

Version No.			

ROLL NUMBER						



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Answer Sheet No. _____

Sign. of Candidate _____

Sign. of Invigilator _____

BIOLOGY SSC–I (2nd Set Solution)
SECTION – A (Marks 12)
Time allowed: 15 Minutes

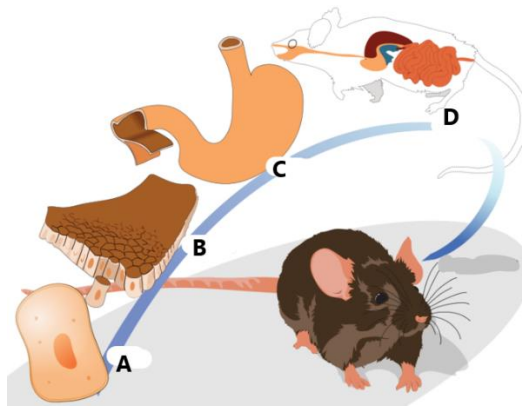
Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. **Do not use lead pencil.**

Q.1 Fill the relevant bubble for each part. All parts carry one mark.

(1) Bacteria are used for making insulin. Which branch of biology it is?

- A. Physiology B. Histology
 C. Cell biology D. Biotechnology

(2) Following diagram shows level of organization in a rat. Which one is the organ level?



- A. B.
 C. D.

(3) Which option has correctly matched disease and vector mosquito?

	Malaria in humans	Malaria in birds	Dengue fever
A	<i>Anopheles</i>	<i>Aedes</i>	<i>Culex</i>
B	<i>Aedes</i>	<i>Culex</i>	<i>Anopheles</i>
C	<i>Anopheles</i>	<i>Culex</i>	<i>Aedes</i>
D	<i>Culex</i>	<i>Anopheles</i>	<i>Aedes</i>

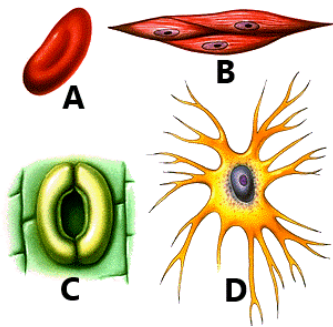
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(4) Which cell is a prokaryote?



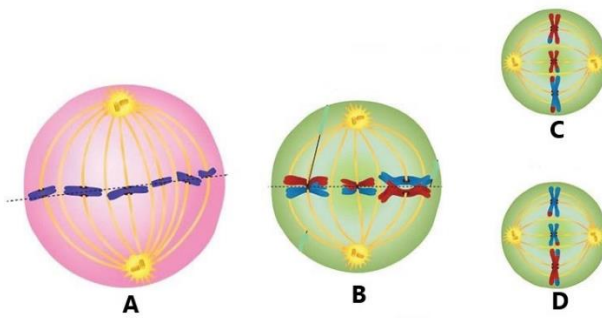
- A. Cell A B. Cell B
 C. Cell C D. Cell D

(5) The diagrams show cells from different types of tissues (not drawn on scale). Which type of cell contracts when it is stimulated?



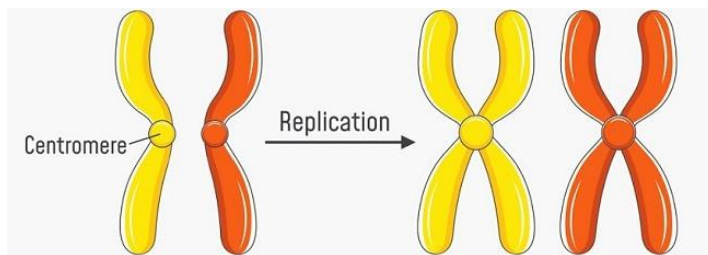
- A. Cell A B. Cell B
 C. Cell C D. Cell D

(6) Which of the following cell is at Metaphase I stage?



- A. B.
 C. D.

