

**MODEL QUESTION PAPER I**  
**CLASS XI**  
**BIOLOGY (THEORY)**

Max Marks.: 70

TIME : 3 Hrs

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General Instructions :

- i. This question paper consists of 4 sections - A,B, C & D. Section A consists of 5 questions of one mark each, Section B is of 10 questions of two marks each, Section C is of 10 questions of three marks each and Section D is of 3 questions of five marks each.
- ii. All questions are compulsory
- iii. There is no overall choice. However, an internal choice has been provided in one question of 2 marks, in one question of 3 marks and in all the three questions of 5 marks weightage. Attempt only one of the choices in such questions.
- iv. Question numbers 1-5 are to be answered in one word or one sentence each.
- v. Question numbers 6-15 are to be answered in approximately 20-30 words each.
- vi. Question numbers 16-25 are to be answered in approximately 30-50 words each.
- vii. Question numbers 26-28 are to be answered in approximately 80-120 words each

**SECTION A**

Q1. Define – “Coelom”?

Q2. What are “Bulliform Cells”?

Q3. What is the role of alary muscles in cockroach?

Q4. During an experiment a Biologist adds Cytokinin to the culture medium. What is its purpose?

Q5. Give an example of-

- (a) Hyperglycerine hormone.
- (b) Hormone secreted from atrial wall which decrease blood pressure.

**SECTION- B**

Q6. Mention the difference between-

- (a) Open and closed Vascular bundle.
- (b) Exarch and Endarch Primary Xylem.

Q7. It is said that, when the head of cockroach is cut-off , it will still live for as long as one week. Justify the statement.

Q8. What are nuclear pores? State their function.

- Q9. Name the stage of cell cycle at which the following events occur:-
- Chromosomes move to equator of spindle.
  - Centromere splits and Chromatids separate.
  - Pairing between homologous chromosome takes place.
  - Crossing over between homologous chromosomes takes place.
- Q10. Which plant hormone exists in gaseous form? State its function.
- Q11. Justify the statement “Photorespiration is a wasteful process in C-3 plants”.
- Q12. What is respiratory quotient? What is its value for fats?
- Q13. Which hormonal deficiency is responsible for-
- Dibetes mellitus
  - Goitre
- Q14. Explain the role of Na-ion in the generation of Action potential.
- Q15. How will hearing get affected if the Eustachian tube gets blocked ?
- OR
- What is meant by the term “Osmoregulation”?
- Q16. What are the characteristics of Euglenoids?
- Q17. Compare the characters of Chordates and Nonchordates.
- OR
- What is heterosopy? Briefly comment on its significance. Give two examples.
- Q18. Write the floral formula and then draw the suitable floral diagram for a flower with the following floral characters:-  
Actinomorphic , Bisexual , hypogynous , five united sepals with valvate aestivation, five free petals with twisted aestivation , five free stamens , anthers dithecous and axile placentation.
- Q19. Mention the function of the following:-
- Ureters in frog.
  - Malpighian tubules.
  - Body wall in earthworm.
- Q20. Identify the micronutrient of plant which helps in splitting of water to liberate oxygen during photosynthesis. How does the excess of this micronutrient induce the deficiency of other nutrients in plants?
- Q21. What is Apolast and Symplast pathway of water movement in the root? Explain the role of Casparian strip in endodermis.

Q22. Name two cytoplasmic cell organelles that are double membrane bound. State their functions and draw labeled diagram of both.

Q23. What do you mean by co-factors of enzyme? Mention the difference between: Prosthetic group and Co-enzyme.

Q24. What is the significance of Juxta-glomerular apparatus (JGA) in kidney function?

Q25. Why do we call our heart myogenic? What do the P-wave and T-wave represent in the electrograph (ECG)?

#### SECTION-D

Q26. Describe the events taking place during Interphase. What is the  $G_0$  (quiescent phase) of cell cycle?

OR

- (a) Describe the fluid mosaic model of plasma membrane.
- (b) Describe the structure of plastids along with a diagram.

Q27. How will you ascertain by looking at the external and the internal characters, whether a plant is  $C_3$  or  $C_4$ ? Even though very few cells in a  $C_4$ -plant carry out biosynthetic Calvin pathway, yet they are highly productive. Justify the above statement, explaining the  $C_4$  pathway.

OR

Give the schematic representation of glycolysis. What happens when oxygen is not available to the  $C_4$  pathway?

