| Version No. | | | |
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| ROLL NUMBER | | | | | | |
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1 1 1 1 | 1 1 1 1 1 1 1
2 2 2 2 | 2 2 2 2 2 2 2
3 3 3 3 | 3 3 3 3 3 3 3
4 4 4 4 | 4 4 4 4 4 4 4
5 5 5 5 | 5 5 5 5 5 5 5
6 6 6 6 | 6 6 6 6 6 6 6
7 7 7 7 | 7 7 7 7 7 7 7
8 8 8 8 | 8 8 8 8 8 8 8
9 9 9 9 | 9 9 9 9 9 9 9

**Answer Sheet No.**_____

**Sign. of Candidate** _____

**Sign. of Invigilator** _____

# BIOLOGY HSSC–I (3rd Set)

## SECTION – A (Marks 17)

**Time allowed: 25 Minutes**

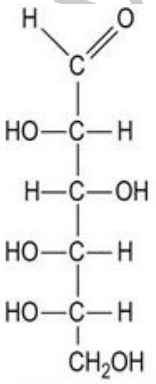
Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. **Do not use lead pencil.**

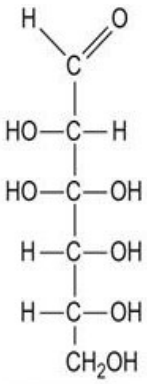
**Q.1 Fill the relevant bubble for each part. All parts carry one mark.**

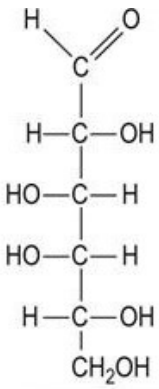
(1) During the secretion of Insulin from Pancreas, which route is it most likely to take?

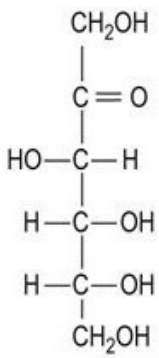
A. Golgi apparatus → RER→ SER →Secretory vesicle ◯
B. RER→SER→ Golgi apparatus→Secretory vesicle ◯
C. RER→ Transport vesicle → Golgi apparatus →Secretory vesicle ◯
D. Transport vesicle→RER→ Golgi apparatus→Secretory vesicle ◯

(2) Which molecule is ketohexose?

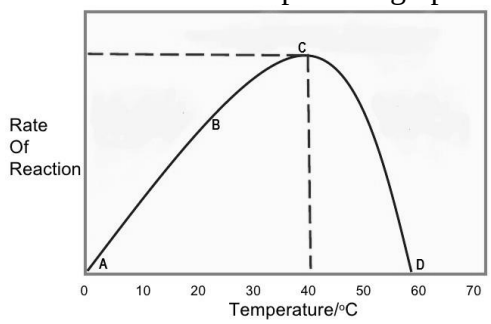
A.  ◯

B.  ◯

C.  ◯

D.  ◯

(3) This graph shows effect of temperature on rate of reaction of an enzyme catalysed reaction. Mention the point of graph that shows optimum temperature.




A. ◯ B. ◯
C. ◯ D. ◯

(4) Why Z scheme temporarily shifts to cyclic pathway during light reaction?

A. Z scheme produces more ATP as compared to NADPH ◯
B. Z scheme produces less ATP as compared to NADPH ◯
C. Calvin cycle requires more ATP as compared to NADPH ◯
D. Calvin cycle requires less ATP as compared to NADPH ◯

(5) Transmission of Viral hepatitis is through different routes. Identify the correct option among the following.

| | **Via Blood only** | **Via Blood and body fluids** | **Via Faecal Oral route** | |
|---|---|---|---|---|
| A. | Hepatitis A and E | Hepatitis B and D | Hepatitis C | ◯ |
| B. | Hepatitis C | Hepatitis B and D | Hepatitis A and E | ◯ |
| C. | Hepatitis A and E | Hepatitis C | Hepatitis B and D | ◯ |
| D. | Hepatitis B and D | Hepatitis A and E | Hepatitis C | ◯ |

