Tripura
Class XI
Biology
Sample Paper – 2 Solution

SECTION A

1.

(i) The urochordates are also called tunicates because the adult body is enclosed within a leathery test or tunic formed of a cellulose-like organic substance termed tunicin.

(ii) A neem leaf is pinnately compound because its lamina is completely broken up into distinct segments or leaflets which are separately articulated at the base.

(iii) Insulin

(iv) It requires a membrane, a proton pump, a proton gradient and the enzyme ATPase.

(v) Sebaceous glands (wax glands)

(vi) They are called roundworms because their body is circular in cross-section.

(vii) When the vascular bundle lacks cambium, it is referred to as closed.

(viii) Metacentric chromosome has the centromere at the centre and the two arms are equal in length.

(ix) Ubiquinol

SECTION B

2.

(i) Bryophytes are called amphibians of the plant kingdom because they live in soil but require an external layer of water for their existence so that the male gametes can swim and reach the archegonia.

(ii)

i. In *Amoeba*, the contractile vacuole is involved in excretion and osmoregulation.

ii. In protists, food vacuoles contain digestive enzymes which help digest nutrients.

(iii) When pCO_2 is high and pO_2 is low as in the tissue, more binding of carbon dioxide with haemoglobin occurs, whereas when the pCO_2 is low and pO_2 is high as in the alveoli, dissociation of CO_2 from carbaminohaemoglobin takes place.

(iv) Emphysema is inflation or abnormal distension of the bronchioles or alveolar sacs of the lungs. As the alveolar septa collapse, the surface area for gas exchange is greatly reduced.

Causes of emphysema:

i. Cigarette smoking
ii. Inhalation of other smoke or toxic substances over a period of time

Or

Amylase is secreted by salivary glands and pancreas.

Salivary glands secrete saliva which contains salivary amylase into the buccal cavity and converts starch into maltose.

Pancreas secretes pancreatic juice containing pancreatic amylase into the duodenum. It acts on starch and breaks it into maltose.

(v) The mutually beneficial or symbiotic association of a fungus with the root of a higher plant is known as mycorrhiza.

The plant is immensely benefited from the association with the fungus. Fungal hyphae take part in the absorption of water, dissolving essential minerals present in the organic debris and handling over the same to plant, absorbing inorganic salts present in the soil and producing various growth promoting substances. The fungus in return is dependent on the higher plant for shelter and food.

(vi) In addition to the genomic DNA, many bacteria have small circular DNA outside the genomic DNA. These are called plasmids.

Plasmid DNA confers certain unique characters such as resistance to antibiotics, fertility factor etc.

(vii) Oxygen in the blood is transported in the following two ways:

i. As dissolved gas: About 1–3% of oxygen is transported by blood in dissolved form in the plasma of blood.
ii. As oxyhaemoglobin: About 97–99% of oxygen is transported in chemical combination with haemoglobin in the red blood cells.

SECTION C

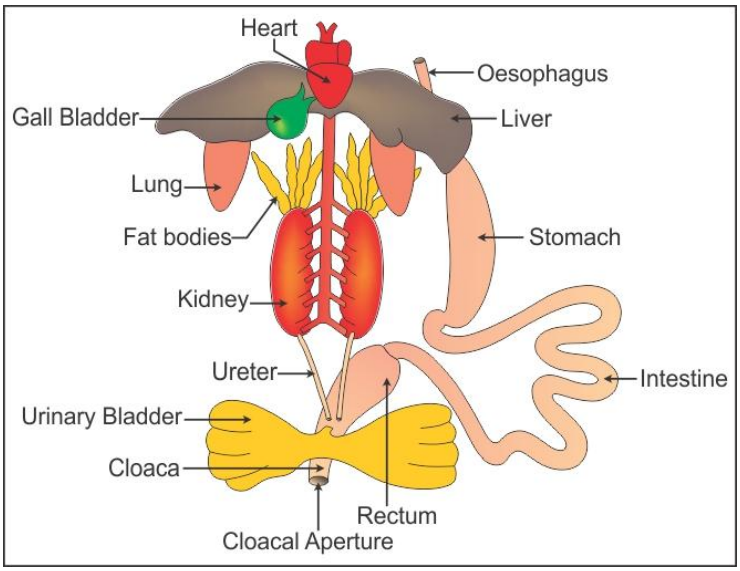
3.

(i)

Intracellular Digestion	Extracellular Digestion
(i) It occurs within the cells. (ii) Only a few enzymes are associated with this digestion. (iii) It occurs in unicellular organisms and some lower organisms.	(i) It occurs outside the cells in the cavity of the alimentary canal. (ii) A large number of digestive glands and enzymes are associated with this digestion. (iii) It occurs in multicellular organisms.