Q28. What are the major transport mechanisms of  $CO_2$  in the human body? Explain in brief.

OR

Draw the diagram of a sarcomere of skeletal muscle showing different regions. Describe the important steps in muscle contraction.

**Model Question Paper II**  
**Class XI**  
**Subject Biology**

Max Marks.: 70

TIME : 3 Hrs

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General Instructions :

- viii. This question paper consists of 4 sections - A,B, C & D. Section A consists of 5 questions of one mark each, Section B is of 10 questions of two marks each, Section C is of 10 questions of three marks each and Section D is of 3 questions of five marks each.
- ix. All questions are compulsory
- x. There is no overall choice. However, an internal choice has been provided in one question of 2 marks, in one question of 3 marks and in all the three questions of 5 marks weightage. Attempt only one of the choices in such questions.
- xi. Question numbers 1-5 are to be answered in one word or one sentence each.
- xii. Question numbers 6-15 are to be answered in approximately 20-30 words each.
- xiii. Question numbers 16-25 are to be answered in approximately 30-50 words each.
- xiv. Question numbers 26-28 are to be answered in approximately 80-120 words each

**SECTION A**

- 01. What is the cover on the gills of Bony fish?
- 02. What is the economic importance of Indigofera and to which family does it belong?
- 03. Where do you find chondriocytes?
- 04. Which plant hormone causes wilting of leaves?
- 05. Name the special granules found in the nerve cell.

**SECTION B**

- 06. Differentiate the two types of inflorescence.
- 07. What is the significance of Typhlosole? To which part of the digestive system of higher organisms can it be compared to?
- 08. What is quiescent stage? How is it represented?
- 09. Differentiate between passive transport and active transport.

10. Tomato plants and sugarcane are exposed to light of same intensity and  $\text{CO}_2$  concentration beyond  $450 \mu\text{l L}^{-1}$ . How is the rate of photosynthesis affected in the two types and why?
11. What is the importance of chloroplasts for our survival?
12. In what form is Potassium absorbed by plants? Write any two functions of Potassium in plants.
13. How do you distinguish between a skeletal muscle and a cardiac muscle?

**OR**

Differentiate between exocrine gland and endocrine gland.

14. Draw a neat labelled diagram of reflex arc.
15. If the stomach stops releasing HCl, what are the expected problems in an individual?

**SECTION C**

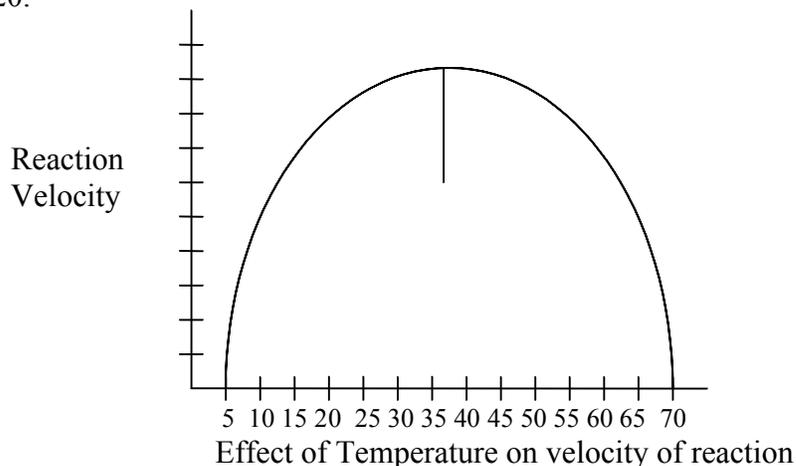
16. Give three types of life cycle shown by plants with examples.
17. What is the technical term for sac fungi? Why is it so called? State its two characteristics.

**OR**

What do the terms Phycobiont and Mycobiont signify? Why is its symbiotic association referred to as pollution indicators.

18. You are given 2 slides of T.S. of monocot and dicot stem. What are the characters which help you to identify them.
19. What is wood botanically? Differentiate between Heart wood and Sap wood.

20.



Looking at the graph above, at what temperature is the maximum reaction and minimum reaction. Give reasons for the same.

21. Write three significances of Meiosis.
22. Describe nitrogen cycle.
23. Explain the formation of root nodules in a leguminous plant.
24. Explain counter current mechanism.
25. What are three types of animals based on the nitrogenous waste produced?

