Roll No: | | | | | | | |

Answer Sheet No: _____

Sig. of Candidate: _____

Sig. of Invigilator: _____

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

SECTION – A

Time allowed: 20 minutes Marks: 12

Note: Section-A is compulsory. All parts of this section are to be answered on the separately provided OMR Answer Sheet and should be completed in the first 20 minutes and handed over to the Centre Superintendent. Do not use lead pencil.

Q.1 Encircle the correct option i.e. A / B / C / D. All parts carry equal marks.

(1) Which of the following branches of biology deals with the study of functions of heart?

A. Morphology B. Physiology
C. Histology D. Cell biology

(2) Hardness of seed coat is due to:

A. Sclereid B. Fibre
C. Tracheid D. Vessels

(3) Following are the characteristics of a good hypothesis,EXCEPT:

A. Should be a complex statement
B. Should be a tentative idea
C. Should be testable
D. Should agree with available observation

(4) The scientific name of Rice is:

A. *OryzaSativa* B. *oryzasativa*
C. *Oryzasativa* D. *ORYZA SATIVA*

(5) Select the one which is "NOT" the characteristic of a Prion:

A. Composed of protein only B. Can replicate
C. Cause disease in sheep D. Contain circular RNA

(6) Many enzymes require cofactors for their proper working. Different cofactorsbelong to different groups. Pick the odd one:

A. Vitamin A B. Coenzyme A
C. NAD^+ D. Haem group

(7) If a cell does not undergo S-phase, one of the following events cannot take place:

A. Increase in number of organelles
B. Synthesis of protein
C. Replication of DNA
D. Increase in size of cell

(8) Identify the event where mitosis will not take place:

A. RBC replacement B. Gamete formation
C. Grass propagation D. Wound healing

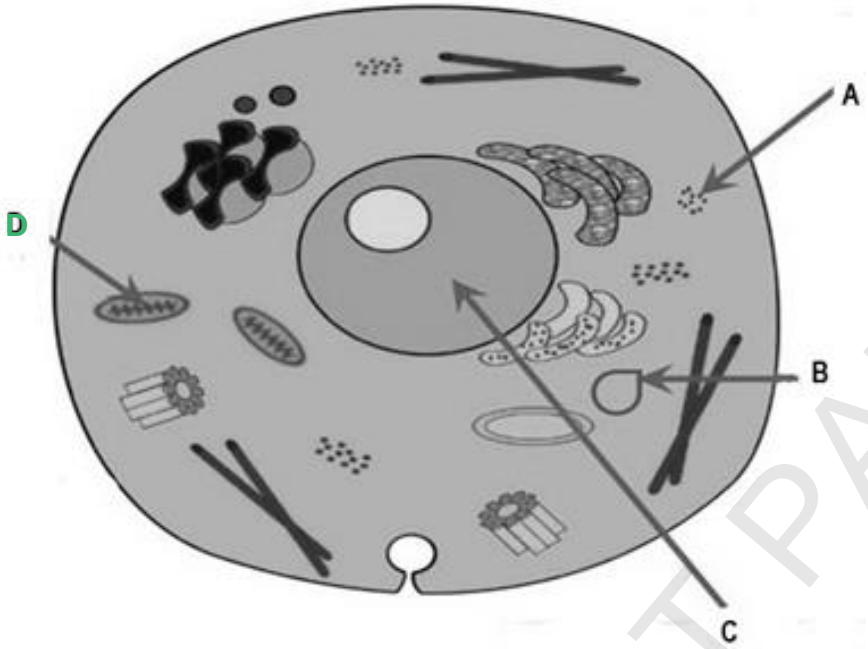
(9) After strenuous exercise you get tired because skeletal muscles accumulate:

A. Lactic acid only B. Ethyl alcohol
C. Lactic acid and CO_2 D. Ethyl alcohol and CO_2

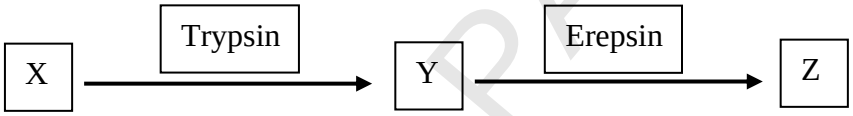
(10) If a person gets injured, which type of WBCs will release histamine?

