

46 (d)

Both apical meristem and intercalary meristem are primary meristems because they appear early in life of plants and contributes to the formation of primary plant body

47 (a)

The parenchymatous cells which lies between the xylem and the phloem are called conjunctive tissue

48 (d)

Lateral meristem is that meristem, which occur on the sides and helpful in increasing width of stem and root. They divide mainly in one plane (periclinal), **increasing the diameter** of an organ, *e.g.*, cambium (fascicular and interfascicular cambium), extra stellar cambium, cork cambium and marginal meristem of some leaves.

49 (a)

Bast or phloem fibers are present in pericycle (*e.g.*, *Corchorus capsularis* (jute), *Hibiscus cannabinus* (patsan), *Crotalaria juncea* (sunhemp)). These fibres are also known as extraxylary fibers.

50 (c)

At certain regions, the phellogen cuts off closely arranged parenchymatous cells on the outer side instead of cork cells. These parenchymatous cells soon rupture the epidermis, forming a lens-shaped openings called lenticels. Lenticels permit the exchange of gases between the outer atmosphere and the internal tissue of the stem. These occur in most woody trees

51 (d)

Dendrochronology is the branch of Botany that deals with the determination of age of a tree by counting and analyzing the annual growth rings of the tree.

52 (d)

Secondary meristem.

The cylindrical meristem, *i.e.*, fascicular vascular cambium, interfascicular cambium and cork cambium are examples of secondary or lateral meristem and are responsible for producing secondary tissue

53 (c)

As a result of continued secondary growth in subsequent years, the older part of secondary xylem or wood becomes non-functional as it loses the power of conduction. The cells of this wood are filled with resins or tannins produced by adjacent functional cells. The activities of vessels become blocked by tyloses. Due to these activities, non-functional, secondary xylem becomes hard, durable and blackish in colour, called heartwood.

54 (b)

The cells of epidermis bear a number of hairs. The root hairs are unicellular elongations of the epidermal cells and helps to absorb water and minerals from the soil. On the stem the epidermal hairs are called trichomes. The trichomes in the shoot system are usually multicellular. They may be branched or unbranched and soft or stiff. They may even be **secretory**. The trichomes help in preventing water loss due to transpiration

55 (b)

The transverse section of a typical young dicotyledonous stem shows that the epidermis is the outermost protective layer of the stem covered with a thin layer of cuticle. It may bear trichomes and a few stomata

- 56 (d)
In *Cycas* leaflet, transfusion tissue or hydrostereon are present on each side of the midrib in between the palisade and spongy tissue. Transfusion tissue is made up of horizontally arranged tracheids, which supply water and minerals to palisade and spongy tissue up to margins. Transfusion tissue facilitates lateral conduction of water because there are no lateral veins.
Leaf of *Pinus* also contains transfusion tissue (needle).
- 57 (b)
Sapwood is also known as alburnum. It is the outerward or peripheral wood of the plant, consisting of living cells and is light in colour and weight. Alburnum represents the functional part of secondary xylem (wood), where tracheids and vessels are not plugged by tyloses and secondary metabolites are not deposited in tracheary elements.
- 58 (b)
The vascular bundles in *Hordeum vulgare* (barley) plant are scattered in ground tissues, many in number and vary in size-smaller towards periphery and bigger towards centre of the ground tissue, oval or rounded in outline, conjoint, collateral and closed.
- 59 (a)
In plate meristem, the cells divide in several planes and consequently, there is an increase in the area of the organ. It results in the formation of flat structures, *e.g.*, in epidermal growth and leaf formation.
- 60 (c)
The secondary xylem or wood is distinguishable as spring wood and autumn wood by presence of annual rings. Later on, due to excessive growth, it is termed as heartwood and sap wood. Wood is superior to any metal in its availability, cheapness, toughness, strength and elasticity.
- 61 (d)
Sieve plates are formed by two adjoining end walls of neighbouring sieve elements of sieve tube of phloem. At maturity, these become impregnated with callose pad, which may be seasonal callose (for only limited unfavourable period) or definitive callose (formed permanently in functionless old sieve tubes).
- 62 (d)
The phloem fibre of jute, flax and hemp are used for commercial purpose because of its characteristic to lose protoplasm and become dead at maturity
- 63 (b)
The monocot stem has a sclerenchymatous hypodermis, a large number of scattered vascular bundles, each surrounded by a sclerenchymatous bundle sheath, and a large, conspicuous parenchymatous ground tissue. Vascular bundles are conjoint and closed. Peripheral vascular bundles are generally smaller than the centrally located ones. The phloem parenchyma is absent and water-containing cavities are present within the vascular bundles
- 64 (c)
In a woody dicotyledonous tree, shoot tips and root tips consist of primary tissues.
- 65 (d)
If the plant belongs to the tropical forest then the age of tree can't be determined by annual rings because the physiological and environmental factors remain the same throughout the year and due to this, the fluctuation of cambial activity does not take place
- 66 (d)
The first formed primary phloem consists of narrow sieve tubes and is referred to as protophloem and later formed primary phloem is referred to as metaxylem