#### **SECTION D**

26. Describe Prophase I of Meiosis I. Support with diagram.

**OR**

- a) Name the four types of Blood groups in human beings.
- b) What is the basis for such grouping?
- c) Which group is known as the universal donor?
- d) Which group is known as universal recipient ?
- e) Name the blood groups that can be transfused into B group.

27. Draw schematic diagram of Inter-relationship among metabolic pathways showing respiration mediated breakdown of different organic molecules to  $\text{CO}_2$  and  $\text{H}_2\text{O}$ .

**OR**

Explain with schematic diagram the electron transport system.

28. Draw a neat labelled diagram of the internal structure of heart and explain Cardiac Cycle.

**OR**

Explain the mechanism of conduction of Nerve impulse.

**Marking Scheme of Model question Paper II**  
**Class XI**  
**Subject Biology**

MM: 70

Time 3 Hours.

**SECTION A**

1. Operculum (1)
2. As a dye – Fabaceae (1/2 + 1/2)
3. Cartilaginous tissue (1)
4. Abscisic acid (1)
5. Nissl's granules (1)

**SECTION B**

- 6.i) Cymose and Racemose  
ii) Acropetal, basipetal (any 2 points of difference) (2)
7. To increase the surface area of absorption of the intestine in earthworm. It can be compared to the intestinal villi of higher organism (1+1)
8. Inactive state during cell division is known as quiescent stage.  $G_0$  (1+1)
9. Passive transport – i) No spending of energy  
ii) Region of lower concentration to higher concentration  
Active transport – i) Requires energy.  
ii) Region of higher concentration to lower concentration (1+1)
10. Rate of photosynthesis is higher in tomato plant.

	<b>Exocrine</b>	<b>Endocrine</b>	
Tomato reaches beyond and plant saturation at $360 \mu\text{l L}^{-1}$ .	i) With duct.	i) Ductless.	plant saturation $450 \mu\text{l L}^{-1}$ sugarcane reaches
	ii) Enzyme	ii) Hormones	
	iii) Pepsin, Trypsin	iii) Insulin, Glucagon	

(1+1)

- 11.i) Gives food  
 ii) Gives oxygen  
 iii) Gives timber  
 iv) Fossil fuel (any 2)

(1+1)

12. Potassium+ ions.

- i) Anion – balance  
 ii) Opening stomata (any

<b>Skeletal Muscle</b>	<b>Cardiac Muscle</b>
i) Striations prominent	i) Less Striations
ii) Multinucleated	ii) Single nucleus in a cell
iii) No intercalated disc	iii) intercalated disc present
iv) Gets fatigued	iv) working continuously

Cation  
& closing of other role)

(1+1)

13.

Any 2 (1+1)

**OR**

Any 2 (1+1)

14. Pg. 322 Fig. 21.5 Reflex arc.

15. Protein digestion will get affected, bacteria won't get killed, pepsinogen won't get converted to pepsin, no pH of 1.8 which is optimal for pepsin. Any 2 (1+1)

**SECTION C**

16. Refer Pg 42 Fig 3.7

(1+1+1)

17. Ascomycetes- Sexual spores are produced in sac like structure.

- i) Unicellular or multicellular
- ii) Mycelium is septate
- iii) Saprophytic, parasitic or decomposer (Any other) (1+1+1)

**OR**

Phycobiont - algal part, mycobiont – fungal part. Lichen, which is a symbiotic association does not grow in polluted places. (1+1+1)

18.

<b>Monocot stem</b>	<b>Dicot stem</b>
i) Vascular Bundles are more	i) Vascular Bundles are few
ii) Distributed in ground tissue	ii) arranged in a ring
iii) Open Vascular Bundles	iii) Closed Vascular Bundles
iv) Pith not present	iv) Pith present

Any 3 points (1+1+1)

19. Secondary xylem.

(1)

<b>Heart wood</b>	<b>Sap wood</b>
i. Dead elements	i. living tissue
ii. central layer	ii. peripheral layer
iii. storage of tannin, resin	iii. conduction of water and minerals
iv. darker colour	iv. lighter colour
v. resistant to decay	v. not resistant

Any 2 points (2)

20. At 5° C and 70° C minimum activity.  
Between 35° and 40° C maximum activity  
Every enzyme has its optimum temperature

(1+1+1)

21. i) Chromosome number gets reduced.  
ii) Produces variation & evolution.  
iii) Keeps chromosome number constant.