A. Neutrophil B. Eosinophil
C. Basophil D. Lymphocyte

(11) In the given animal cell, which labelled part is responsible for the oxidation of food in the cell:



(12) The diagram shows some stages of digestion. Choose the best option for the action of Trypsin and Erepsin enzymes:



	X	Y	Z
A	Protein	Amino acid	Polypeptide
B	Amino acid	Protein	Polypeptide
C	Polypeptide	Amino acid	Protein
D	Protein	Polypeptide	Amino acid

Solution of MCQ (Section A)

1	**B**	**5**	**D**	**9**	**A**
2	**A**	**6**	**D**	**10**	**C**
3	**A**	**7**	**C**	**11**	**D**
4	**C**	**8**	**B**	**12**	**D**

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

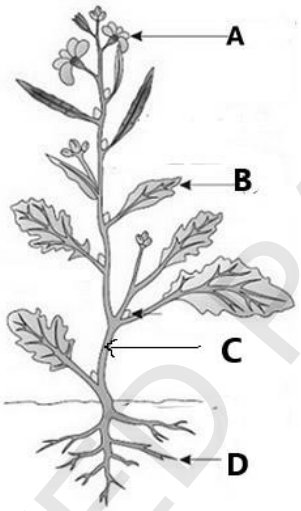
Time allowed: 2.40 hours Total Marks: 53

Note: Answer any ELEVEN parts from Section 'B' andattempt any TWO questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet–B if required. 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. Answer the following questions related to the Mustard plant



a. Name the level of organization exhibited by the Mustard plant.Also write its scientific name. (1)

(Answer) Level of organization shown by the mustard plant is **"Multicellular organization".**

Scientific name of the Mustard plant is *Brassica campestris.*

b. Mention the role of part A in the given plant. (1)

(Answer) Labelled part A in the above figure of Mustard plant is "Flower" Flower is **the reproductive part** of the Mustard plant.It directly takes part in sexual reproduction responsible for the **formation of seeds & fruit**

c. Identify the part C and D of the plant on the basis of their function?(1)

(Answer) Part C - Stem (vegetative part
Part D - Root (vegetative part)

ii. How Ronald Ross proved the deduction, "**Plasmodium should be present in mosquito**"?

(Answer) Ronald Ross performed important experiments in order to test the deductions related to the transmission of plasmodium

i. <u>BY USINGFEMALE ANOPHELES MOSQUITO</u>

He allowed a female Anopheles mosquito to bite a malarial patient. He killed the mosquito some days later & found Plasmodium multiplying in stomach of mosquito.

ii. <u>BY USING FEMALE CULEX MOSQUITO</u>

He allowed female Culex mosquito to bite on the sparrows suffering from malaria. He then allowed these mosquitoes to bite the healthy sparrows. The sparrows got malaria.

<u>RESULTS:</u>The experiments of Ross confirmed that mosquito is involved in the spread Plasmodium &malaria

iii. Suppose a doctor is examining the group of children suffering from Rickets and anaemia:

a. Name the food components the children are lacking in their diet. (1)

(Answer) **Deficiency** of **Vitamin D** is the cause of Rickets in children &**deficiency of iron** causes anaemia

b. What is the importance of those food components in human body? (2)

(Answer) **Vitamin D**

i. Helps to regulate the absorption of calcium and phosphate by the intestines & their retention in the body
ii. Helps in deposition of Calcium & phosphorus in bones so keeps the bones strong.

Iron

i. It is a part of haemoglobin and myoglobin in muscles. It is involved in the transport of oxygen.
ii. It is involved in cellular energy production.
iii. It also supports immune system.

