cytokinins **(d) Abscisic acid**

16. Iodine is necessary for the synthesis of which hormone?
(a) Adrenaline (b) Thyroxin (c) Auxin (d) Insulin
17. Choose the incorrect statement about insulin
(a) It is produced from pancreas
(b) It regulates growth and development of the body
(c) It regulates blood sugar level
(d) Insufficient secretion of insulin will cause diabetes
18. Select the mis-matched pair
(a) Adrenaline : Pituitary gland (b) Testosterone: Testes
(c) Estrogen : Ovary (d) Thyroxin : Thyroid gland
19. The shape of guard cells changes due to change in the
(a) protein composition of cells (b) temperature of cells
(c) amount of water in cells (d) position of nucleus in the cells
20. The growth of tendril in pea plants is due to
(a) effect of light (b) effect of gravity
(c) rapid cell divisions in tendrillar cells that are away from the support
(d) rapid cell divisions in tendrillar cells in contact with the support
21. The growth of pollen tubes towards ovules is due to
(a) hydrotropism **(b) chemotropism** (c) geotropism (d) phototropism
22. The movement of sunflower in accordance with the path of sun is due to
(a) phototropism(b) geotropism (c) chemotropism (d) hydrotropism
23. The substance that triggers the fall of mature leaves and fruits from plants is due to
(a) auxin (b) gibberellin **(c) abscisic acid** (d) cytokinin
24. Which of the following statements about transmission of nerve impulse is incorrect?
(a) Nerve impulse travels from dendritic end towards axonal end
(b) At the dendritic end electrical impulses bring about the release of some chemicals which generate an electrical impulse at the axonal end of another neuron
(c) The chemicals released from the axonal end of one neuron cross the synapse and generate a similar electrical impulse in a dendrite of another neuron
(d) A neuron transmits electrical impulses not only to another neuron but also to muscle and gland cells
25. Involuntary actions in the body are controlled by
(a) medulla in fore brain (b) medulla in mid brain
(c) medulla in hind brain (d) medulla in spinal cord
26. Which of the following is not an involuntary action?
(a) Vomiting (b) Salivation (c) Heart beat **(d) Chewing**

27. When a person is suffering from severe cold, he or she cannot

- (a) differentiate the taste of an apple from that of an ice cream
- (b) differentiate the smell of a perfume from that of an agarbatti**
- (c) differentiate red light from green light
- (d) differentiate a hot object from a cold object

28. What is the correct direction of flow of electrical impulses?



29. Which statement is not true about thyroxin?

- (a) Iron is essential for the synthesis of thyroxin**
- (b) It regulates carbohydrates, protein and fat metabolism in the body
- (c) Thyroid gland requires iodine to synthesise thyroxin
- (d) Thyroxin is also called thyroid hormone

30. Dwarfism results due to

- (a) Excess secretion of thyroxin
- (b) Less secretion of growth hormone**
- (c) Less secretion of adrenaline
- (d) Excess secretion of growth hormone

31. Dramatic changes of body features associated with puberty are mainly because of secretion of

- (a) oestrogen from testes and testosterone from ovary
- (b) estrogen from adrenal gland and testosterone from pituitary gland
- (c) testosterone from testes and estrogen from ovary**
- (d) testosterone from thyroid gland and estrogen from pituitary gland

32. A doctor advised a person to take an injection of insulin because

- (a) his blood pressure was low
- (b) his heart was beating slowly
- (c) he was suffering from goitre
- (d) his sugar level in blood was high**

33. The hormone which increases the fertility in males is called

- (a) oestrogen
- (b) testosterone**
- (c) insulin
- (d) growth hormone

34. Which of the following endocrine glands is unpaired?

- (a) Adrenal
- (b) Testes
- (c) Pituitary**
- (d) Ovary

35. Junction between two neurons is called

- (a) cell junction
- (b) neuro muscular junction
- (c) neural joint
- (d) synapse**

36. In humans, the life processes are controlled and regulated by

- (a) reproductive and endocrine systems
- (b) respiratory and nervous systems
- (c) endocrine and digestive systems
- (d) nervous and endocrine systems**

Match the following:

| Column I | Column II |
|-----------------|---|
| 1. Cerebrum | a) Salivation, blood pressure, vomiting |
| 2. Cerebellum | b) Involuntary functions |
| 3. Hypothalamus | c) Sensory reception, voluntary actions |
| 4. Medulla | d) coordination of motor functions, balance of body |

| Column I | Column II |
|------------------|--|
| 1. Auxin | a) Rapid cell division in fruits & seeds |
| 2. Gibberellins | b) Inhibition of growth |
| 3. Cytokinins | c) Cells grow longer |
| 4. Abscisic acid | d) Growth of stem |