IRRITABILITY

Ability of a living body to feel and respond is called irritability

MOVEMENT

Ability of living body to move without changing location is called movement

PARENCHYMATOUS TISSUE

Parenchyma

Parenchyma tissues have following characters

- They are composed of cells which are large
- They have thin primary cell wall
- They have pectin-rich middle lamella
- They have large vacuole which fills most of the cell
- They have an active nucleus with dispersed chromatin.
- Parenchyma cells are commonly polyhedral (many-sided) and loosely packed together, separated by a network of intercellular spaces.

Collenchyma

The collenchyma tissues have following characters

- They are supporting tissues.
- They give strength to plant parts where bending and flexibility are required.
- These tissues are commonly found in leaf stalks (petioles), leaf laminas and young stems.
- Collenchyma cells have thick cell walls with additional cellulose.
- Although the cell wall is extra thick, but it is flexible and can be stretched.

Scelerenchyma

The Scelerenchyma have following characters

- Scelerenchyma is also a supporting tissue
- It gives rigidity as well as strength due to presence of lignin.
- Because the cell wall is so thick, in mature Scelerenchyma cells the protoplasm usually degenerates to leave a gap or lumen in the centre of the cell.

Fibers: they are elongated cells with tapering end walls. They are often arranged in a continuous layer in stems or in vascular tissue.

Sclereids or stone cells: They are branched or more or less even-shaped, and play a role of protection as much as support. They form the hard tissue of seed coats and give pears and some other fruits their gritty texture.

Types of Movement in Plants

There are 2 types of movement in plants

1. **Autonomic movement**
   It is the movement of plants due to internal stimuli
2. **Induced movement**
   It in the movement of plants due to external stimuli

AUTONOMIC MOVEMENT:

This type of movement may be further divided into three more type which are as under

Locomotory movement It is movement of (a) whole plant body (b) whole plant organ (c) whole material within cell. This is also called movement of locomotion. Movement of whole protoplasm in cytoplasm, movement of whole chromosomes during cell division and,

flagellary locomotion of Euglena are examples of Locomotory movement

Growth and Curvature movement: It is movement of part of plants due to growth. This type of movement is further divided into following types.

Nutation: When growth takes place in the young stem in zigzag manner due to alternate growth on opposite side, it is called nutation. E.g. Movement of climber

Nastic movement: It is the growth in the parts of plants due to differences in the rate of growth on two opposite sides. If the growth is in the anterior part, it is called **epinastic** and if it is in the posterior part, it is **hyponastic.**

TURGER MOVEMENT:
It is the movement of part of plant due to Turger pressure. For example, when plant cells intake water, their size changes and some movement occur from original place. Turger movement may result due to loss and gain of water.

PARATONIC MOVEMENT
It is the movement of plants due to external stimuli. There are following types of paratonic movement

1. **Tropic movement**: It is the movement of part of plant towards or away from the external stimuli. This type of movement is directional, which means that the plant part will move towards the direction of stimuli. Tropic movement is further divided into following types

Phototropism: It is movement of part of plant due to light stimuli. If the part of plant moves towards the light, it is called positive phototropism (E.g. movement of shoot towards light) and when plant part move away from light, is called negative phototropism (E.g. movement of roots towards soil away from light).

Geotropism: It is movement of part of plant towards gravitational attraction of earth. E.g. movement of roots towards soil.

Chemotropism: It is movement of part of plant due to chemical attraction. E.g. Pollen grains transfer to stigma due to the attraction of sugar substance called Malic acid.

Hydrotropism: It is the movement of part of plant in relation to water. For example roots are called positively hydrotropic because they are stimulated by water in the soil.

Thigmotropism: It is movement of part of plant in response to touch. Such type of movement may be seen in climber plants.

Nastic Movement: It is the movement of part of plant, but here the movement is non-directional. In this type of movement, plant part will move in opposite to the direction of stimuli. Depending on the type of stimulus, nastic movement is of many types such as following

a) **Photonastic:** Against light
b) **Thermronastic:** Against temperature
c) **Sesminastic:** Against touch
d) **Nictinastic:** Against day and light

SESSILE ANIMALS
The animals, which can move but can not Locomote
E.g. Man

MOTILE ANIMALS
Animals, which can move, and Locomote
e.g. Sea anemone

BILATERAL SYMMETRY
Division of body into two halves from longitudinal angle. **e.g. man**.