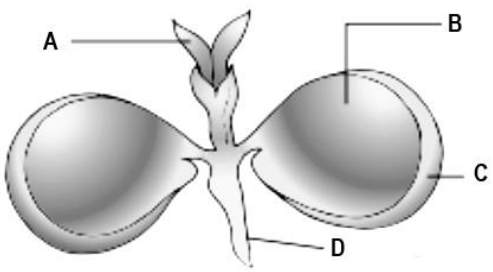
(6) We have 1 billion bacteria per square centimetre of our skin. Why we have so many bacteria on our skin?

A. To produce acne, eczema and pimples on the skin ◯
B. To limit the growth of pathogens by colonization resistance ◯
C. To provide essential minerals and nutrients to the body ◯
D. To help in decomposition after the death of a person ◯

(7) The filaments of some fungi are coenocytic, which means they:

A. Are not differentiated into organs ◯
B. Are composed of distinct cells ◯
C. Do not have cross walls ◯
D. Have mushroom like appearance ◯

(8) The diagram shows a dicot seed opened. Select the part that is impenetrable and prevents germ growth.




A. ◯ B. ◯
C. ◯ D. ◯

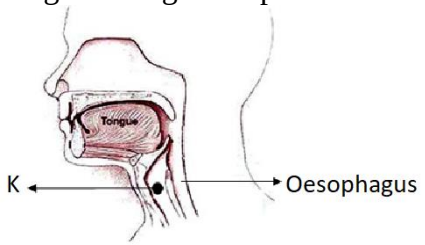
(9) All organ systems are less developed in parasitic flat worms **EXCEPT**:

A. Circulatory system ◯ B. Digestive system ◯
C. Reproductive system ◯ D. Respiratory system ◯

(10) Water potential ($\Psi_w$), solute potential ($\Psi_s$) and pressure potential ($\Psi_p$) are interrelated with each other. If $\Psi_w$=-1500 KPa and $\Psi_s$= -2100 KPa, then $\Psi_p$ will be:

A. 3600 KPa ◯ B. -3600 KPa ◯
C. -600 KPa ◯ D. 600 KPa ◯

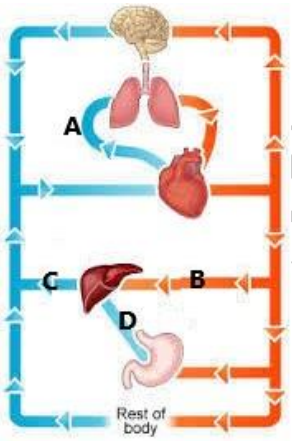
(11) The given diagram represents the entry of food particle "K" in trachea.




Which one of the following reason could be responsible for the entry of particle "K" into larynx instead of oesophagus?

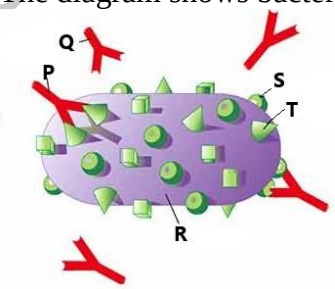
A. Waves of contraction and relaxation of skeletal muscles ◯
B. Upward movement of soft palate ◯
C. Failure of larynx to move upward closing glottis ◯
D. Failure of lubrication activity of oral cavity ◯

(12) The diagram shows flow of blood in various parts of body. Identify the portal vein.




A. ◯ B. ◯
C. ◯ D. ◯

(13) The diagram shows bacteria surrounded by antibodies. Which parts are antigens?