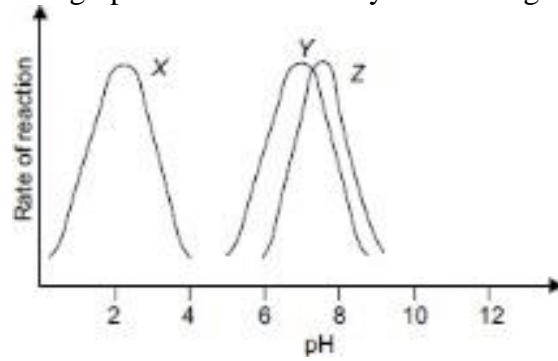
(7) The replication of chromosomes is represented below.



What is the total number of chromosomes in this diagram?

- A. 2 B. 3
 C. 4 D. 6

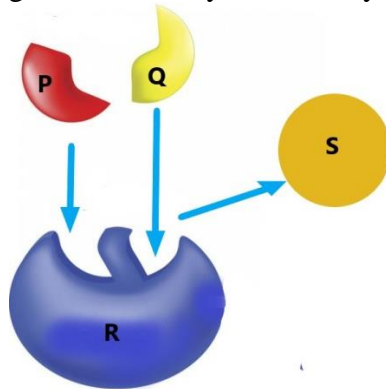
- (8) The graph relates the activity of three digestive enzymes at different pH levels.



Which statement is correct?

- A. Enzyme X and Y are both active at pH 7
- B. Enzyme X and Z are both active at pH 4
- C. Enzyme Y and Z are both active at pH 4
- D. Enzyme Y and Z are both active at pH 7

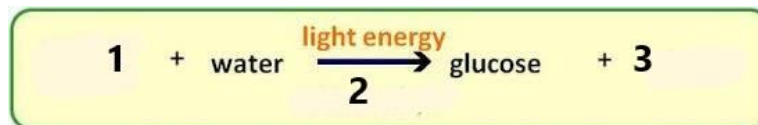
- (9) The diagram shows a synthesis enzyme with substrates and product.



Which components will form enzyme substrate complex?

- A. P, Q and S
- B. P, Q and R
- C. Q, R and S
- D. P, R and S

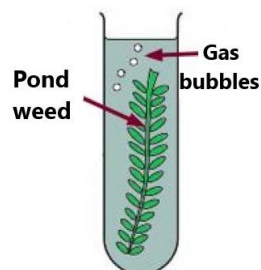
- (10) The following equation for photosynthesis is incomplete.



What do the numbers represent?

	1	2	3
A	Carbon dioxide	Oxygen	Chlorophyll
B	Carbon dioxide	Chlorophyll	Oxygen
C	Oxygen	Chlorophyll	Carbon dioxide
D	Chlorophyll	Oxygen	Carbon dioxide

- (11) The diagram shows a pond weed in a test tube filled with water. Which conditions would cause the plant to produce more bubbles?



	Dissolved carbon dioxide	Light	Temperature
A	Present	Bright	Cool
B	Present	Bright	Warm
C	Present	Dim	Cool
D	Absent	Dim	Warm

-
-
-
-

- (12) Which one of the following is atherosclerosis:
- A. Breaking of the walls of the arteries
 - B. Widening of arteries
 - C. Deposition of fats in the walls of the arteries
 - D. Hardening of arteries



Federal Board SSC-I Examination
Biology Model Question Paper
(Curriculum 2006)

Time allowed: 2.45 hours

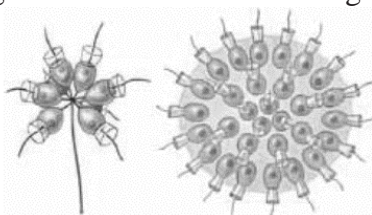
Total Marks: 53

Note: Answer any eleven parts from Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Write your answers neatly and legibly.

SECTION – B (Marks 33)

Q.2 Attempt any **ELEVEN** parts from the following. All parts carry equal marks. Be brief and to the point. (11× 3 = 33)

i. The following diagram shows two colonial organisms.



When their cells were separated from each other, all cells were able to survive. Explain why?

Ans. When the cells in colony are separated they can survive as independent organisms because in colonial type of cellular organization, many unicellular organisms live together but do not have any division of labour among them. Each unicellular organism in a colony lives its own life and does not depend on other cells for its vital requirements.

ii. What is filtration? Give example to clarify it.