RADIAL SYMMETRICAL
Division of body into two halves from many angles **e.g. Sea anemone**

PROPULSION
Movement of body in one (usually forward) direction

EXO-SKELETON
A hard external skeleton that protects an animals. It is made up of chitin protein. **e.g. insects**

HYDROSTATIC SKELETON
A skeletal system composed of fluids called hydrostatic fluids. **e.g. Earth worm**

ENDO SKELETON
A hard bony skeleton present mainly in vertebrate animals **e.g. man**

SUTURE JOINT
It is a type of immovable joint which is present in skull of man

HINGE JOINT
It is slightly movable joint which can move the bone in one direction **e.g. Knee joint**

BALL AND SOCKET JOINT
A type of joint that allows the limb to rotate in all directions **e.g. Shoulder joint**

SKELETAL MUSCLES
The muscles which are present on bones

STRATED VOLUNTARY
Same as above

CARDIA MUSCLES
The muscles only found in heart. Because heart pumps all the time, so it needs lot of energy, therefore there are too many mitochondria in these muscles as compared to other muscles

STRATED INVOLUNTARY
Same as above

SMOOTH MUSCLES
These are thin and spindle shape muscles and are not attached with bones. **e.g. muscles of intestine, liver, lungs and spleen**

INVOLUNTARY MUSCLES
Same as above

SARCOPLASM
The cytoplasm of muscle cell

SARCOLEMMA
The outer membrane of muscle cell

MYOSIN
The thick filament of muscle fiber. It is a protein

ACTIN
The thin filament of muscle fiber. It is also a protein

ACTO-MYOCIN
The Actin and Myosin together are called actomyosin. They help in muscular movement

SARCOMERE
The region between Z line is called Macromere

ACTOMYOSIN ATP
When actin and myosin combine with ATP is called actomyosin ATP.

CREATINE PHOSPHATE
A compound, which supplies energy if the ATP stock is finished

SINOAURICULAR NODE
A small tissue present in right ventricle of heart and control the heart beat

PACE MAKER
Same as above

Axial Skeleton: It consists of all bones in skull, bones of ribs and sternum and vertebrae.

Appendicular skeleton: It consists of all bones of pelvic girdle, pectoral girdle, arms and legs.

Axial skeleton
Skull
Vertebral column
Sternum
Ribs
Appendicular skeleton
Pectoral girdle: clavicle, scapula
Arm: humerus, ulna, radius
Hand: carpals, metacarpals, phalanges
Pelvic girdle: coxal bones
Leg: femur, patella, fibula, tibia
Foot: tarsals, metatarsals, phalanges

of genetic skeletal
ıe child is born with
skull. Such children
ain never develops

of genetic skeletal deformation in which there is over deposition of calcium between the joints. Due to over deposition, the person will be unable to move the joints and will feel lot of pain

Functions of skeleton:
Generally human skeleton has following functions

- It provides supporting frame work
- It gives shape to body
- It Protects organs
- It help body in movement
- The bone marrow produce RBCs
- It supplies calcium and phosphorus to blood

Cleft palate: It is a kind of genetic skeletal disorder in which the bones of upper jaws are not properly formed. Therefore the child will be a cut in his upper lip.

Hormonal disorders:
This is a kind of skeletal deformation in which the bones are not properly formed due to some kind of hormonal problem. Some examples are given as under

Osteoporosis:
This is a kind of deformation of skeleton due to decrease in the level of estrogen hormone in females. This condition generally appears in old age. In this disease bones become very soft, thin and weak.

Nutritional disorders:
Sometimes, bones are deformed due to nutritional deficiencies. Some examples of such kind of disorders are as under

Rickets:

It is a kind of skeletal disorders due to deficiency of vitamin D**. In this** condition, the pelvis and legs are mostly affected.

DISC SLIP

- It may be defined as a condition in which Displacement or rupture of cartilaginous ring of disc takes place. The cartilage ring of vertebrae is called inter-vertebral discs. The inter-vertebral disc acts as shock observer and provides mobility to vertebrae. It also helps in avoiding Grinding.

Symptoms of disc slip
Following symptoms are observed in disc slip

- It causes severe pain
- Person is unable to move
- Prolong rest on hard bed
- Pain killers may help

SPONDYLOSIS:
This is a kind of problem associated with the bones of neck region in which deformity of joint of 2 vertebrae of neck region takes place. The vertebrae press the nerve and cause severe pain in neck, shoulder & upper limb.