(1+1+1)

22. Nitrogen cycle Pg. 201 Fig 12.3.

(3)

23. Refer Pg. 202 & 203 Fig. 12.4.

(3)

24. Pg. 295 & Pg. 296 Fig. 19.4 & Fig.19.6. Explanation and drawing.

(3)

25. Pg. 290

(1+1+1)

**SECTION D**

26. Pg. 168, Fig. 10.3

**OR**

- i) AB, A, B, O
- ii) Presence of Antigen & Antibody
- iii) Universal Donor – O
- iv) Universal Recipient - AB
- v) B group & O group (5)

27. Fig. 14.6, Pg, 236

**OR**

Fig. 14.4, Pg.233 (5)

28. Fig. 18.2, Pg.283, Pg. 284 Explanation for Cardiac Cycle.

**OR**

Pg. 317 & 318, Generation and conduction of nerve impulse. (5)

**Note: Q-7, 10, 18 & 20 are HOTS ≈ 10 marks ≈ 15%**

MODEL QUESTION PAPER III  
CLASS XI  
SUB: - BIOLOGY (THEORY)

Max Marks.: 70

TIMES : 3 Hrs

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General Instructions :

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- xvi. All questions are compulsory
- xvii. There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question in 3 marks and three questions in 5 marks weightage. Attempt only one of the choices in such questions.
- xviii. Question numbers 1-5 are to be answered in one word or one sentence each.
- xix. Question numbers 6-15 are to be answered in approximately 20-30 words each.
- xx. Question numbers 16-25 are to be answered in approximately 30-50 words each.
- xxi. Question numbers 26-28 are to be answered in approximately 80-120 words each

**SECTION -A**

Q1. What is the role of methanogens in the gut of several ruminant animals?

Q2. For which family would you assign the floral formula.  $\oplus \begin{matrix} \circ \\ \uparrow \\ \ominus \end{matrix} K_{(5)} \overline{C_5} A_5 \underline{G}_{(2)}$

Q3. Where do you find clitellum?

Q4. Define facilitated diffusion?

Q5. Which animal hormone is known as emergency hormone?

**SECTION -B**

Q6. Where is Bidder's canal located? What are its functions?

Q7. Justify the following statement on the basis of external features-

- (i) Potato is a stem.
- (ii) Sweet potato is a root.

Q8. How does the position of centromere form the basis of classification of chromosomes?

Q9. Illustrate the different nature of bonds linking monomers to make polymers in case of polysaccharides and proteins.

Q10. Why is it that in certain plants, deficiency symptoms appear first in the younger parts of the plant while in others, they do so in mature organs?

Q11. RuBisCO is an enzyme that acts both as cabboxylase and oxygenase. Why do you think RuBisCO carries out more carboxylation in C<sub>4</sub> plants?

Q12. What are the crucial events in aerobic respiration in plants?

Q13. What is the composition of bile?

Q14. Differentiate between  
Vital capacity and total lung capacity.

**OR**

What is the effect of pCO<sub>2</sub> on oxygen transport?

Q15. Name the type of joint between the following:-

- (a) Atlas / axis
- (b) femur / acetabulum
- (c) between cranial bones
- (d) between pectoral girdle and humerus.

### **SECTION-C**

Q16. Classify algae on the basis of pigments and stored food?

Q17. Write down the four characteristics of phylum Arthropoda. Write one example of economically important insect and one gregarious pest.

**OR**

Explain three classes of protozoa.

Q18. Draw a labelled diagram of maize grain.

Q19. Explain the three types of simple epithelium.

Q20. How do neutral solutes move across the plasma membrane? Can polar molecules also move across it in the same way? If not, then how are these transported across the membrane?

Q21. Explain the three structures of proteins.

Q22. What do you understand by photoperiodism and vernalisation? Describe their significance.

Q23. Mention the criteria for essentiality of an element.

Q24. How does erythroblastosis foetalis occur? How can it be avoided?

Q25. How does the mechanism of hearing take place?

**SECTION-D**

Q26. Explain the nuclear changes taking place in the different stages of mitosis with labelled diagrams.

**OR**

Classify enzymes and write their nomenclature.

Q27. Name the two cells of Islets of Langerhans which secrete hormones. Name the hormones. Explain their role in maintaining sugar level in blood.

**OR**

How do the following disorders take place:-

- (i) Osteoporosis
- (ii) Gout
- (iii) Renal calculi
- (iv) Coronary Artery disease
- (v) Emphysema

Q28. Draw schematic diagram of Krebs's cycle?