(Note: students can write any 2 functions of Vitamin D andiron)

iv. Briefly describe the problem of Protein Energy Malnutrition. (3)

(Answer) **Protein energy malnutrition** is caused by deficiency of both proteins and calories in the diet. Example of diseases caused by PEM is Kwashiorkor & Marasmus

Kawashiorkor: A growing child who does not get enough protein develops this disease. Growth is retarded & a child is weak

Marasmus: The wasting of the body resulting from general starvation is called marasmus. Patient lose all their body fat & muscle strength.They acquire a skeletal appearance

v. Which kingdom does Euglena belong to? Give reason for its placement.Enlist any three characteristics of that kingdom.(0.5+1+1.5)

(Answer) **Euglena** belongs to **Kingdom Protista.**

Reason for placement:it is a unicellular organism.Euglena has both plant-like (presence of chlorophyll) and animal-like (heterotrophic mode of nutrition in darkness and lack of cell wall) characters. Due to this it is placed in the kingdom Protista.

characteristics

i. Kingdom Protista includes eukaryotic organisms with a unicellular or simple multicellular structure.
ii. Most organisms belonging to this kingdom are aquatic
iii. It includes animal like protists called protozoa e.g., amoeba, Plant like protists called algae e.g., Euglena. Fungi like protistse.g., slime mold

vi. Complete the table related to epithelial tissue

	Tissue name	Location	Function
a	Squamous epithelium	Alveoli of lungs	Passage of material by diffusion & filtration
b	Columnar epithelium	Lines stomach & intestine	Secretion, absorption & protection
c	Ciliated epithelium	Lines the respiratory passages	Transport through tubes

vii. How pollution affects the biodiversity? Briefly discuss. (3)

(Answer) Pollution affects environment & biodiversity.

i. The global climate change may occur so rapidly that many species will be unable to adjust their range & become extinct.

ii. Pesticides have caused the abundance of predatory birds to decrease & acid deposition has caused worldwide decline in amphibian population

(Note: Students can write down other effects of pollution according to their choice)

viii.

a. In the above figure, identify the phase and type of cell division. (01)

(Answer) The type of cell division in the given figure is **"Mitosis"**.& the phase of mitosis shown in the figure is **"Anaphase"**

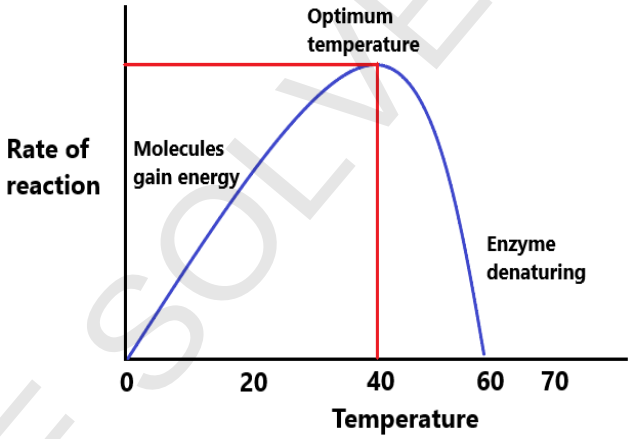
b. State the events taking place in this phase of cell division. (02)

i. In anaphase spindle fibres**contract.**

ii. Sister chromatid of each chromosome **separate** from each other and move to the opposite poles. Now they are called chromosomes. Finally, same number of chromosomesas parent cell reach the respective poles.

ix. With the help of graph interpret the effect of temperature on enzyme activity?

(Answer) **Effect of temperature on enzyme activity:**



Heat increases molecular motion,so the molecules of the substrates & enzymes move more quickly so the rate of reaction increases. The temperature at which an enzyme catalysed reaction happens fastest is called the **Optimum temperature.** Different enzymes have different optimum temperature. Optimum temperature for **human enzymes is 36^0C TO 38^0C.**

If the temperature is increased above the optimum temperature, then rate of reaction decreases due to denaturation of enzyme.

If temperature is reduced to below freezing point, enzymes are inactivated but not denatured. They will regain their catalytic activity when higher temperatures are restored

x Give reasons why: (1.5x2=3)

a. Death of heart muscles takes place during Myocardial infarction.

