

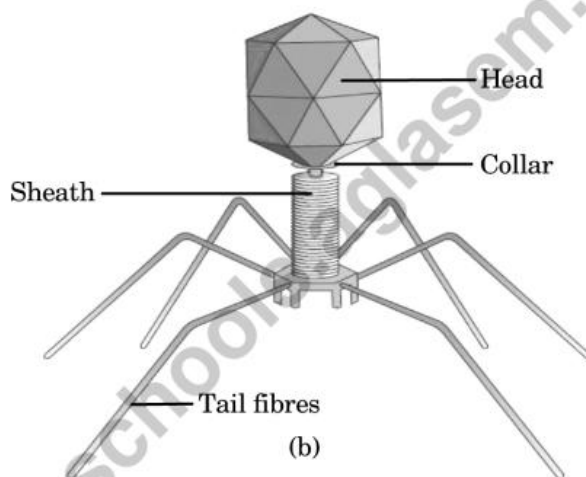
SAMPLE QUESTION PAPER-B

Section-A

1. These are archaebacteria. Since they live and grow in high saline or salty environments they are called halophiles. 1
2. The stomatal aperture, guard cells and the surrounding subsidiary cells together are called stomatal apparatus. 1
3. The age of a tree can be determined by counting annual growth rings in the lower part of the stem. 1
4. Potassium is involved in many physiological processes like respiration, photosynthesis, stomatal movement and protein synthesis. 1
5. It prevents enzymatic hydrolysis of stored food and enables the seed to survive a long period of dormancy. 1

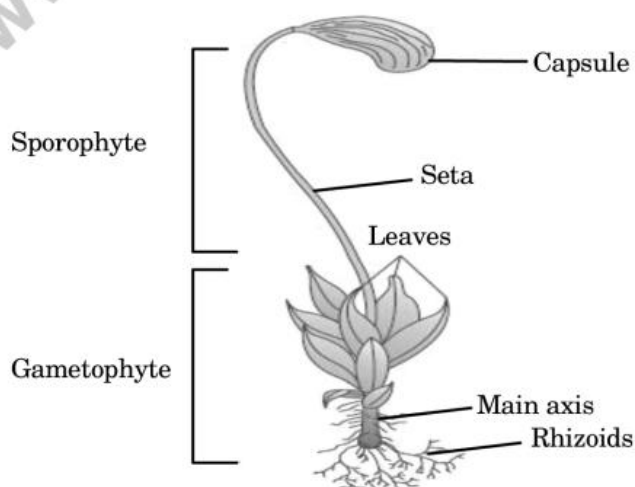
Section-B

6.



2

OR



2

7. **Calcium :**

- (a) For the formation of spindles during cell wall.
- (b) For the formation of middle lamella.

Zinc :

(a) For the synthesis of auxin.

(b) For activation of carboxylases.

2

8. It refers to the deposits of the indestructible siliceous cell wall of diatoms in the ocean floor.

Uses :

(i) As an absorbent for liquid nitroglycerine to make explosives.

(ii) For filtering the liquids in sugar factories.

(iii) As inert extender in paints.

(iv) For insulation in boilers and blast furnace.

(v) In powdered form as abrasive in silver polish and tooth paste.

(Any two) 2

9. These are the structures which hold the cells of a tissue together, when they are not widely separated by extracellular material. The three types of cell junctions are : Tight junctions, Adhering junctions and Gap junctions.

2

10. Division of labour is the phenomenon in which different cells or tissues of a multicellular organism perform different life functions. Multicellular organisms have cells organized into tissues, organs, organ system, each of which performs a particular function. Example – alimentary canal helps in digestion.

2

Section-C

11. Functions of potassium :

(i) In opening and closing of stomata.

(ii) Activates a number of enzymes.

(iii) Involved in protein synthesis.

(iv) Maintains turgidity of cells.

(v) Maintains anion-cation balance of cells.

(Any two)

Symptoms :

(i) Interveinal chlorosis.

(ii) Scorched leaf tips.

(iii) Shorter internodes.

(iv) Disintegration of plastids.