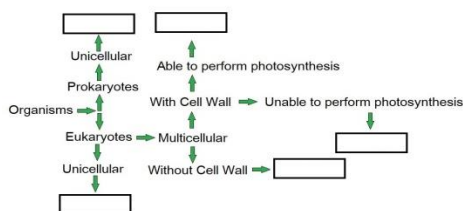
Ans. Filtration is a process by which small molecules are forced to move across semipermeable membrane by hydrostatic pressure or blood pressure. For example in the body tissue fluid is formed when water and dissolved substances are forced out of the blood capillaries through the tiny pores in its walls. While the larger molecules such as proteins remain inside.

iii. Observations are mainly of two types i.e., qualitative and quantitative. Describe them with the help of examples.

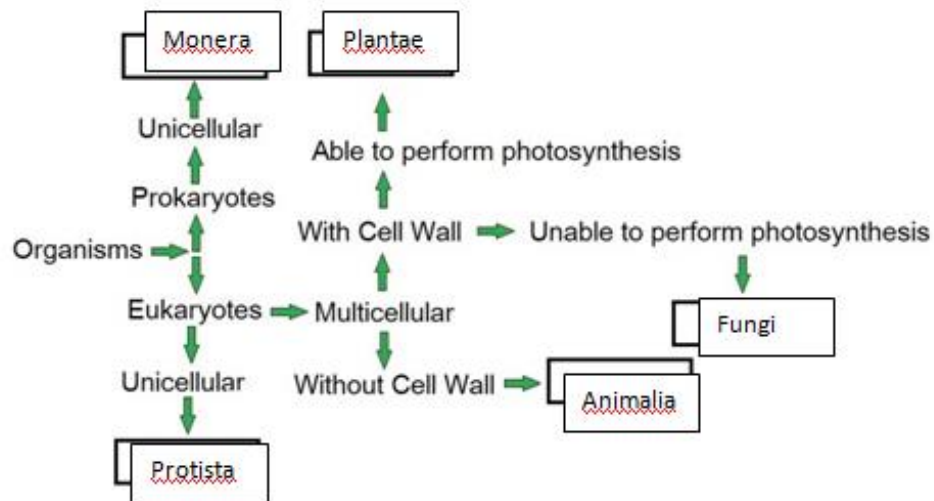
Ans. **Qualitative observations** are based on some quality or characteristic. These observations are made by using five senses i.e. vision, hearing, smell, taste and touch. For example the freezing point of water is colder than the boiling point.

Quantitative observations are based on measurable value. These observations are made by using instruments. Quantitative observations are more accurate than qualitative ones because they are measurable and can be recorded in terms of numbers. For example the freezing point of water 0 °C and the boiling point is 100 °C.

iv. Complete the following flow chart according to five kingdom classification system.



Ans.



v. Which tissue is responsible for the transport of water and dissolved substances in plants. Describe its structure.

Ans. Xylem tissue is responsible for the transport of water and dissolved substances from roots to the aerial parts. Due to the presence of lignin, the secondary walls of its cells are thick and rigid. That is why xylem tissue also provides support to plant body. Two types of cell are found in xylem tissue i.e. vessel element and tracheids.

Vessel elements have thick secondary cell walls. They lack end walls and join together to form long tubes. They are dead empty cells.

Tracheids are slender cells with overlapping ends. The cell wall is lignified and has pits. Tracheids are hollow, empty, dead cells when mature. They provide mechanical support to plant

vi. In rapidly dividing cells which phase of cell cycle is reduced? Explain.

Ans. Cell cycle consists of two major phases i.e. interphase and mitotic phase (M phase). Most of the cell cycle is spent in interphase. Mitotic phase is a relatively short period of cell cycle. Interphase lasts for 90% of the total time required for cell cycle. It is further divided into three sub phases i. e. G₁, S, G₂. After the G₂ phase, cell enters the division phase i.e. M phase. Cells that stop dividing enter the G₀ phase. In multicellular eukaryotes, cells enter G₀ phase from G₁. Some cells remain in G₀ for indefinite period. In rapidly dividing cells interphase of cell cycle is reduced.

vii. Visualize what safety factor is there in releasing the pepsin in its inactive form.