(Answer) **Infarction** means death **due to lack of oxygen**

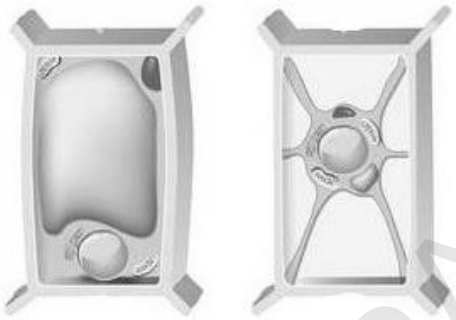
i. if one of the **coronary arteries of heart is blocked due to embolus or large plaque**,blockage will occur.

ii. Portion of the heart muscle will not get supply of oxygen so this portion of **heart muscle dies**.

b. RBCs are biconcave in shape

(Answer) The biconcave shape of RBC provides a **larger surface** for the **diffusion of gases into and out of the cell at a faster rate.** Exchange of oxygen is efficient due to biconcave RBCs.

xi. In the given figure, plant cells are placed in hypotonic and hypertonic solutions.



Evaluate the effects of these solutions on plant cells.

(Answer) **Cell in the hypotonic solution:** In the figure where the cell is placed in hypotonic solution;

i. Water from outside of the cell moves inside the cell.
ii. Cytoplasm expands& large central vacuole gains water.
iii. Plasma membrane pushes against the rigid cell wall. So cell will become turgid in this situation cell will not burst because cell wall does not give away

Cell in the hypertonic solution: In the figure where the cell is placed in hypertonic solution;

i. When a plant cell is placed in a hypertonic solution, the water inside the cells is drawn out by osmosis.
ii. The vacuoles decrease in size.
iii. The cytoplasm also shrinks and plasmolysis occurs.

xii. Give reasons as, to why: (1x3=3)

a. A person with blood type O is universal donor

(Answer) People with type O blood are called universal donors because their **donated red blood cells have no antigens** and can therefore be safely given to people of any blood group.

b. Veins have low blood pressure as compared to arteries

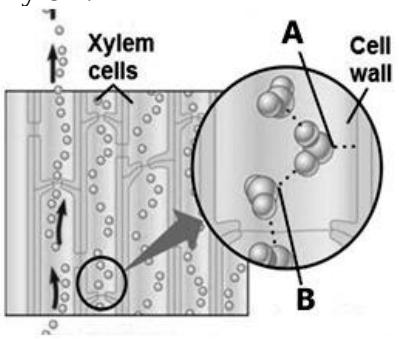
(Answer) Veins carry blood back to your heart from the rest of the body.

i. Blood pressure in the arteries is high because heart pumps the blood with high pressure in arteries. From arteries blood move to arterioles then to capillaries.
ii. Blood in veins comes from capillary network.
iii. As blood pressure is low in capillaries so veins receive blood at low pressure

c. In humid air transpiration rate is less.

(Answer) Humid air already **contains lot of water vapour**. So humid air can **accept very little water vapours** from plants so rate of transpiration remains less in humid air.

xiii. The figure given below shows part of mechanism for the movement of water through xylem.



a. Identify forces A and B. (1)

(Answer) A - Adhesion
B - Cohesion

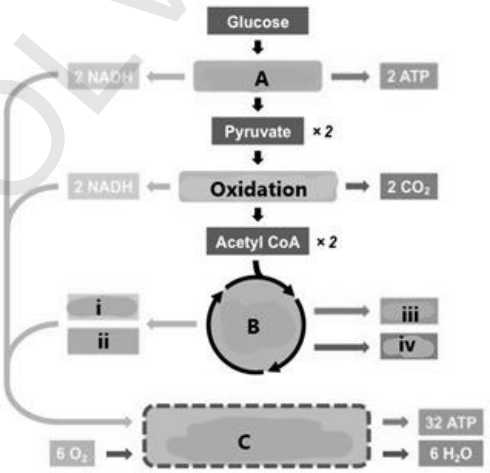
b. Despite of the gravitational force, how the upward movement of water takes place through xylem? (2)

(Answer) Upward movement of water trough xylem is due to

i. **Cohesion** which is force of attraction between the water molecules due to strong hydrogen bonding with eachother**Adhesion** which is the attraction between different molecules (between water molecules & xylem vessels &tracheid) Due to these cohesive and adhesive forces a continuous column of water is formed from roots up to the leaves.