(Any one) 3

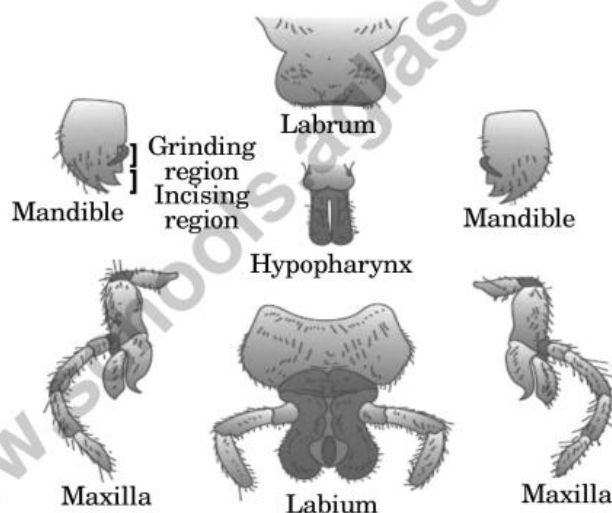
12.	C₃ pathway	C₄ pathway
	(i) The primary acceptor of RuBP.	The primary acceptor is PEP.
	(ii) The first product is phosphoglyceric acid.	The first product is oxaloacetic acid.
	(iii) The enzyme is sensitive to high temperature and oxygen concentration.	The enzyme is not much affected by oxygen concentration.
	(iv) The pathway becomes saturated at higher concentration of carbon dioxide.	The pathway becomes saturated at a lower concentration of carbon dioxide.

(Any three) 3

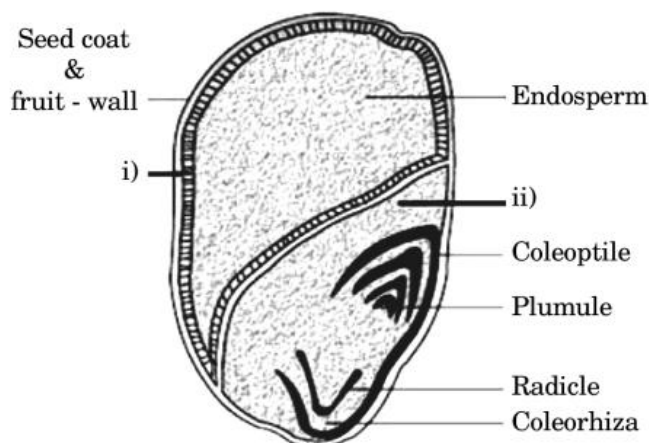
13.	Chondrichthyes	Osteichthyes
	(i) The endoskeleton is cartilagenous.	The endoskeleton is bony.
	(ii) Mouth is ventral.	Mouth is terminal.
	(iii) Tail fin is heterocercal.	Tail fin is homocercal.
	(iv) Air bladder is absent.	Air bladder is present.
	(v) Operculum is absent.	Operculum is present.
	(vi) Fertilization is internal.	Fertilization is external.

$\frac{1}{2} \times 6 = 3$

14. ATP is synthesized with the help of complex V (ATP synthase). Complex V consists of F_0 and F_1 components. F_0 is an integral membrane protein complex that act as the channel through which the protons pass across the membrane into the matrix. The passage of protons through the channel is coupled to the catalytic site of F_1 component and one molecule of ATP is synthesized for every $2H^+$ passing through F_0 . **3**
15. It is a type of cell division where the number of chromosomes is reduced to half in the daughter cells.
- Significance :**
- (i) It ensures the maintenance of a constant chromosome number, characteristic of a species.
 - (ii) The crossing over results in variations of genetic characters in the progeny; variation is necessary for survival of species and it is the raw material for evolution. **1+2=3**
16. Actin filament contain three proteins namely, actin (F-actin and G-actins), tropomyosin and troponin. Each actin filament consists of two F-actin which are helically wound to each other. Each F-actin is a polymer of globular actin. Two filaments of tropomyosin also run close to F-actins throughout their length. Troponin is a complex protein found at regular intervals on the tropomyosin. In the reacting state, a subunit of troponin masks the actin-binding site of myosin. **3**
17. It is the phenomenon in which a substance closely resembling the substrate in its molecular structure competes with it for the active site on the enzyme. Eg – Malonate resembles succinate in its structure and inhibits the action of succinate dehydrogenase. Competitive inhibition is used in the control of bacterial pathogens. **3**
- 18.