Ans. Pepsin is a powerful protein-digesting enzyme. Stomach walls are mostly proteins. Therefore pepsin is not released in its active form. Rather it is secreted as inactive pepsinogen, which requires HCl for activation. The mucous of gastric juice forms a thick coating over the inner walls of stomach and neutralizes the HCl there. It makes pepsinogen difficult to be activated and to attack stomach walls.

viii. How does meiosis lead to variation in genes?

Ans. The chromosome pairs undergo crossing over during meiosis. So daughter cells i.e. gametes have genetic variations. When gametes fuse and form zygote, its genetic makeup is different from both parents. Thus meiosis allows a species to bring variations in the next generations. Beneficial variations help organisms to adapt to the changes in environment.

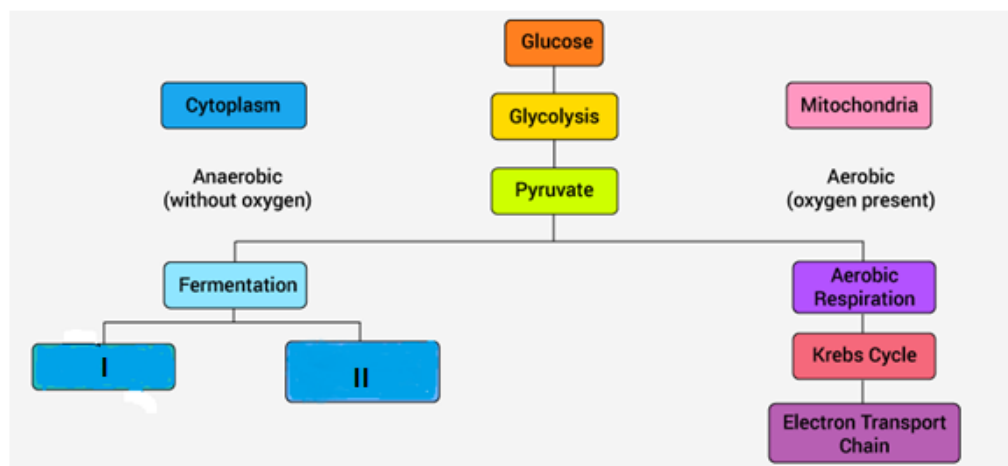
ix. According to induced fit model, the active site is flexible. Does it mean that any substrate can attach with this flexible active site? If not, then explain.

Ans. Enzymes are very specific for the substrate. One enzyme can act on a particular substrate because active sites possess specific geometric shapes that fit with specific substrates. According to induced fit model, the active site is slightly flexible but not flexible enough that any substrate can attach with active site.

x. Where are chromoplast and leucoplast found in plants? Write down their functions.

Ans. Chromoplasts are type of plastids in plant cells. They contain pigments associated with bright colours and are present in the cells of flower petals and fruits. Their function is to give colours to these parts and thus help in pollination and dispersal of fruit. Leucoplasts are the type of plastids. They are colourless and store starch, proteins and lipids. They are present in the cells of those parts where food is stored.

xi. The diagram shows flow chart about types of cellular respiration.



a. Name the products I and II

Ans. Ethyl alcohol + CO₂ and Lactic acid

b. Categorize the types of anaerobic respiration and give their importance.

Ans. **i) Alcoholic fermentation:** In this type of anaerobic respiration, pyruvic acid is further broken down into alcohol (C₂H₅ OH) and CO₂.

Importance: Alcoholic fermentation by yeasts is used in making wine and baking.

ii) Lactic acid fermentation: In this type of anaerobic respiration, each pyruvic acid molecule is converted into lactic acid (C₂H₆O₃).

Importance: The fermenting powers of bacteria are used for making cheese and yogurt. Anaerobic respiration provides energy to humans muscle cells during exercise by using lactic acid fermentation.

xii. Following table shows the names of three enzymes found in alimentary canal. Complete the Table by writing names of substrate and end- product for each enzyme.

Name of enzyme	Substrate	End -product
Protease		
Amylase		
Lipase		

Ans.

Name of enzyme	Substrate	End -product
Protease	<i>Protein</i>	<i>Amino acid</i>
Amylase	<i>Starch</i>	<i>Glucose</i>
Lipase	<i>Lipid</i>	<i>Fatty acid & Glycerol</i>

xiii. A child caught a small jelly fish from ocean in a bottle. After reaching home he placed it in a bucket of tap water. What will happen to the cells of jelly fish?