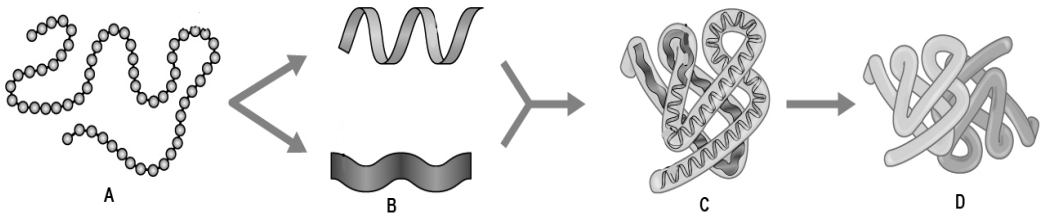



A. P and Q ◯ B. S and T ◯
C. P, Q and R ◯ D. R, S and T ◯

(14) "P" are organelles produced in a rounded structure "Q" found in nucleus of eukaryotic cells and then pass through "R" into cytoplasm to provide site for synthesis of "S".
What does "R" indicate in the above statement?

A. Nuclear pore ◯ B. Ribosome ◯
C. Cell membrane ◯ D. RNA ◯

(15) The diagram shows four levels of protein structure. Select the level that depends on disulphide bridges for stability.




A. ◯ B. ◯
C. ◯ D. ◯

(16) The process of chemiosmotic phosphorylation depends on proton pumps. Pick the row that shows the components of ETC that pump $H^+$ to generate ATP.

| | NADH dehydrogenase complex | FADH dehydrogenase complex | Coenzyme Q | Cytochrome reductase complex | Cytochrome c | Cytochrome oxidase complex |
|---|---|---|---|---|---|---|
| A. | ✓ | x | ✓ | ✓ | x | ✓ |
| B. | X | ✓ | x | X | ✓ | X |
| C. | ✓ | X | x | ✓ | X | ✓ |
| D. | x | ✓ | ✓ | x | ✓ | X |

A. ◯ B. ◯
C. ◯ D. ◯

(17) Ascent of sap depends on four factors according to TACT theory. Choose the pair of factors that depend on hydrogen bonding of water?

A. Cohesion and Adhesion ◯
B. Transpiration and Adhesion ◯
C. Cohesion and Tension ◯
D. Transpiration and Tension ◯

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

Time allowed: 2.35 hours Total Marks: 68

Note: Answer any fourteen 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 42)

**Q.2** Attempt any **FOURTEEN** parts from the following. All parts carry equal marks.

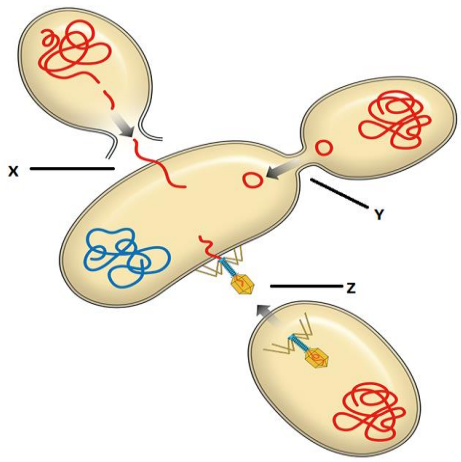
i. Why lysosomes are called suicidal bags?

ii. Compare eukaryotic and prokaryotic flagellum for the following aspects.
a. Composition b. Ultra – structure c. Basal body

iii. Why hydrophobic exclusion property of water is important for protoplasm?

iv. Draw the cloverleaf model of tRNA with proper labels.

v. Following diagram show the different methods of parasexuality in Bacteria.

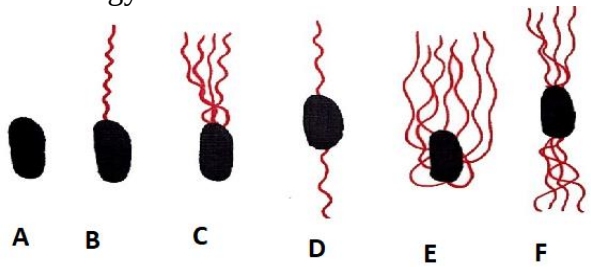



Correctly name and introduce the methods of parasexuality represented by X, Y and Z in the diagram.

vi. What do you know about feedback inhibition in relation to enzyme action?

vii. How it was proved that oxygen liberated during photosynthesis comes from water, not carbon dioxide?

viii. In the following diagram, some types of bacteria are shown. Use correct terminology for each of these bacteria on the basis of flagella distribution.