ii. The evaporation of water from the leaves results in the suction force which pulls the water up the xylem vessel. This suction force due to transpiration is called **transpiration force**.so due to all these forces water moves up against the force of gravity through xylem.

xiv. The given flow chart illustrates the aerobic respiration. Answer the questions related to it: (1+2)



(a) Name the phases of aerobic respiration	(b) Label the products of phase B of respiration
A. Glycolysis	i.6NADH
B.Kreb's cycle	ii.2$FADH_2$
C. Electron Transport chain	iii.2ATP
	iv.4CO_2

(Note: Labelled part (i) and (ii) names are interchangeable. Labelled parts (iii) and (iv) names are interchangeable.)

xv. Why ATP is called the energy currency of the cell?Justify the statement.

(Answer) The primary molecule used by the cells to capture & release energy is Adenosine Triphosphate. The ability of ATP to store and release energy is due to its molecular structure. **Each ATP molecule has three phosphate groups attached with adenosine.**

In the structure of ATP the **2 terminal phosphate groups** are linked with each otheras **energy rich bonds**.The energy in this bond is released as it breaks and inorganic phosphate (Pi) gets separated from ATP. In common energy reactions only the outermost of the two high-energy bonds breaks. When this happens, on breakdown of terminal bond ATP becomes ADP (adenosine diphosphate) and one Pi is released with the release of 7.3 kcal of energy (7,300 calories).

ATP ⟶ ADP + Pi + (7.3 kcal per mole)

In some cases, ADP is further broken down to AMP with the release of 7.3 kcal of energy.

ADP ⟶ AMP +Pi +(7.3 kcal per mole)

SECTION – C(Marks 20)

Note: Attempt any **TWO**questions. All questions carry equal marks. (2×10 = 20)

Q.3 a. Identify the causes and effects of deforestation. **(1.5+2.5)**

(Answer) Deforestation

The cutting down of trees, destruction of forest, leaves the soil barren, which is called deforestation. We are destroying forests (a) for timber (b) to get land for agriculture (c) to make roads, airports etc. (d) to make houses, buildings for the settlement of ever-increasing number of human population and urban development (e) to get land for grazing.

Effects of Deforestation on Biodiversity

i. Removal of forests causes soil erosion, silting up of lakes and rivers, flood and the loss of thousands of species of animals and plants.
ii. When the trees are cut down and the soil is ploughed, there is less protection from the wind and rain. Heavy rainfall washes the soil off the hillsides into rivers. The hillsides are left bare and useless and the rivers become choked up with mud and silt, which can cause floods.
iii. About half of the rain, comes from the transpiration of the trees themselves. When areas of forest are cleared, this source of rain is removed, cloud cover is reduced and the local climate change quite dramatically.
iv. The temperature range from day to night is more extreme and the rainfall reduces.
v. Many of our present-day drugs quinine, aspirin etc., are derived from plants. We are likely to deprive the world of these valuable resources.

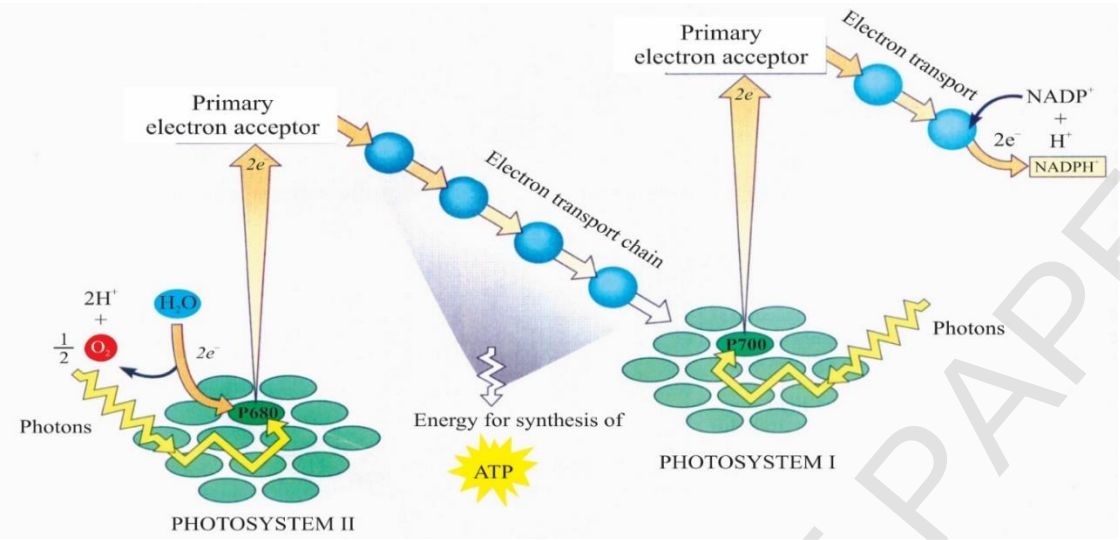
c. List the events of light dependent reactions with help of Z scheme diagram.**(4+2)**