Ans. Jelly fish lives in sea water that contains more solute concentration. Fresh water is hypotonic solution i.e. a solution with low solute concentration (more water) than the cell. When jelly fish is kept in tap water (fresh water), there will be net movement of water molecules inside the cell. The cells will swell and may burst.

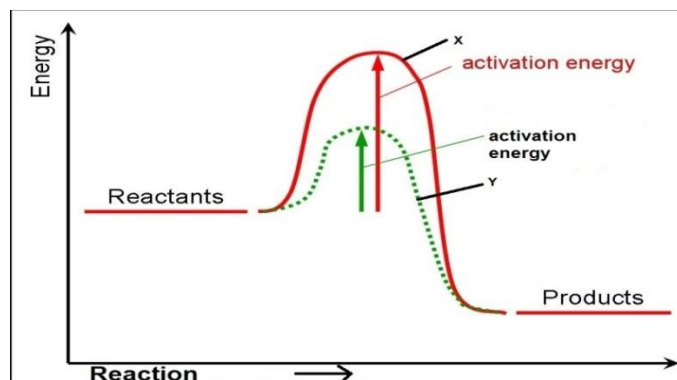
xiv. Draw a table showing names of any three arteries arising from dorsal aorta and the organ to which they supply blood.

Name of arteries	Supply blood to the organ

Ans.

Name of arteries	Supply blood to the organ
<i>Hepatic artery</i>	<i>Liver</i>
<i>Renal artery</i>	<i>Kidney</i>
<i>Gonadal artery</i>	<i>Gonads</i>

xv.



a. A graph is drawn for two reactions. Identify the graphs X or Y as catalyzed or non catalyzed reaction?

Ans. **X** : Non catalyzed reaction (reaction without enzyme)

Y : Catalyzed reaction (reaction with enzyme)

b. Support your answer with reasons.

Ans. Graph 'Y' is enzyme catalyzed reaction because it shows lower activation energy. All chemical reactions require activation energy. Enzymes lower the activation energy of the reaction. Therefore reactants convert into products at minimum energy requirement.

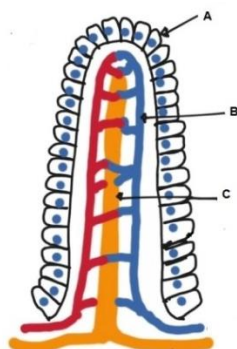
SECTION – C (Marks 20)

Note: Attempt any **TWO** questions. All questions carry equal marks.

(2×10 = 20)

Q.3 a.

(2+1+2)



i. Name the structure and label it's A, B and C parts.

Ans. Structure Name: Villi (villus)

A: Epithelial cell

B: Blood capillaries

C: Lacteal

ii. Mention its function in the digestive tract.

Ans. **Villi** increase the surface area of the inner walls of small intestine and it helps in the absorption of digested food.

iii. Explain the absorption of:

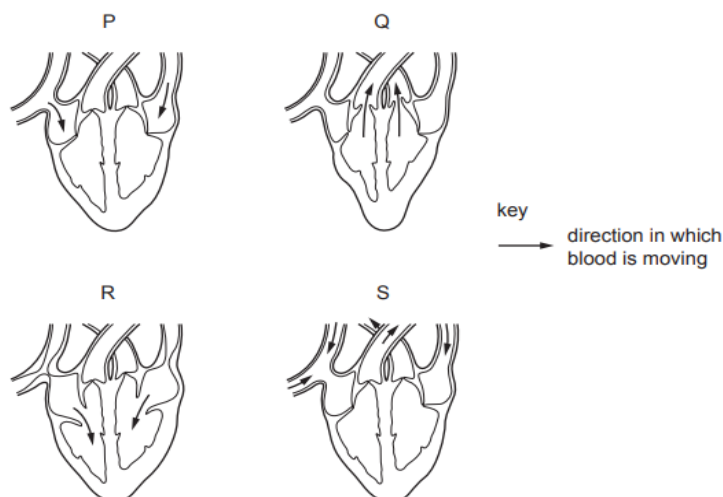
► Glucose and amino acid

Ans. The walls of villus are only single-cell thick. The digested molecules i.e. simple sugars and amino acids are absorbed from intestine into the blood capillaries present in villi. Blood carries them from small intestine by the hepatic portal vein to the liver for filtering. Absorption occurs by the combination of diffusion and active transport.