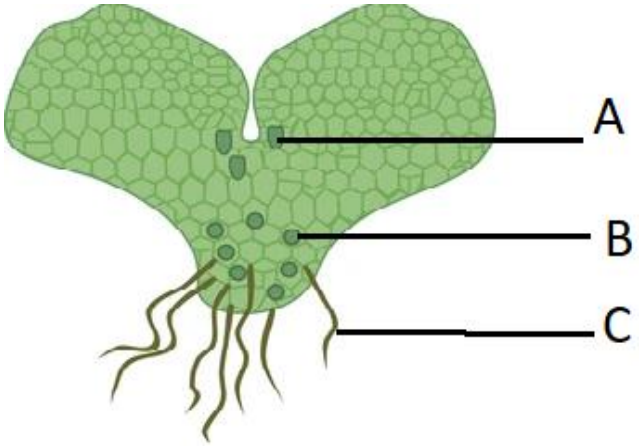

ix. Draw a labelled diagram of HIV.

x. Define:
a. Glycolysis b. Trichome c. Sarcinae

xi. How lipids and protein absorption occurs in small intestine of man?

xii. Why Kingdom Protista is considered a polyphyletic group?

xiii. Following is the diagram of prothallus of a fern.



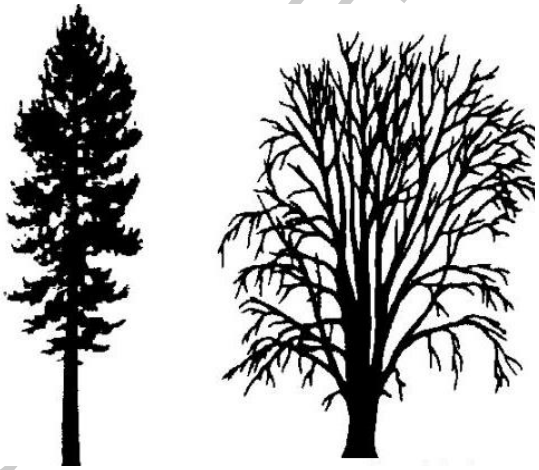

a. Correctly name the parts labelled as A, B and C
b. Draw the microscopically enlarged view of structures shown as A and B
c. Which phase of life cycle is shown in this diagram?

xiv. How single veined leaves evolved in plants?

xv. Compare Protostomes and Deuterostomes for the following features:
a. Cleavage b. Fate of blastophore c. Coelom formation

xvi. Applying 10 kg ammonium nitrate per acre of land to a tomato crop give maximum yield. In light of your knowledge of tonicity, what would you predict if 1000 kg of ammonium nitrate is given to the same crop per acre?

xvii. Difference in the branching pattern of the two plants is due to a growth correlation.

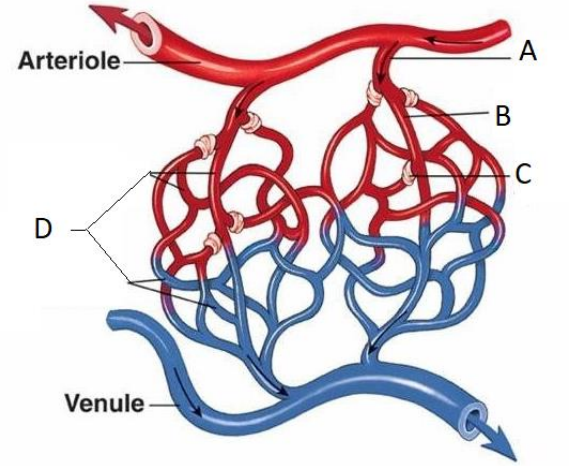


Explain the mechanism of the correlation responsible for this pattern of plant growth.

