

5

LIFE PROCESSES – MOVEMENT IN ANIMALS AND PLANTS

I. Multiple choice questions: Tick (✓) the correct choice.

1. Cilia are used for locomotion in case of
(a) *Amoeba* (b) *Euglena* (c) *Paramecium* (d) *Hydra*

Ans. (c)

2. Earthworm moves by means of
(a) flagella (b) circular and longitudinal muscles
(c) fins (d) hind limbs

Ans. (b)

3. Synovial cavity is found in
(a) immovable joints (b) freely movable joints
(c) slightly movable joints (d) muscles

Ans. (b)

4. In tropic movement, plant parts move
(a) away from the stimulus (b) towards the stimulus
(c) either towards or away from the stimulus
(d) only towards soil

Ans. (c)

5. *Amoeba* uses these for locomotion.
(a) cilia (b) flagella (c) pseudopodia (d) tentacles

Ans. (c)

6. Roots are
(a) positively geotropic but negatively phototropic.
(b) positively geotropic and positively phototropic.
(c) negatively geotropic and negatively phototropic.
(d) negatively geotropic but negatively phototropic.

Ans. (a)

7. Growth resulting in movement of a plant part in response to water is called
(a) thigmotropism (b) phototropism
(c) hydrotropism (d) geotropism

Ans. (c)

8. Geotropism is the movement of plant parts in response to
(a) light (b) gravity (c) temperature (d) touch

Ans. (b)

9. The ball and socket joints are found in
(a) skull (b) knee
(c) between femur and pelvis (d) between vertebrae

Ans. (c)

10. Which of the following is not a flightless bird?
(a) Penguin (b) Emu (c) Pigeon (d) Ostrich

Ans. (c)

11. How many pairs of walking legs are there in an insect?
(a) One pair (b) Two pairs (c) Three pairs (d) Four pairs

Ans. (c)

12. Skull bones have
(a) fixed joints (b) movable joint
(c) partially movable joint (d) no joint

Ans. (a)

13. Pseudopodia is also known as
(a) permanent feet (b) false feet
(c) true feet (d) joint feet

Ans. (b)

14. Paramecium can swim forward and backward with the help of
(a) tentacles (b) flagella (c) walking legs (d) cilia

Ans. (d)

15. Which of the following is numerous and the shortest organ of locomotion?

(a) Pseudopoda (b) Cilia (c) Flagella (d) Tentacles

Ans. (b)

II. Fill in the blanks.

1. A joint occurs where two meet.
2. When a muscle, it regains to its original shape.
3. In a positive response, the movement is the stimulus.

4. The bony framework of the body that gives shape to the body is called a
 5. The point where two or more bones meet is called
 6. hold bones together at movable joints.
 7. A joint allows movement in all directions.
 8. Growth in response to touch is called
 9. *Amoeba* moves with the help of while paramecium moves with the help
 10. *Amoeba* lives in water but does not
 11. The wrist is made up of bones called
 12. is an example of flightless bird.
 13. fin of a fish acts like a rudder.
 14. Non-directional movements in plants are called
 15. Earthworm moves with the help of its
 16. is similar to bone, but is not as hard.
 17. helps in holding the bones together.
 18. is considered both a plant and an animal.
 19. is an example of movable joint.
 20. is the muscle which bends the forearm.
- Ans.** 1. Bones 2. Relax 3. towards 4. Skeleton 5. Joint 6. Ligament 7. Ball & Socket joint 8. Thigmotropism 9. Pseudopodia, Cilia 10. Swim 11. Carpels 12. Ostrich 13. Tail 14. Nastic movement 15. Setae 16. Cartilage 17. Ligament 18. *Euglena* 19. Hinge joint 20. Biceps.

III. Choose the correct answer from within the brackets and complete the sentences.

1. *Paramecium* moves with the help of (flagella/cilia)
2. Most mammals are (bipeds/quadrupeds)
3. The bones are held together by (ligaments/tendons)
4. Bones of the skull are held together by (semi movable joints/fixed joints)

5. Pivot joint provides movement.
(on directional/up and down)
6. The outer ear is made of (cartilage/muscle)
7. The muscle found in the heart is
(smooth muscles/cardiac muscles)
8. Response of plants to sunlight is called
(thigmotropism/phototropism)

Ans. 1. Cilia 2. Quadrupeds 3. Ligaments 4. Fixed joints 5. Up and down 6. Cartilage 7. Cardiac muscles 8. Phototropism.