Symptoms of spondylosis
The main symptoms are as under

- Pain in neck area
- Head feels heavy and may not be turned around
- Person feels difficulty in walking and driving

ARTHRITIS:
It may be defined as skeletal problem in which the joints are over filled with calcium. Therefore bones may not be moved at all.

Reasons

- Joint become swollen, painful an immovable
- It may be due to heredity
- It may be due to viral infection
- It may be due to aging

SCIATICA
It may be defined as sever pain of hind limb which occur when Sciatic plexus nerve is pressed at the location of pelvic girdle.

Causes of sciatica
There are following causes of sciatica

- Disc slip
- Damage of sciatic nerve due to needle of syringe when injection is done in iliac vein

Symptoms of sciatica

- leg is highly painful
- Virtually immovable
- Recovery is very slow
- Some times never complete

Tetany:
It is sudden contraction of muscles due to decrease in the level of calcium in blood. When the level of calcium decreases in blood, than the neuron cells produces twitching of the muscles very rapidly, due to that the tetany occurs.

Cramps:
It may be defined a muscle pull due to dehydration or decrease of sugar level in blood. This condition arise mostly due to over exercising

LOCOMOTION IN PROTOZOA

PSEUDOPODIA
A temporary locomotary organ in class Sarcodina e.g.Amoeba.

FLAGELLA
A long thread like locomotary organ in class Flafellata e.g. Euglena and Trypanosoma

FLAGILIN
A protein present in flagella

CILIA

Series of small thread like locomotary organs in class cilliata e.g. Paramecium and Balantidium

GLIDING LOCOMOTION

A type of locomotion in which organs are not required **e.g. Plasmodium**

LOCOMOTION IN MULTICELLULAR

LOOPING

Type of locomotion in which hydra can move without attaching its tentacles with substratum

SUMMERSAULTING

A type of locomotion in which hydra attaches its tentacles with substratum and basal disc is freed for some time

JET PROPULSION

Type of locomotion found in Jelly fish. Here the contraction of jelly fish will through water out of body and relaxation of body will allow water to enter in again with force which moves body forward in jet manner.

TUBE FEET

Structures which helps the star fish in locomotion. This system is called hydraulic or water vascular system

LIGAMENT

A point where two bones are connected

TENDON

The point of attachment of muscle with bone.

ANTAGONISTIC MUSCLE

When a pair of muscle on bone work against each other, such muscle is called antagonistic muscle

BICEP MUSCLE

If a muscle is attached to bone by two tendon

TRICEP MUSCLE

If a muscle is attached to bone by three tendon

PROTECTOR MUSCLE

A muscle which pulls the lower part of limb in forward direction

RETRACTOR MUSCLE

The muscle which pulls the limb in backward direction

ADDUCTOR MUSCLE

The muscle that pulls the limb towards body

ABDUCTOR MUSCLE

The muscle that pulls the limb away from body

ROTATOR MUSCLE

The muscle which help in rotation of bone in all directions

FLEXOR MUSCLE

The muscles which bring two parts of limbs close to each other

EXTENSOR MUSCLE

Muscles which pulls the limb away from each other

CARTILAGE

The soft bones of body e.g. bones of nose, ears and penis

SYNOVIAL CAVITY

A cavity between two bones at the point of joint

SYNOVIAL FLUID

A fluid present in synovial cavity. It lubricates the joints.

PLANTIGRADE

A type of locomotion in which the animals touch whole of the foot sole with ground e.g. Man and Bear

DIGITIGRADE

A type of locomotion, in which animal Locomote with fingers tips. E.g. Dogs and cats, rabbit, lion

UNGULIGRADE

In some animals, the fingers are changed into hoof, and when locomotion is done with hoof, it is called Unguligrade