xviii. Complete the following table related to digestion in human beings following the pattern in row 1:

| | Digestive juice | Source | Substance acted upon | Products of digestion |
|---|---|---|---|---|
| **1** | **Salivary amylase** | Salivary gland | starch | maltose |
| **2** | **Pepsin** | | | |
| **3** | **Erepsin** | | | |
| **4** | **Bile** | | | |

xix. In the following figure a capillary network at tissue level is shown.




a. Give correct names to the parts labelled as A, B, C and D.
b. Through which structure in the diagram blood mainly flow in a metabolically inactive tissue?
c. What is the functional role of structures "C" in the diagram?

xx. What is your understanding about heart attack?

## **SECTION – C** (Marks 26)

**Note:** Attempt any **TWO** questions. All questions carry equal marks. (2×13 = 26)

**Q.3** a. Describe two double membrane organelles of eukaryotic cells that are the centers of two vital bioenergetic reactions. **(4+4)**

b. Explain the chemical nature and functions of acyl glycerols. **(05)**

**Q.4** a. How $C_4$ plants compensate for the energy loss due to photorespiration under high temperature regime. **(04)**

b. Define and explain the role of two types of phagocytes in second line of defense. **(04)**

c. Draw and explain the life cycle of a typical mushroom (like *Agaricus*). **(05)**

**Q.5** a. List the distinguishing features of phylum echinodermata giving relevant examples. **(04)**

b. Explain the role of phytochromes in photoperiodic response. **(04)**

c. Explain the structure of human heart with the help of a diagram. **(05)**

* * * * *

# BIOLOGY HSSC-I (3rd Set)
## Student Learning Outcomes Alignment Chart
**(Curriculum 2006)**

## SECTION – A

**Q.1**

(1) Describe the structure and functions of Golgi complex.
(2) Distinguish the properties and role of monosaccharides, write their empirical formula and classify them.
(3) Describe the effect of temperature on enzyme action.
(4) Describe the events of non cyclic photophosphorylation and outline the cyclic photophosphorylation.
(5) Describe the causative agent, symptoms, treatment and prevention of the following viral diseases:
Hepatitis, herpes, polio and leaf curl virus disease of cotton.
(6) Describe the benefits of bacterial flora of humans.
(7) List the characteristics that distinguish fungi from other groups and give reasons why fungi are classified in a separate kingdom.
(8) Explain how this life cycle demonstrates an adaptation of angiosperms on land.
(9) Describe the evolutionary adaptations in the concerned phyla for digestion, gas exchange, transport, excretion and coordination.
(10) Explain the movement of water between plant cells, and between the cells and their environment in terms of water potential.
(11) Explain swallowing and peristalsis.
(12) Trace the path of the blood through the pulmonary and systemic circulation (coronary, hepatic portal and renal circulation).
(13) Describe the role of B cells in antibody mediated immunity.
(14) Describe the chemical composition and structure of nuclear envelope.
(15) Classify proteins as globular and fibrous proteins.
(16) Describe chemiosmosis and relate it with electron transport chain.
(17) Explain the movement of water in xylem through TACT mechanism.

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## SECTION – B

**Q.2**

i. Describe the formation, structure and functions of the lysosomes.
ii. - Describe the structure of bacterial flagellum.
- Explain the structure of cilia and flagella and the mechanism of their movement.
iii. Explain the following properties of water that make it the cradle of life.
High polarity, hydrogen bonding, high specific heat, high heat of vaporization, cohesion, hydrophobic exclusion, ionization lower density of ice.
iv. Distinguish in terms of structures and roles, the three types of RNA.
v. Explain how mutations and genetic recombination lend variability to bacterial reproduction.
vi. Explain feedback inhibition.
vii. Explain, narrating the experimental work done, the role of water in photosynthesis.
viii. Explain motility in bacteria.
ix. Draw labeled diagrams of bacteriophage, flu virus and HIV.