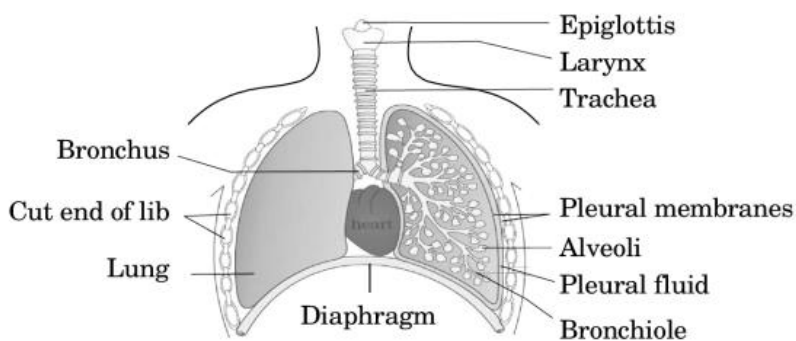
OR



3

3

19.



3

20. All chordates have a notochord, but only in vertebrates, the notochord is replaced by vertebral column. Since vertebrates have a notochord in the embryonic stages they are chordates. So all the vertebrates are chordates but not all chordates are vertebrates. Sub phylum vertebrata — (1) Agnatha and (2) Gnathostomata. 3

21. When a protein has many subunits (polypeptide chains), each having a primary, secondary or tertiary structure of its own, the protein is said to be in its quaternary structure. Examples – Myoglobin, Insulin, Haemoglobin. 3

22.	Rods	Cones
	(i) These are meant for vision in dim light.	These are meant for vision in bright light.
	(ii) They do not have the ability to make coloured image.	They have the ability to make coloured image.
	(iii) These contain the visual pigment rhodopsin.	These contain the pigment iodopsin.

3

23. Ganga water has been immensely polluted due to :

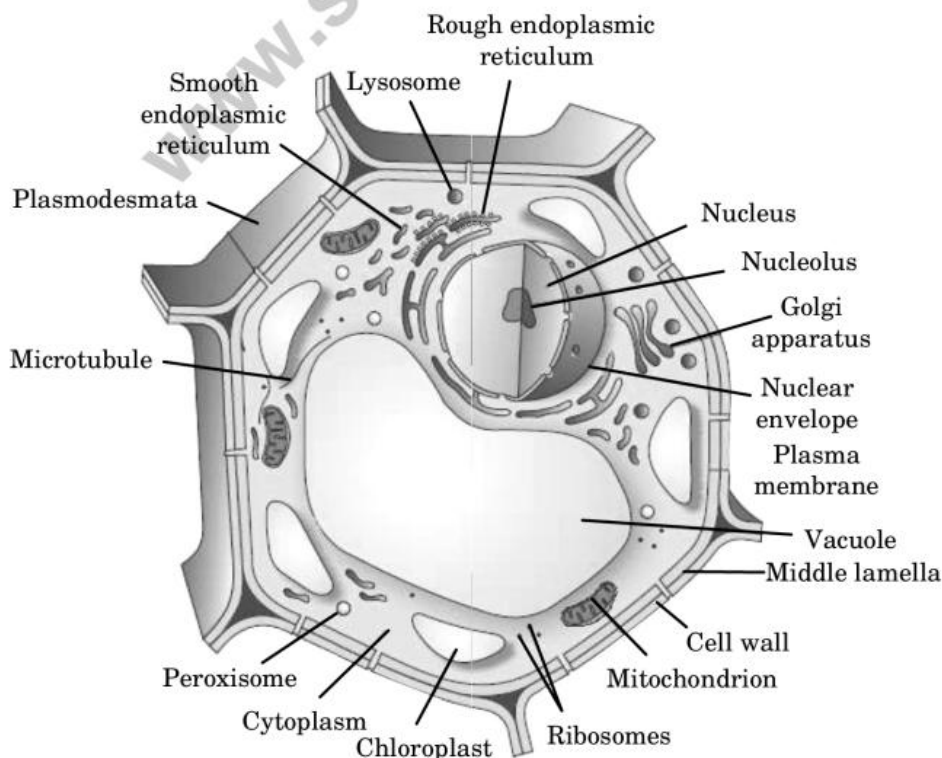
- * Industrial waste
- * Immenssion of idols and other religious items.
- * Bathing & washing (Usage of detergents)
- * Sewage
- * Fertilizers used in excess.

Value – Care , Concern , Rational use of natural resource.