PRACTICE SHEET

1. In living organisms, movement can occur at --------
   (a) Cellular level
   (b) Organ level
   (c) Whole body level
   (d) All of above
2. Terrestrial animals need more support because, air does not provide support like water
   (a) True
   (b) False
3. The lower plants, particularly, Bryophytes are entirely made up of ----------tissues
   (a) Parenchyma
   (b) Collenchymas
   (c) Scelerenchyma
   (d) All
4. Since parenchyma tissues do not have lignin material, in their cells, hence, they support the plant by
   (a) Turgidity
   (b) Water potential
   (c) Both a&b
   (d) None
5. ----------kind of tissues become dead on maturation
   (a) Parenchyma
   (b) Collenchymas
   (c) Scelerenchyma
   (d) All
6. When secondary growth continues up to number of years, secondary xylem accumulate in the form of
   (a) Cambium
   (b) Wood
   (c) Cork
   (d) None
7. By counting the annual ring, ------of plant may be calculated
   (a) Age
   (b) Size
   (c) Girth
   (d) All
8. ----------may be defined as any action taken by living organs to reduce its irritability produced by stimuli
   (a) Support
   (b) Movement
   (c) Response
   (d) All
9. Movement which occur due to internal stimuli is termed as
   (a) Autonomic
   (b) Spontaneous
   (c) Induced
   (d) Both a&b
10. Movement of whole plant body is called----------
   (a) Movement of locomotion
   (b) Movement of curvature
   (c) Induced locomotion
   (d) None
11. Cyclosis of protoplasm is example of
   (a) Movement of locomotion
   (b) Movement of curvature
   (c) Induced locomotion
   (d) None
12. Alternate change in growth rate on opposite of apex is termed as --------
   (a) Nutation
   (b) Turger movement
   (c) Both a&b
   (d) None
13. Movement in plant parts due to differences in the rate of growth is called
   (a) Paratonic movement
   (b) Nastic movement
   (c) Both a&b
   (d) None
14. When movement occurs due to faster growth on upper side of the organ it is termed as----------
   (a) epinastic movement
   (b) Hyponastic movement
   (c) Both a&b
   (d) None
15. When movement occurs due to faster growth on lower side of the organ it is termed as----------
   (a) epinastic movement

(b) Hyponastic movement
(c) Both a&b
(d) None

16. When cell looses or gains water, its size changes. Such type of movement is called
    (a) (a) epinastic movement
    (b) Hyponastic movement
    (c) Both a&b
    (d) Turger movement
17. Movement which is result of external stimuli is called
    (a) Paratonic movement
    (b) Induced movement
    (c) Both a&b
    (d) None
18. Movement of a part of plant organ due to light stimulation is called
    (a) Hydrotropism
    (b) Geotropism
    (c) Phototropism
    (d) None
19. Movement of part of plant in response to the touch stimuli is termed as ---------
    (a) Hydrotropism
    (b) Geotropism
    (c) Phototropism
    (d) Thigmotropism
20. Non-directional movement of part of plant is termed as ----------
    (a) Nastic
    (b) Tropic
    (c) Tactic
    (d) None
21. Since plants are sessile organisms, so they mainly show their movement tin the form of growth
    (a) True
    (b) False
22. ----------is a plant growth hormone, which was discovered by Went (1928).
    (a) Auxins
    (b) Cytokine
    (c) Gibberellins
    (d) None
23. Human endoskeleton is about ----------– percent of the total body weight
    (a) 10
    (b) 18
    (c) 20
    (d) 22
24. The longest and strongest bone in human body is
    (a) Femur
    (b) Tibia
    (c) Fibula
    (d) None
25. The smallest bone of body is present in middle ear, and it is called ----------
    (a) Vesicles
    (b) Auditory ossicles
    (c) Both a&b
    (d) None
26. Cartilage is a kind of soft bone and is made up of ----------cells
    (a) Collagen
    (b) Ossicles
    (c) Chondrocytes
    (d) None
27. Main protein in the matrix of the bones is----------
    (a) Melanin
    (b) Fibrin
    (c) Collagen
    (d) All
28. Cells of bones are called ----------
    (a) Collagen
    (b) Ossicles
    (c) Chondrocytes
    (d) Ostocytes
29. ----------joint connects the bones of ankle and wrist
    (a) Sliding joint
    (b) Ball & socket
    (c) Both a&b
    (d) None
30. Enlargement of skull bones is a disorder termed as ----------
    (a) Microcephaly
    (b) Arthritis
    (c) Cleft palate
    (d) None
31. Arthritis of joints is called----------
    (a) Microcephaly

(b) Arthritis
(c) Cleft palate
(d) Osteoarthritis

32. Displacement of inter-vertebral discs is called ----------
(a) Disc slip
(b) Sciatica
(c) Both a&b
(d) None

33 Deformity of the joint of two vertebrae of the neck is termed as
(a) **Spondylosis**
(b) Sciatica
© Both a&b
(d) None

34. A condition in which joints become swollen, painful and immovable is termed as -----
(a) Sciatica
(b) **Arthritis**
© Disc clip
(d) All