(Answer) Light Dependent Reactions of Photosynthesis

The reactions, which depend upon light, are called light dependent reactions of photosynthesis. These reactions take place in thylakoid membranes where photosynthetic pigments are arranged into clusters called photosystems. There are two types of photosystems: **Photosystem I** and **Photosystem II**. Process of light dependent reactions starts from photosystem II

1. Chlorophyll a of photosystem II absorbs light and a pair of electrons is emitted from it.
2. The emitted electron pair passes through electron transport chain and provides energy for ATP synthesis.
3. At the same time **photolysis** takes place. In this process light splits water into oxygen atom, two hydrogen ions (H^+) and two electrons. Oxygen is released out while electron pair is provided to chlorophyll of photosystem II to compensate its electron loss.

4. Light also acts on photosystem 1 which gives out an electron pair. These electrons and two H^+ of water reduce $NADP^+$ to NADPH



Requirements of Light reaction	Products of light Reaction
i. Light	Oxygen
ii. Enzymes	ATP
iii. Water	NADPH
iv. $NADP^+$	
v. ADP & Inorganic phosphate	

Q.4 Heart acts as a pumping organ in body. Explain the structure and function of human heart along with the diagram. **(4+3+3)**

Answer: HUMAN HEART

The human heart is a hollow pumping organ. It is somewhat conical in shape. It is about the size of a man's fist.

Pericardium.

The heart is enclosed in a thin tough transparent sac, the **pericardium**.

Pericardialfluid

There is a fluid between the heart and the pericardium called **pericardialfluid**. It is lubricating fluid, which reduces friction between the pericardium and heart.

Myocardium

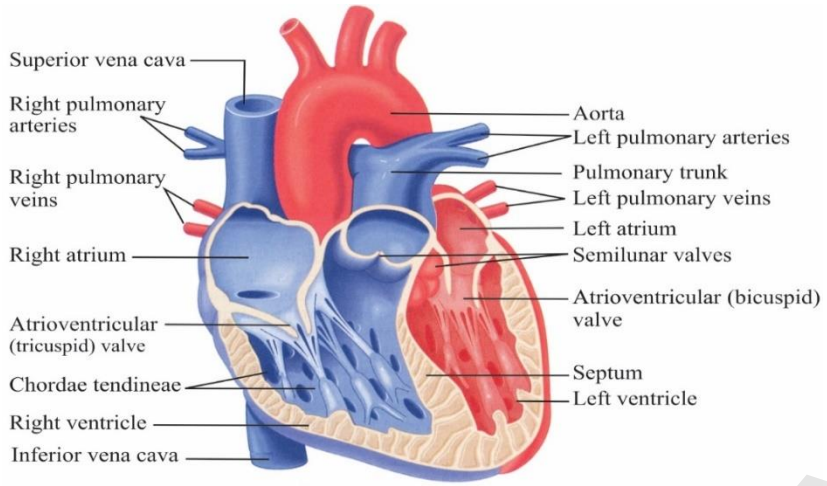
The major portion of the heart is called **myocardium**. It consists largely of cardiac muscle tissue.