x. - Outline (naming the reactants and products of each step of) the event of Glycolysis.
- Justify why cyanobacteria are considered the most prominent of the photosynthetic bacteria.
- Explain the great diversity of shapes and sizes found in bacteria.

xi. Explain the absorption of digestive products from small intestine lumen to the blood capillaries and lacteals of the villi.

xii. Explain protists as a diverse group of eukaryotes that has polyphylatic origin and defined only by exclusion from other groups.

xiii. Outline the life cycle of ferns.

xiv. Explain the evolution of leaf in vascular plants.

xv. Classify coelomates into protostomes and deuterostomes.

xvi. Explain the movement of water between plant cells and between the cells and their environment in terms of water potential.

xvii. Explain influence of apical meristem on the growth of lateral shoots.

xviii. Describe the major actions carried out on food in the three regions of small intestine.

xix. Describe the role of precapillary sphincters in regulating the flow of blood through capillaries.

xx. Categorize Angina pectoris heart attack and heart failure as the stages of cardiovascular disease development.

## SECTION – C

**Q.3** a. - Explain the external and internal structure of mitochondria and interlink it with its function.
- Explain the external and internal structure of chloroplast and interlink it with its function.

b. -Define lipids and describe the properties and roles of acylglycerol phodpholipids terpenes and waxes.
- Illustrate the molecular structure (making and breaking) of an acylglycerol, a phospholipid and a terpene.

**Q.4** a. Outline the process of $C_4$ Photosynthesis as an adaptation evolved in some plants to deal with the problem of photrespiration.

b. Describe the role of macrophages and neutrophils in killing bacteria.

c. Classify fungi into zygomycota Ascomycota and basidiomycota and give the diagnostic features of each group.

**Q.5** a. Describe the general characteristics, importance and examples of sponges, cnidarians platyhelminths, aschelminths, molluscs, annelids arthropods and echinoderms.

b. Describe the mechanism of photoperiodism with reference to the mode of action of phytochrome.

c. Describe the structure of walls of heart and rationalize the thickness of the walls of each chamber.

*** * * * ***

# BIOLOGY HSSC I (3rd Set)

Table of Specifications

| | Chap 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Total marks | %age |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **K (Knowledge)** | | 1(15)1<br>3(b) 5 | 1(3) 1<br>2(vi) 3 | 2(vii)3<br>2(x-a) 1 | 1(5) 1 | 2(v) 3<br>2(x:b,c) 2 | 1(7) 1 | 1(8) 1 | 5(a) 4 | 1(17) 1 | 2(xi) 3 | 2(xix)3 | 1(13)1 | 34 | 29.3% |
| **U (Understanding)** | 1(1) 1<br>1(14)1<br>2(i)3<br>3(a)8 | 1(2)1<br>2(iii)3 | | 1(4) 1<br>4(a) 4 | | 1(6)1<br>2(ii)3<br>2(viii)3 | 2(xii) 3 | 2(xiv)3 | 1(9) 1<br>2(xv)3 | 2(xvi) 3<br>5(b) 4 | 1(11)1<br>2(xviii)3 | 1(12) 1<br>2(xx)3 | 4 (b)4 | 58 | 50% |
| **A (Application)** | | 2(iv)3 | | 1(16)1 | 2(ix)3 | | 4(c)5 | 2(xiii)3 | | 1(10)1<br>2(xvii) 3 | | 5(C) 5 | | 24 | 20.7% |
| Total marks | 13 | 13 | 4 | 10 | 04 | 12 | 09 | 07 | 08 | 12 | 07 | 12 | 05 | 116 | 100% |

**KEY:**

1(1)(1)
Question No. (Part No.) (Allocated Marks)

**Note:** (i) The policy of FBISE for knowledge based questions, understanding based questions and application based questions is approximately as follows:

a) 30% knowledge based.
b) 50% understanding based.
c) 20% application based.

(ii) The total marks specified for each unit/content in the table of specification is only related to this model question paper.

(iii) The level of difficulty of the paper is approximately as follows:

a) 40% easy
b) 40% moderate
c) 20% difficult