IV. Write true or false for each statement. Rewrite the false statements correctly.

1. All vertebrates have a skeleton.
2. Bones in the ankle and wrist have pivot joints.
3. The direction of nastic movement is either towards or away from the stimulus.
4. *Amoeba* can swim.
5. In *Euglena*, the parallel force causes the body to rotate.
5. *Amoeba* cannot walk.
7. Pseudopodia consists of protoplasm.
8. Cilia is longer than flagellia.
9. Humerus is the bone of the upper arm.
10. Hip bone is also called pectoral girdle.
11. Non-directional movements in plants are called tropic movement.
12. *Chlamydomonas* exhibits locomotion.
13. Hydra catches its prey with the help of its flagella.
14. Muscles are attached to bones.
15. The stem shows positive geotropism and negative phototropism.
16. Tropic movements in plants are due to hormones.
17. Smooth muscles are also called striated and voluntary muscles.
18. Ribs are attached to the vertebrae and the breast bone.
19. Tarsals form the wrist bone.
20. Femur forms the bone of upper arm.

Ans. 1. T 2. F 3. F 4. F 5. T 6. F 7. T 8. F 9. T 10. F 11. F
12. T 13. F 14. T 15. F 16. F 17. F 18. T 19. F 20. F

V. Answer the following questions.

(i) Match the name of the organism in Column A with the organs of movement in Column B.

Column A	Column B
1. <i>Amoeba</i>	(a) flagellum
2. <i>Paramecium</i>	(b) fins
3. <i>Hydra</i>	(c) cilia
4. fish	(d) pseudopodia
5. <i>Euglena</i>	(e) tentacles

Ans. 1. (d) 2. (c) 3. (e) 4. (b) 5. (a)

(ii) Match the following animals with their organs of locomotion.

Column A	Column B
1. Dog	(a) Pectoral fin
2. Whale	(b) Muscular paddles
3. Bird	(c) Feathered wing
4. Earthworm	(d) Setae
5. Insect	(e) Joint feet
6. Fish	(f) Legs for running

Ans. 1. (f) 2. (b) 3. (c) 4. (d) 5. (e) 6. (a)

VI. Answer the following questions.

(a) Given below is a list of various body parts. Name the joints present in these parts.

finger, toes, wrist, knee, ankle, elbow, shoulder, hip, neck, skull

Ans. **Hinge joint.** Finger, knee, toes, elbow

Gliding joint. Wrist, ankle

Ball and socket joint. Shoulder, hip

Pivot joint. Neck

Immovable joint. Skull

(b) State the types of movement in the following:

- (i) *Amoeba* (ii) *Paramecium* and
(iii) *Euglena* (iv) *Hydra*

Ans. Organisms Movement

- Amoeba* — Amoeboid
Paramecium — Creeping and swimming
Euglena — Flagellar movement
Hydra — Looping and somersaulting

(c) Where are the following found?

- (i) Glenoid cavity _____

Ans. Glenoid cavity is present in pectoral girdle.

- (ii) Radius and ulna _____

Ans. Radius and ulna are the bones of lower arm.

- (iii) Metacarpals _____

Ans. Metacarpals are the bones of palm.

- (iv) Sternum _____

Ans. Sternum is the bone of chest.

- (v) Humerus _____

Ans. Humerus is the bone of upper arm.

(d) Name the structures associated with locomotion in the following organisms:

- (i) *Amoeba* (ii) *Paramecium*
(iii) *Euglena* (iv) *Hydra*
(v) Fish (vi) Reptiles
(vii) Birds (viii) Frog

Ans. Organisms Locomotory organs

- Amoeba* — Pseudopodia
Paramecium — Cilia
Euglena — Flagellum
Hydra — Tentacles
Fish — Tail with fins
Reptiles — Fore limbs and hind limbs
Birds — Wings
Frog — Webbed feet

(e) Name the joints found in/between:

- (i) Teeth and gum (ii) Finger (iii) Skull
(iv) Knee (v) Shoulder

- Ans.** 1. Teeth and gum — Immovable joint
2. Finger — Hinge joint
3. Skull — Immovable joint
4. Knee — Hinge joint
5. Shoulder — Ball and socket joint

(f) Study the given diagram and answer the following questions:

(i) Name the plant

Ans. Touch-me-not (*Mimosa*)

(ii) What happens to the leaves when they are touched?

Ans. The leaflet of touch-me-not plant drops if we touch it.

(iii) What is this phenomenon called?

Ans. This phenomenon is called thigmotropism.