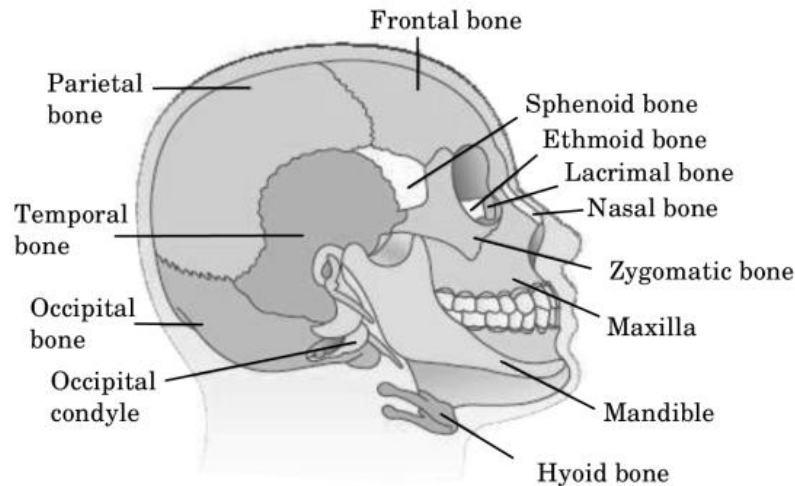
3+1=4

Section-D

24.

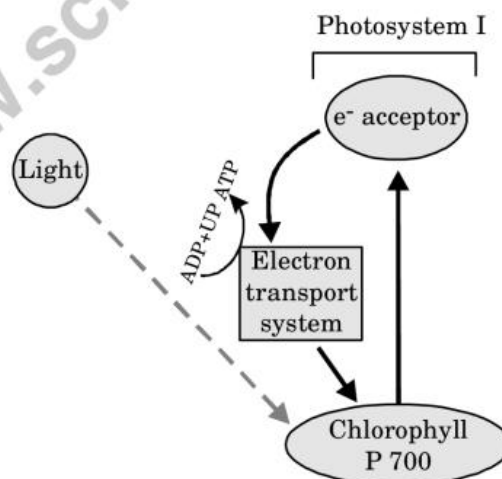


OR



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25. (1) Living organisms have the capability of extracting energy from oxidisable substances and store this in the form of bond energy. Special substances like ATP carry this energy in their chemical bonds.
- (2) The process of which ATP is synthesized by cells (in mitochondria and chloroplasts) is named phosphorylation. Photophosphorylation is the synthesis of ATP from ADP and inorganic phosphate in the presence of light.
- (3) When only PS I is functional, the electron is circulated within the photosystem and the phosphorylation occurs due to cyclic flow of electrons. A possible location where this could be happening is in the stroma lamellae. While the membrane or lamellae of the grana have both PS I and PS II the stroma lamellae membranes lack PS II as well as NADP reductase enzyme.
- (4) The excited electron does not pass on to NADP^+ but is cycled back to the PS I complex through the electron transport chain. The cyclic flow hence, results only in the synthesis of ATP, but not of $\text{NADPH} + \text{H}^+$.
- (5) Cyclic photophosphorylation also occurs when only light of wavelengths beyond 680 nm are available for excitation.



5

OR

Mineral nutrition refers to how plants obtain their nutrient elements from soil, water or air and use them for their growth and development.

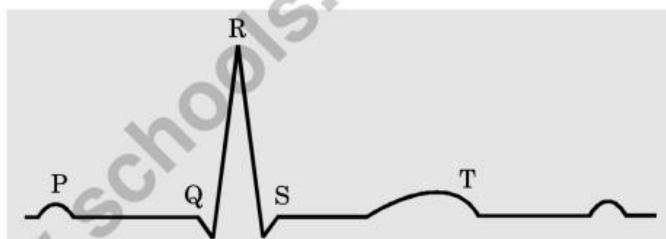
Essential elements :

Most of the minerals present in soil can enter plants through roots. In addition to the 17 essential elements, there are some beneficial elements such as sodium, silicon, cobalt and selenium. They are required by higher plants. Essential elements can also be grouped into four broad categories on the basis of their diverse functions. These categories are :

- (i) Essential elements as components of biomolecules and hence structural elements of cells (e.g., carbon, hydrogen, oxygen and nitrogen).
- (ii) Essential elements that are components of energy-related chemical compounds in plants (e.g., magnesium in chlorophyll and phosphorous in ATP).
- (iii) Essential elements that activate or inhibit enzymes, for example Mg^{2+} is an activator for both ribulose biphosphate carboxylase-oxygenase and phosphoenol pyruvate carboxylase, both of which are critical enzymes in photosynthetic carbon fixation; Zn^{2+} is an activator of alcohol dehydrogenase and Mo of nitrogenase during nitrogen metabolism.
- (iv) Some essential elements can alter the osmotic potential of a cell. Potassium plays an important role in the opening and closing of stomata.