(ii) In earthworm, four pairs of tubular hearts are present.
The anterior two pairs of the hearts known as the lateral hearts lie in the 7th and 9th segments, while the posterior pairs called latero-oesophageal hearts are situated in the 12th and 13th segments.

(iii) Digestive system of frog:



(iv) Modification of the root is a change in the shape, size, structure and normal functioning of the root to perform some secondary functions or a particular adaptation.

(a) Banyan tree: In banyan trees, long roots develop from branches which go deep down to reach the ground to provide additional mechanical support to the banyan tree. This modification is called a prop root.

(b) Turnip: In turnip, the root is modified to store extra food. This modification is called napiform fleshy tap root.

(c) Mangrove trees: The roots of mangrove trees get modified into pneumatic structures to provide additional oxygen to the plant. This modification of roots is called respiratory roots or pneumatophores.

(v) Based on the number of amino and carboxyl groups, amino acids are of the following types:

i. Acidic amino acids: The amino acids have an extra carboxylic group. Examples: Glutamic acid and aspartic acid

ii. Basic amino acids: They have an additional amino group without forming amides. Examples: Arginine and lysine

iii. Neutral amino acids: These amino acids have one amino group and one carboxylic group. Examples: Glycine and valine

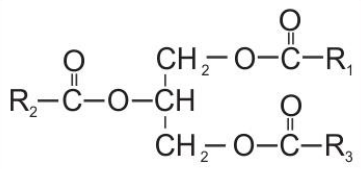
(vi)

i. At several places, the nuclear envelope is interrupted by minute pores formed by the fusion of its two membranes; this is referred to as the nuclear pores.
The nuclear pores serve as the passage for the movement of RNA and protein molecules in both directions between the nucleus and the cytoplasm.

ii. Interkinesis is the short phase between meiosis I and meiosis II.

(vii)

i.



Triglyceride (R_1, R_2 and R_3 are fatty acids)

ii. Ribose and deoxyribose

(viii) Glycolysis is the process of partial oxidation of glucose or a similar hexose sugar into two molecules of pyruvic acid through a series of ten enzyme-mediated reactions.
The two monosaccharides are glucose and fructose which readily enter the glycolytic pathway.

(ix) It is the synthesis of energy-rich ATP molecules with the help of energy liberated during oxidation of reduced coenzyme (NADH, $FADH_2$) produced in respiration.
The enzyme required for this synthesis is called ATP synthase (Complex V).
ATP synthase is located in F_1 or head place of the F_0–F_1 or elementary particle which is present in the inner mitochondrial membrane.

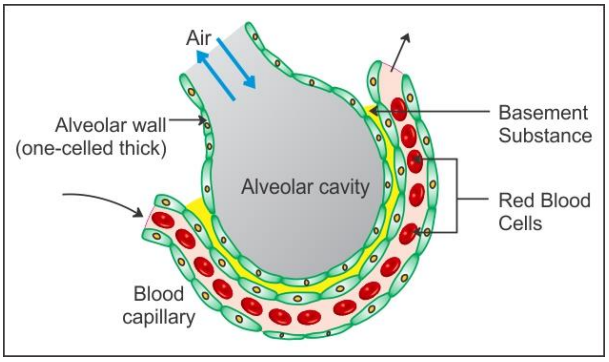
(x) Human beings have diphyodont (two sets of teeth—milk or deciduous and permanent), thecodont (teeth are embedded in sockets of the jaw bones) and heterodont teeth (different type of teeth).
An adult human has 32 permanent teeth which are of four different types—incisors (I), canines (C), premolars (PM) and molars (M).
The arrangement of teeth in each half of the upper and lower jaw in the order I, C, PM, M is represented by the dental formula.
The dental formula in human beings is 2123.

(xi) The major plasma proteins are fibrinogens, globulins and albumins.
Importance of plasma proteins:

i. Fibrinogens help in the clotting or coagulation of blood.
ii. Globulins, also called immunoglobulins, are involved in the defence mechanisms of the body.
iii. Albumins and globulins retain water and thus help in maintaining the osmotic balance.

Or

Alveoli are the primary sites of exchange of gases. The alveolar region has enough pressure gradient to facilitate diffusion of gases. Other regions of the respiratory system do not have the required pressure gradient. Also, the membrane of the alveoli is thin enough to facilitate the exchange of gases in a convenient manner.



SECTION D

4.

i. Guttation
ii. These are stomata-like pores generally present at the tips or margins of leaves of those plants which grow in moist and shady places.
iii. When root pressure increases, water is forced out into intercellular spaces and flows out of the hydathodes.
iv. Curiosity to know about scientific phenomena.