► Fatty acids and glycerol

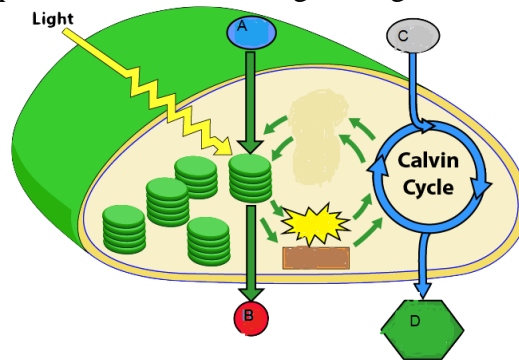
Ans. Fatty acids and glycerol, present in small intestine, are absorbed into the lacteal of villus. Lacteal carries them to the main lymphatic duct, from where they enter in blood stream.

b. The diagram shows four stages of heart beat. Identify the labelled diagram in which: (5)



- i. Tricuspid valve is open
Ans: R
- ii. Left atrium is relaxed
Ans: P, Q and S
- iii. Aortic semilunar valve is open
Ans: Q
- iv. Right ventricle is contracted
Ans: Q
- v. Write the correct order for the stages of heart beat.
Ans: S, P, R, Q

Q.4 a. Answer the questions related to the given figure. **(1+3+2)**

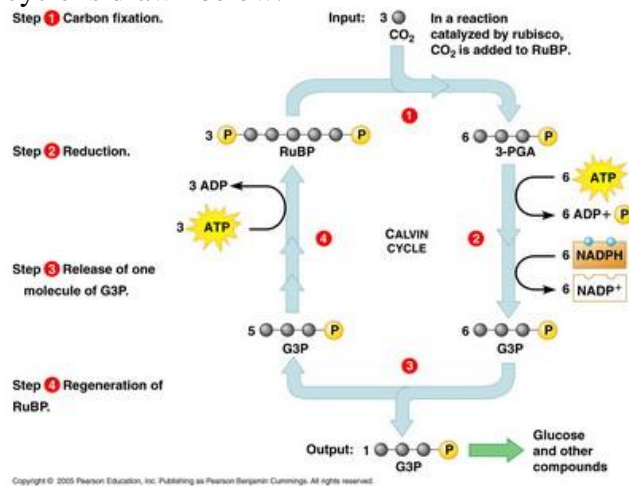


- i. This figure is depicting the overview of photosynthesis. Identify the input A, B and output C, D of photosynthesis.
- ii. Enlist the events that take place in stroma of chloroplast with the help of flow chart.

Ans: In the stroma of chloroplast the process of light independent reaction or calvin cycle takes place. The following are the events of light independent reaction:

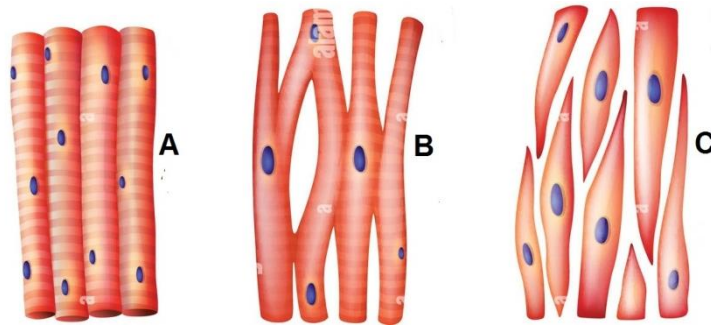
- CO_2 molecules are combined with 5-carbon compounds to form 2 temporary 6-carbon compounds, each of which splits into two 3- carbon compounds.
- The 3-carbon compounds are reduced to 3-carbon carbohydrates by using ATP and hydrogen from NADPH. The 3-carbon carbohydrates are used to manufacture glucose.
- The 3-carbon carbohydrates are also used to regenerate the original 5-carbon compounds. This step also utilizes ATP.