- 67 (b)
As growth begins, the cells of medullary rays, which lie in between vascular bundles become active and rise to cambial strip called interfascicular cambium constitute cambium.
- 68 (c)
Pericycle It is few layered thick tissue. It lies inner to the endodermis and outside the vascular strand. The pericycle is made up of both parenchymatous and sclerenchymatous fibres
- 70 (c)
In grasses (monocotyledons), the guard cells are dumb-bell shaped and in dicotyledonous (bean, castor, pea), the guard cells are bean or kidney-shaped
- 71 (b)
Squamous epithelium - Skin of frog
Columnar epithelium - Stomach
Ciliated epithelium - Bronchioles
Stratified squamous epithelium - Oesophagus
Glandular epithelium - Salivary gland
- 72 (b)
Cartilage is a vertebrate skeletal connective tissue. It is an amorphous matrix and contains glycoproteins, basophilic chondroitin and fine collagen fibres. Cartilage helps in bone to bone ligation.
- 73 (b)
Animal tissues are categorised into four basic types on the basis of their structure and function
- 74 (c)
The cells of adipose tissue are specialised to store fats. The excess of nutrients which are not used immediately by the body are converted into fats and get stored in this tissue
- 75 (a)
The microscopic study of the tissues and organs in relation to their functions is known as histology. It is also called as microscopic anatomy or microanatomy
- 76 (c)
The respiratory system of the cockroach comprises a network of white, shining tubes called trachea, that opens out by 10 pairs of small holes called spiracles which are present on the lateral sides of the body
- 77 (a)
Adipose tissue is a type of loose connective tissue located mainly beneath the skin. The cells of this tissue are specialised to store fats
- 78 (c)
Epithelial tissue lining of uriniferous tubules in the kidneys eliminates the nitrogenous waste and performs the function of excretion
Reproduction Germinal epithelium of the seminiferous tubules and ovaries produces spermatozoa and ova respectively
Absorption Epithelial lining of the intestine absorbs digested food
Secretion Epithelial lining the cavities gives rise to the glands that provide valuable secretions such as, mucous, gastric juice, etc.
- 78 (b)
200 hexagonal ommatidia.
Ommatidia of cockroach is the visual unit. Each eye consists of about 2000 hexagonal ommatidia with the help of which, a cockroach can receive several images of an object
- 80 (a)

Heart of the cockroach is elongated muscular tube lying along the mid dorsal line of the thorax and abdomen

81 (c)

In epithelial tissue, the adjacent cells form ion-rich gap or cell junctions for intercellular communication and chemical exchange. These junctions probably do not provide physical support.

82 (a)

In mammals, RBC_S are roughly circular, biconcave, disc like, non-nucleated corpuscles. In human, the RBC_S are 6.5 μ to 8 μ in diameter (average diameter 7.2 μ) and 1-2 μ thick.

38 (c)

Compound epithelium is made of multilayered cells. Their main function is to provide protection against chemical and mechanical stresses. They covers the dry surface of skin, the moist surface of buccal cavity, the inner lining of ducts of, salivary glands and pancreatic ducts

84 (c)

Hyaline cartilage is most abundant kind of cartilage with no fibres and transparent matrix. It is the initial skeleton of foetus. In adults it is found in bronchi, larynx, at the end of ribs etc.

85 (c)

Epithelial tissue has a free surface, which faces either a body fluid or the outside environment and thus provides a covering to body parts

86 (b)

Neutrophil, monocytes and macrophages are types of white blood cells. The granular white blood cells neutrophils, eosinophils and agranular leucocytes including monocytes and tissue macrophages are phagocytic in nature.

Basophils are non-phagocytic and involved in allergic reactions.

88 (b)

Tendons are the example of dense regular connective tissue. In this, collagen fibres are present in rows between many parallel bundles of fibres

89 (b)

Hindwings forms the real organs of flight and are used for flying

They are known as metathoracic wings

90 (b)

Erythropoiesis is the formation of RBC_S in blood. It starts in liver in the embryo and in the red bone marrow of adults.