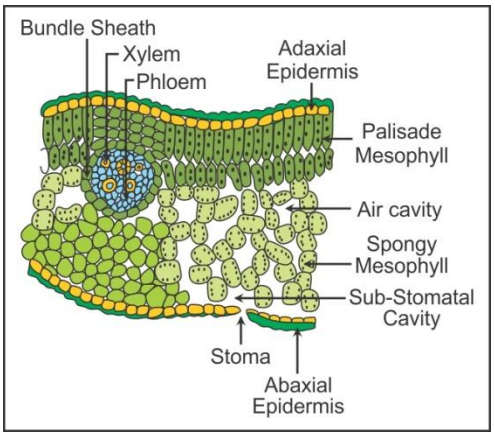
SECTION E

5.

(i) Dorsiventral (dicotyledonous) leaf:

The vertical section of a dorsiventral leaf through the lamina shows three main parts—epidermis, mesophyll and vascular system.

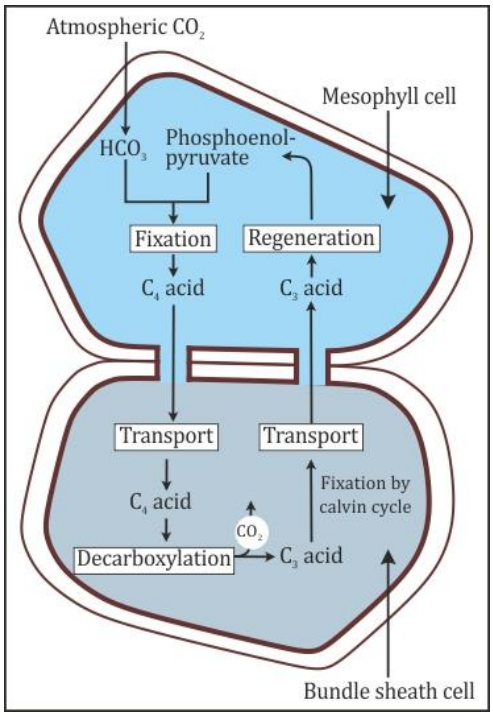
i. Epidermis: The epidermis has two parts:
   (a) Upper or adaxial epidermis: It is a single layer composed of a row of compactly arranged parenchyma cells which possesses a thick cuticle on the outer surface of the upper (adaxial) epidermis. Stomata are generally absent in this layer.
   (b) The lower or abaxial epidermis bounds the leaf on the lower surface and bears stomata.
ii. Mesophyll: The tissue between the upper and the lower epidermis is called the mesophyll. It possesses chloroplasts and carries out photosynthesis. It has two types of cells—palisade parenchyma and spongy parenchyma. The palisade parenchyma is made of elongated cells which are arranged vertically and parallel to each other. The oval or round and loosely arranged spongy parenchyma is situated below the palisade cells and extends to the lower epidermis. There are numerous large spaces and air cavities between these cells.



iii. Vascular system: It is made of several vascular bundles of varying sizes depending on the venation. These are found at the boundary between the palisade and the spongy regions. Each vascular bundle is surrounded by a sheath of compactly arranged parenchyma cells called bundle sheath. The xylem lies towards the upper side of the leaf, while the phloem is found towards the lower surface.

Or

(i)



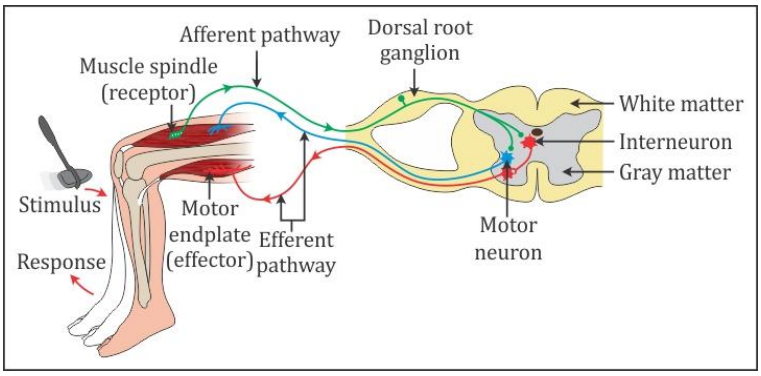
(ii) Maize and sugarcane
(iii) Oxaloacetic acid

(ii)

i. The path followed by the stimulus up to eliciting a response in a reflex action is called the reflex arc.

ii. The reflex pathway comprises the following components:
(a) Specific receptor
(b) Afferent neuron
(c) Intermediate or relay neuron
(d) Efferent neuron
(e) Effector organ

iii.



Or

i.
(a) Basophil
(b) Blood platelets
(c) Monocyte
(d) Eosinophil
(e) Neutrophil

ii. Functions:
(a) Basophils release histamine and heparin into the blood.
(b) Blood platelets help in blood clotting.
(c) Monocytes are phagocytic in action and engulf bacteria and cellular debris.
(d) Eosinophils have antihistamine properties.
(e) Neutrophils are phagocytic. They engulf microbes.