Flow chart of calvin cycle is drawn below.



b. Observe following tissues.

(1.5+ 2.5)



i. Recognize the type of cells A, B & C.

Ans: A: Skeletal muscles

B: Cardiac muscles

C: Smooth muscles

ii. Write characteristics of each of them.

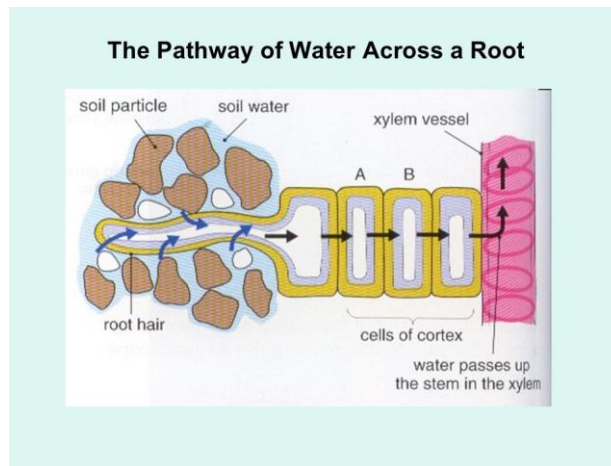
Ans.

Characteristics	Skeletal Muscle	Cardiac Muscle	Smooth Muscle
Location	Attached with skeleton	Present in heart	Present in tubes of body like intestine, stomach, blood vessels
Shape	Long fibers	Branched cells with intercalated discs	Spindle shaped
Nucleus	Multinucleated	Single nucleus	Single nucleus
Striations in cytoplasm	Present	Present	Absent
Control	Voluntary	Involuntary	Involuntary
Function	Movement of body parts	Contraction of heart chambers	Movement of substances e.g., peristalsis

Q.5 a. Describe absorption of water and minerals in plants. Draw labelled internal structure of dicot root and show the path of water uptake by arrows. (3+2)

Ans. In plants, minerals and water are transported through the xylem cells from the soil to the leaves. Mineral salts in the soil are absorbed into plants through roots, then these are transported upwards along with water via the xylem. Root hairs grow into the soil. The cytoplasm of root hairs has higher concentration of salts than soil water. That's why water moves by osmosis into root hairs. Salts also enter root hairs by diffusion or active transport.

Osmosis causes osmotic pressure, hence water and minerals are transported from one cell to another and finally enters the xylem vessel. Once in xylem, water and salts are carried to all the aerial parts of plant.



- b. i. Biodiversity plays important role in maintaining ecosystem. Enumerate the reasons for conservation of biodiversity. (3+2)

Ans: The reasons for protecting biodiversity are following:

Maintenance of soil quality: The activities of microbial and animal species play a key role in the cycling of crucial elements such as nitrogen, carbon and phosphorous between the living and non-living parts of the biosphere.

Maintenance of air quality: Plant species purify the air and regulate the composition of the atmosphere.

Maintenance of water quality: Wetland ecosystems (swamps, marshes, etc.) absorb and recycle essential nutrients, treat sewage, and cleans wastes.

Pest control; Around 99 percent of potential crop pests are controlled by a variety of other organisms, including insects, birds and fungi.

Pollination and crop production: Many flowering plants rely on the activities of various animal species - bees, butterflies, bats, birds, etc, - to help pollination. More than one-third of human's food crops depend on this process of natural pollination and dispersal of seeds.

Provision of food and medicine: Biodiversity provides the majority of our foodstuffs and traditional medicines derived mainly from plants.

- ii. What are the major issues we are facing in Pakistan for conserving biodiversity?

Ans: In Pakistan there are following major threats to biodiversity:

1. Hunting

Hunting is major threat for animals in Pakistan. So hunting of some animals and birds is completely banned e.g. black deer, spotted deer etc

2. Deforestation

Deforestation is the cutting down of trees for the conversion of a forest to non-forest land. Pakistan is facing the deforestation crisis. Large area of forest is used for fuel purposes or for wood furnishing.

3. Pollution

Increasing pollution is affecting the biodiversity. Species can not adjust the rapidly changing environment and may become extinct.