35. Over deposition of calcium in the joints is cause of ---------
(a) Sciatica
(b) **Arthritis**
© Disc clip
(d) All

36. A man and women has same number of bones and muscles
(a) **True**
(b) False

37. Skeletal muscles work under
(a) **Voluntary control**
(b) Involuntary control
© Both a&b
(d) None

38. Under microscope, skeletal muscle cells look striped, hence they are called-----
(a) Unstraited
(b) **Striated**
© Both a&b
(d) None

39. There are ------bones in human body
(a) 205
(b) **206**
© 207
(d) 106

40. There are ------muscles in human body
(a) 205
(b) 300
© 500
(d) **600**

41. The accumulation of lactic acid in the muscles produces tiring condition of the muscles known as
(a) Fermentation
(b) Aerobic respiration
© Trauma
(d) **Fatigue**

42. The mode of locomotion in jelly fish is termed as --------
(a) Propulsion
(b) **Jet like propulsion**
© Jetting
(d) None

43. Water vascular system is a Locomotory system used by
(a) Snail
(b) Jelly fish
© **Starfish**
(d) All

44. Animals that use 4 legs in locomotion are called
(a) Bipedal
(b) Tripedal
© **Tetra-pedals**
(d) None

45. Muscles which have 2 attachments on same bone are called
(a) Triceps
(b) **Bicep**
© Tendon
(d) Ligament

46. Organisms which remain attached with an object are called
A) Sessile
B) Motile
C) Both a and b

D) None

47. Animals having similarity in their lateral side are called

A) Radially symmetrical
B) Bilaterally symmetrical
C) None

48. Sea anemone is example of

A) Radially symmetrical
B) Bilateral
C) both a and b
D) None

49. Displacement of an animal from it place is called

A) Locomotion
B) Movement
C) Both
D) None

50. One of following is not necessary for locomotion

A) Support
B) Stability
C) Propulsion
D) Repulsion

51. Skeleton which is made of hard protein and found on external side of body is called

A) Hydrostatic
B) Exoskeleton
C) Molting
D) None

52. One of following posses hydrostatic skeleton

A) Crab
B) Butterfly
C) Earthworm
D) All

53. ----------Allows bone to move in one direction

A) Hinge joint
B) Ball & Socket
C) Suture
D) None

54. ----------Muscles are spindle shape and involuntary

A) Skeletal
B) Smooth
C) Cardiac
D) None

55. ----------Muscles contain more mitochondria

A) Cardiac
B) Smooth
C) Skeletal
D) None

56. One of following is striated involuntary muscle

A) Cardiac
B) Skeletal
C Smooth

57. Blood vessels are made up of

A) Cardiac
B) Smooth
C) Skeletal
D) All

58. The point of attachment of muscle with bone is called

A) Tendon
B) Ligament
C) Joint
D) None

59. The junction where 2 bone meet is called

A) Ligament
B) Tendon
C) Joint
D) All

60. Muscles are rich in proteins

A) Actin
B) Myosin
C) Both a and b
D) None

61. The removal of exoskeleton by arthropods is called

A) Molting
B Recovering
B) Covering
D None

62. The organs of locomotion in single cellular organism is by

A) Cilia
B) Flagella
C) Pseudopodia
D) All

63. One of following refers to muscle cell

A) Myofibril

B) Muscle fiber
C) Sarcolema
D) None

64. Muscles having 2 attachments are called
A) Bicep
B) Triceps
C) Genicep
D) All

65. Coelomic fluids refer to
A) Exoskeleton
B) Hydrostatic
C) Endoskeleton
D) All

NUMBER	CORRECT OPTION
1.	D
2.	A
3.	A
4.	A
5.	C
6.	B
7.	A
8.	B
9.	D
10.	A
11.	A
12.	A
13.	B
14.	A
15.	B
16.	D
17.	C
18.	C
19.	D
20.	A
21.	A
22.	A
23.	B
24.	A
25.	B
26.	C
27.	C
28.	D
29.	A
30.	A
31.	D
32.	A
33.	A
34.	B
35.	B
36.	A
37.	A
38.	B
39.	B
40.	D
41.	D
42.	B
43.	C
44.	C
45.	B
46.	A
47.	B
48.	A
49.	A
50.	D
51.	B
52.	C
53.	A
54.	B
55.	A
56.	A
57.	B
58.	A
59.	C
60.	C
61.	A
62.	D
63.	B
64.	A
65.	B