(iv) Explain the above phenomenon.

Ans. It is a response of a plant to the stimulus of touch. The leaflet of touch-me-not plant drops if we touch it and becomes straight again after some time.



(g) Fill in the blanks, by writing positive or negative against the stem and root.

Phototropic

_____ Stem

_____ Root

Hydrotropic

_____ Stem

_____ Root

Geotropic

_____ Stem

_____ Root

Ans. Phototropic

Positive — Stem

Negative — Root

Hydrotropic

Negative — Stem

Positive — Root

Geotropic

Negative — Stem

Positive — Root

VII. Differentiate between the following:

1. Tendons and ligaments.

Ans.	Tendons	Ligaments
	(1) They connect muscles to bone.	(1) They connect bone to bone.
	(2) These are non-elastic bonds.	(2) These are elastic bonds.
	(3) They stabilise the bones and capable of bearing sudden stresses.	(3) They stabilise the joints by holding the articulating bones together.

2. Hydrotropism and thigmotropism.

Ans.	Hydrotropism	Thigmotropism
	(1) It is a response of plant organs to the stimulus of water.	(1) It is a response of plant organs to the stimulus of touch.
	(2) In plants, roots are positively hydrotrophic and shoots are negatively hydrotrophic.	(2) The leaflets of touch-me-not plant show this type of movement.

3. Hinge joint and ball-and-socket joint.

Ans.	Hinge joint	Ball-and-socket joint
	(1) This joint moves only in one plane.	(1) This joint moves in any plane.
	(2) Elbow joint (joint between upper and lower arm), knee joint (joint-between thigh and lower leg) and wrist joint (joint between fore arm and wrist) are some examples of hinge joint.	(2) Shoulder joint (joint between humerus and pectoral girdle), hip joint (joint between femur and pelvic girdle) are the examples of ball-and-socket joint.

4. Movement and locomotion.

Ans.	Movement	Locomotion
	(1) Movement is only the change of position of body parts in relation to the body.	(1) Locomotion is the movement of the entire body of an organism from one place to another.
	(2) Movement, helps the plants for opening and closing of leaf and flowers. In some plants, it also helps to catch insects.	(2) In animals, locomotion occurs mainly to gather food and to escape from enemies.

5. Tropic and nastic movements.

Ans.	Tropic Movement	Nastic movement
	(1) The movement of plant parts which take place towards or away from the stimulus.	(1) The response which a plant makes to an external stimulus (such as sunlight, temperature, alternation of day and night) is called nastic movement.
	(2) These movements are directional movements.	(2) These movements are non-directional movements.
	(3) Roots and shoots show tropic movement toward sunlight.	(3) Opening and closing of stomata, flowers and lowers are some non-direction (nastic movements).

6. Cartilage and bone.

Ans.	Bone	Cartilage
	(1) Bones are hard connective tissues.	(1) Cartilage are soft connective tissues.
	(2) Major constituents of bones are calcium and phosphorus.	(2) Minerals are absent in cartilage.

(3) Bones protect some delicate organs such as brain and spinal cord.	(3) Cartilage form the end of long bones and protect them from friction.
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VIII. Answer the following:

1. Why do animals need locomotion?

Ans. Animals need locomotion for the following purposes:

- (i) **For nutrition.** Animals need locomotion for the search of food because they are heterotrophic and cannot prepare their own food.
- (ii) **Migration.** Locomotion enables animals to move from an unfavourable place or environment to a favourable place or environment.
- (iii) **Reproduction.** Locomotion helps animals to find their life partner for reproduction.
- (iv) Locomotion helps animals to escape from their enemies and predators.

2. How is locomotion brought about in humans?

Ans. Locomotion in humans is brought about by: Bones and muscles.

Bones comprising the skeletal system and muscles comprising the muscular system.

Locomotion in animals in due to the co-ordinated action of muscles on the limb bones. The movement of bones is due to the series of contraction and relaxation of muscles.

3. How is locomotion different from movement?

Ans. All the living organisms show some type of movement but it is not necessary that all living organisms show locomotion.

Movement is only the change in position of only a part of the body while **locomotion** involves the movement of the whole body. For example, growth of stem towards light is movement while walking, running, flying of animals and birds are locomotion.

4. In which animals, do you find the following structures?

- (a) Webbed feet (b) Pseudopodia (c) Tentacles

Ans. (a) Webbed feet are the locomotory organs of frog in aquatic life.