5

26. (1) ECG is a graphical representation of the electrical activity of the heart during a cardiac cycle. A patient is connected to the machine with three electrical leads (one to each wrist and to the left ankle) that continuously monitor the heart activity. For a detailed evaluation of the heart's function, multiple leads are attached to the chest region. Here, we will talk only about a standard ECG.
- (2) Each peak in the ECG is identified with a letter from P to T that corresponds to a specific electrical activity of the heart. The P-wave represents the electrical excitation (or depolarisation) of the atria, which leads to the contraction of both the atria. The QRS complex represents the depolarisation of the ventricles, which initiates the ventricular contraction.
 - (3) The contraction starts shortly after Q and marks the beginning of the systole. The T-wave represents the return of the ventricles from excited to normal state (repolarisation). The end of the T-wave marks the end of systole.
 - (4) Obviously, by counting the number of QRS complexes that occur in a given time period, one can determine the heart beat rate of an individual.
 - (5) Since the ECGs obtained from different individuals have roughly the same shape for a given lead configuration, any deviation from this shape indicates a possible abnormality or disease.



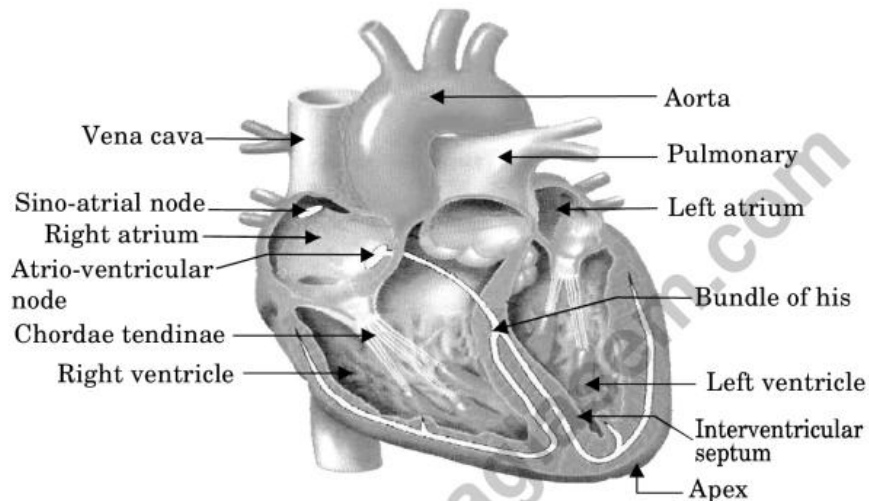
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OR

- (1) Heart is situated in the thoracic cavity, in between the two lungs, slightly tilted to the left. It has the size of a clenched fist. It is protected by a double walled membranous bag, pericardium, enclosing the pericardial fluid.
- (2) Our heart has four chambers, two relatively small upper chambers called atria and two larger lower chambers called ventricles.
- (3) A thin, muscular wall called the inter-atrial septum separates the right and the left atria, whereas a thick-walled, the inter-ventricular septum, separates the left and the right ventricles.
- (4) The atrium and the ventricle of the same side are also separated by a thick fibrous tissue called the atrio-ventricular septum.
- (5) Each of these septa is provided with an opening through which the two chambers of the same side are connected. The opening between the right atrium and the right ventricle is guarded by a valve formed of three muscular flaps or cusps, the tricuspid valve, whereas a bicuspid or mitral valve guards the opening between the left atrium and the left ventricle.
- (6) The openings of the right and the left ventricles into the pulmonary artery and the aorta respectively are provided with the semilunar valves. The valves in the heart allows the flow of blood only in one direction, i.e., from the atria to the ventricles and from the ventricles to the pulmonary artery or aorta. These valves prevent any backward flow.

- (7) The entire heart is made of cardiac muscles. The walls of ventricles are much thicker than that of the atria. A specialized cardiac musculature called the nodal tissue is also distributed in the heart. A patch of this tissue is present in the right upper corner of the right atrium called the sino-atrial node (SAN).
- (8) Another mass of this tissue is seen in the lower left corner of the right atrium close to the atrio-ventricular septum called the atrio-ventricular node (AVN). A bundle of nodal fibres, atrio-ventricular bundle (AV bundle) continues from the AVN which passes through the atrio-ventricular septa to emerge on the top of the inter-ventricular septum and immediately divides into a right and left bundle.
- (9) These branches give rise to minute fibres throughout the ventricular musculature of the respective sides and are called purkinje fibres. These fibres along with right and left bundles are known as bundle of His.

3



2