Longitudinal division of heart

Internally, the heart is divided by a vertical partition into two halves, the right and left. The vertical partition is called **septum**.

Chambers of heart

Each half is again divided into an upper thin-walled **atrium** and a lower thick-walled **ventricle**. Thus, the heart consists of four chambers



i. **right** and **left atria**
ii. **right** and **left ventricles.**

The **atria** receive blood and the **ventricles** distribute it. Blood from the head, neck and arms is returned to the right atrium by **superior vena cava**. Blood from lower parts of the body is brought back by **the inferior vena cava** to the right atrium. Thus, the **right atrium receives deoxygenated blood from the two-vena cava.** When the right atrium contracts, the blood flows into the right ventricle through the tricuspid valve.

Contraction of right ventricle

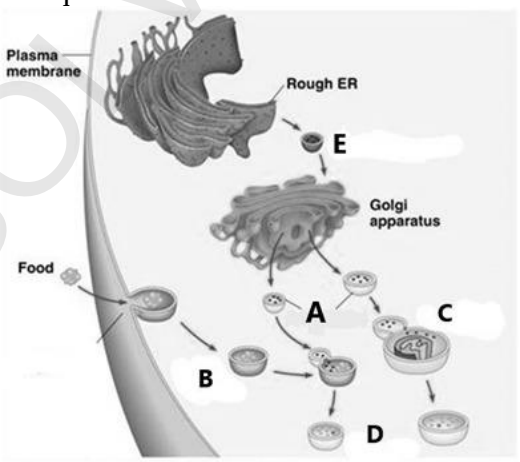
When the right ventricle contracts the blood pressure closes tricuspid valve. This prevents back flow of blood into the atrium. The blood leaves the right ventricle by pulmonary trunk. The pulmonary trunk divides into two pulmonary arteries one to each lung. Return of blood into the ventricle is prevented by **semilunar valves** in the pulmonary trunk. Oxygenated blood from the lungs is brought back to the heart by way of the **pulmonary veins**, which open into the left atrium. When the left atrium contracts the blood enters the left ventricle through bicuspid valve.

Contraction of left ventricle

When the left ventricle contracts, blood leaves by a large artery, the aorta. From the aorta blood is distributed to all parts of the body except lungs.

Aorta also has **semilunar valves** to prevent back flow into the left ventricle.

Q.5 a. Answer the questions related to the functions of an organelle, shown in figure.



i. Identify the organelle A. **(0.5)**

Ans: Lysosome

ii. Label the steps C, D and E. **(1.5)**

Ans: C – Lysosome engulfing damaged organelle

D – Digestion of food vacuole

E – Transport vesicle (containing active hydrolytic enzymes)

iii. Enlist the functions of organelle A. **(3)**

Ans: 1. Lysosomes contain various active hydrolytic enzymes which breakdown proteins, nucleic acids, lipids and carbohydrates.

2. Lysosomes digest engulfed nutrients of food vacuole.

3. Lysosomes serve as recycling centres for damaged organelles

b. How dothe processes of swallowing and peristalsis take place inhumans? Explain **(3+2)**

(Answer) Swallowing

In swallowing the following actions take place:

i. The tongue presses upwards and back against the roof of the mouth forcing a bolus, to the back of the mouth.
ii. The soft palate closes the nasal cavity at the back.
iii. The larynx is pulled upwards so that glottis (opening of trachea) lies under the back of the tongue.
iv. The glottis is also partly closed by the contraction of a ring muscle.
v. The epiglottis (a flap of cartilage) helps to prevent the food from entering glottis instead of oesophagus.

The beginning of the swallowing action is voluntary, but once the food reaches the back of the mouth, swallowing becomes an **automatic** or reflex action. The food is forced into and down the oesophagus by peristalsis.

Peristalsis

The alimentary canal has layers of muscle in its wall which pushes the ingested food forward. A contraction of muscle just behind the food mass pushes the food forward into the next region where muscles are relaxed and oesophagus is wide. This wave of contraction is called **peristalsis**. It is the rhythmic wave of muscular contraction and relaxation in the wall of the alimentary canal that causes the food to move through the alimentary canal.

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