(b) Pseudopodia are the locomotory organs of *Amoeba*.

(c) Tentacles are the locomotory organs of *Hydra*.

5. How does locomotion take place in an earthworm?

Ans. Movement in Earthworm:

Movement in earthworm is brought about by the alternate contractions of circular and longitudinal muscles. These contractions of muscles form a wave of thinning and thickening to pass backwards.

In the movement of earthworm, circular muscles and longitudinal muscles work in alternate way. When circular muscles contract, the body gets longer and narrower. When longitudinal muscles contract, the body gets thicker and shorter. These actions of muscles cause the motion that moves the earthworm through the soil.

6. What is tropism?

Ans. Tropism is the movement of plant organs in response to an external stimulus, such as light, touch, gravity, etc. Tropism in response to light, gravity, water and touch is called phototropism, geotropism, hydrotropism and thigmotropism respectively.

7. What is meant by positive and negative responses.

Ans. Response is the activity that can be elicited by a stimulus. For example, movement of plant parts in response to light, gravity, water, etc.

When the movement occurs towards stimulus it is called *positive response* and when it is away from the stimulus, it is called *negative response*, e.g., stems are *positively phototropic* and roots are *negatively phototropic*.

8. How are tropic movements different from nastic movements?

Ans. Tropic movement and Nastic movement:

On the basis of direction, plant movement is of two types:

The directional growth of plant organs in response to an external stimulus such as light, water, gravity is called **tropic movement**. For example, bending of stem towards a light source.

The movement of plant organs in response to external stimulus that are independent of the direction of stimulus are called **nastic movement**. For example, opening and closing of flowers in response to light.

9. Write in brief, about the different types of tropic movements.

Ans. Tropic movement may be of following types:

- (i) **Phototropism.** The movement of plant parts in response to light is called phototropism. In plants, shoot generally shows growth towards light (positive phototropism) and root shows growth away from light (negative phototropism).
- (ii) **Geotropism.** The movement of plant parts in response to gravity is called geotropism. For example, roots generally grow towards soil so they are positively geotropic and shoots grow away from soil so they are negatively geotropic.
- (iii) **Hydrotropism.** The movement of plant parts in response to water is called hydrotropism. Roots are usually positively hydrotropic.
- (iv) **Thigmotropism.** The movement of plant parts in response to touch is called thigmotropism. It can be seen in touch-me-not (*Mimosa*) plant.

10. Name the stimulus which causes the following movements in plants:

geotropism, opening and closing of flowers, phototropism, thigmotropism, hydrotropism.

Ans. Movement

Geotropism
Opening and closing
of flowers
Phototropism
Thigmotropism
Hydrotropism

Stimulus

— Due to gravity
— Due to light
— Due to light
— Due to touch
— Due to water

11. Describe how the triceps and biceps work together to bend the arm up and straighten it.

Ans. Biceps and triceps are the two muscles which work together to raise and lower the arms. Both of these muscles produce opposite effects, so they are called antagonists. When the biceps contract it causes the joint to bend and at the same time stretches the triceps. When triceps contract, it causes joints to straighten and stretches the biceps. Thus, both of these muscles produce opposite movement.

12. How is the movement of plants different from that in animals?

Ans. In animals, body movement is the result of bones and muscles working together. Bones are not able to move themselves. In plants, movement is due to response of certain stimulus like, light, gravity and touch.

13. Name the locomotive organs of the following:

- | | |
|--------------------|-----------------------|
| (a) <i>Amoeba</i> | (b) <i>Paramecium</i> |
| (c) <i>Euglena</i> | (d) <i>Hydra</i> |

Ans. Animals

Locomotory Organs

<i>Amoeba</i>	— Pseudopodia
<i>Paramecium</i>	— Cilia
<i>Euglena</i>	— Flagellum
<i>Hydra</i>	— Tentacles

14. What is the difference between pseudopodia and cilia?

Ans. Pseudopodia are the finger-like projections formed by the *Amoeba* to move from one place to another. Pseudopodia are also called false feet.

Cilia are the hair-like structures present on the surface of

Paramecium. These cilia help the animal to move from one place to another.

15. How does a paramecium swim in water?

Ans. Paramecium can swim with the help of cilia. These cilia strikes the water throughout its length and animal moves in the direction opposite to the stroke. The animal swims in an elongated spiral path or rotates upon its own longitudinal axis. The animals can swim in forward and backward directions.

16. What are the main functions of the skeleton?

Ans. Functions of skeletal system:

- (i) It provides frame work to the body.
- (ii) It protects the delicate internal organs from mechanical injury. For example, spinal cord is protected by vertebral column.
- (iii) It provides movement to the body with the help of muscles.
- (iv) It produces R.B.Cs with the help of bone marrow in long bones.

17. What is antagonistic movement? Explain with examples.

Ans. Muscles, which produce opposite effects, are called antagonists. For example, biceps and triceps are the muscles of arms. When the biceps contracts, triceps relax and when the triceps contracts, biceps relax.

18. What is a joint? Give one example of each of these.

- (a) fixed joint
- (b) partially movable joint and
- (c) joint with mobility in three plane.

Ans. Joint is the point of contact between two bones. Joints may be movable (ball and socket joint) or immovable (sutures in the skull) joints:

- (a) **Fixed joins** (sutures in skull)

- (b) **Partially movable joint** (vertebrae in backbone)
- (c) **Joints with mobility in three plane** (Ball and socket joints).

19. How are cartilages and ligaments different in their function?

Ans. **Cartilage** is present at the ends of bones that protects these bones from friction.

Ligaments are the flexible connective tissue band that stabilise the joints by holding the articulating bones together.

20. Discuss the special features that help a bird to fly.

Ans. A bird flies with the help of wings. The bird's wings are made of feathers. These wings are made of well-developed pectoral muscles. A bird may fly by flapping its wings or by gliding. Streamlined body of birds makes it to fly easily.

21. Write a short note on flightless birds.

Ans. There are about 40 species of flightless birds living today. Most of these species are evolved in the absence of predators.

Flightless birds have reduced wings but they have well-developed legs, e.g. ostrich of Africa, emu of Australia, penguins have wings modified into paddles which help in swimming.

22. How does a frog swim in water although it does not have fins?

Ans. Frog does not have fins yet it swims in water like fish. It is due to presence of web in between the toes of hindlimbs. So these hindlimbs act as oars to push the water back and get moving forward. Frog cannot swim in fast moving streams.

23. How do the insects jump?

Ans. Insects have three pairs of jointed legs which help them to move. Mostly insects which fly have two pairs of wings — forewings and hindwings.

In some insects, muscular legs are present that are adapted for jumping, e.g. grasshopper. Some insects have flat hind legs which act as oars and help them to swim, e.g. bug.

24. What are the different types of bones? Where are they found?

Ans. According to their shape, bones are divided into three groups:

- (i) **Long bones**, e.g. Bones of arms and legs.
- (ii) **Flat bones**, e.g. Bones of skull and rib cage.
- (iii) **Short bones**, e.g. Bones of wrists and ankles, vertebrae.

25. Differentiate between exoskeleton and endoskeleton.

Ans. **Exoskeleton** as the name implies, are the skeleton which incase the organisms body. It protects and supports the body and provides points of attachment for muscles. In arthropodes, it is made of chitin. In human beings, hair and nails are included in exoskeleton.

Endoskeleton is the framework of body that lies entirely within the body of an animal such as bony framework of vertebrates. It provides support to the body and provides a definite shape to the body. It also protects some delicate structures in our body such as brain is protected by skull bones.

26. How many bones are there in our backbone? What is the function of backbone?

Ans. Our backbone is made of 33 ring-like bones called vertebrae. Backbone protects our spinal cord from injuries.

27. What is rib cage? Name the organs it protects.

Ans. Rib cage is a protective structure which protects the lungs and the heart. Rib cage is made up of twelve pairs of ribs and chest bone called sternum.

28. What are the characteristics of muscles?

Ans. **Characteristics of muscles.** Muscles have four major functional characteristics: contractility, excitability, extensibility and elasticity. Contractility refers to the capacity of muscles to contract or shorten forcefully. Excitability means that muscles responds to stimulation. Extensibility means, muscles can be stretched to their normal resting length and elasticity means that

if muscles are stretched they recoil to their original resting length.

- 29.** Suggest an experiment to show positive geotropism in roots and negative geotropism in shoots.

Ans. In laboratory, we can demonstrate geotropism with the help of an instrument called *klinostat*. With this instrument, we can rotate a potted plant at a slow speed. Take two instruments and fixed with potted plants horizontally. One instrument is rotated and other is not. After some time We see that the root of and shoot of rotating klinostat does not show any bending whiled root and shoot of stationary klinostat show positive and negative geotropism respectively. Rotating klinostat does not show any effect of gravity, this is due to the fact that all parts were exposed to the gravitational.