**OR**

- (a) Give comparisons between  $C_3$  and  $C_4$  plants.
- (b) Explain photophosphorylation in brief with diagram.

**MARKING SCHEME  
FOR MODEL QUESTION PAPER – 1**

**M.M. -70**

**TIME -3Hrs**

**SECTION A**

- Q1-The body cavity which is lined by mesoderm (1)
- Q2-In certain grasses adaxial epidermal cells along the veins modify themselves into large, empty, colourless cells. These are called Bulliform cells. (1)
- Q3- Alary muscles helps in contraction and expansion of heart chambers of heart (1)
- Q4- Rate of cell division will be greatly enhanced (1)
- Q5 a)Glucagon  
b)Atrial Natriuretic Factor (ANF)  $\frac{1}{2} \times 2=1$

**SECTION B**

- Q6. Open vascular bundle has cambium between xylem and phloem  $\frac{1}{2}$
- Closed vascular bundle – doesnot have cambium between xylem & phloem  $\frac{1}{2}$
- Exarch xylem – Protoxylem lies towards periphery  $\frac{1}{2}$
- Endarch xylem – Protoxylem lies towards centre  $\frac{1}{2}$
- Q7. Because the brain is represented by supra – oesophageal ganglion which supplies nerves to antennae and compound eyes and this is not present in the head region. (2)
- Q8. Nuclear pore is a place where the nuclear envelope is interrupted leaving a gap (1)
- (2)  
Functions : (a) Provides passage for RNA and protein molecules in both directions (i.e. from nucleus to cytoplasm and vice versa) (1)
- Q9. i)Metaphase  
ii)Anaphase II (meiosis) / Anaphase (mitosis)  $\frac{1}{2} \times 4 = 2$   
iii)Zygotene  
iv)Pachytene
- Q10. Ethylene; effective in fruit ripening (2)

Q11. In  $C_3$  plants some  $O_2$  bind to Rubisco, hence decreasing  $CO_2$  fixation. In photorespiration, synthesis of sugar & ATP does not take place. Rather  $CO_2$  gets released utilizing ATP. Therefore it is a wasteful process.

(2)

Q12. RQ – It is the ratio of the volume of  $CO_2$  evolved to the volume of  $O_2$  consumed in respiration

2

Value of RQ for fat is less than one

(1)  
(1)

Q13. a) Insulin

1x2=2

b) Thyroxine

Q14. At the point of stimulus, the membrane becomes permeable to sodium. As sodium enters axoplasm, the interior becomes positively charged & exterior becomes negatively charged.

The positive ions travel from depolarized region to the next polarized region through axoplasm

and action potential is created

(2)

Q15. Air pressure on either side of the eardrum will not be maintained and so likely to get damaged.

(2)

Or

Osmoregulation means the regulation of ionic content & fluid volume inside the body.

(2)

**SECTION C**

Q16. Refer to Textbook Pg-21 (Any 3 points)

1x 3 = 3

Q17. Refer to Textbook Pg-55 table 4.1 (Any 3 points)

1x

3 = 3

Or

Heterospory means producing two kinds of spores, macro(large) and micro(small) spores

(1)

It is the precursor of evolution of the seed habit

(1)

3

2 examples: Selaginella, Salvinia (or any other two)

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

Q18.   $K_{(5)} C_5 A_5 \underline{G}_{(2)}$

3

Floral diagram

1

2

}

Q19. a) As urinogenital duct 1 }  
 b) Remove excretory products from haemolymph 1 }  
 3  
 c) Respiratory exchange and excretion 1

Q20. Manganese 1 }  
 3 }  
 Refer Textbook pg-199 (12.24) lines 08-18 2 }

Q21. Apoplast movement : Movement of water through intercellular spaces and walls of cells 1  
 Symplast movement : Movement of water through the cells through their cytoplasm ; and from cell to cell through plasmodesmata. 1  
 3  
 Casparian strips in endodermis is impervious to water , so water is directed to move into the cells and reach xylem. 1

Q22. Mitochondria & chloroplast  $\frac{1}{2} + \frac{1}{2} = 1$  }  
 Functions  $\frac{1}{2} + \frac{1}{2} = 1$  }  
 3 }  
 Diagrams  $\frac{1}{2} + \frac{1}{2} = 1$  }

Q23. Co-factors : Non – protein constituents of enzyme molecules are called co-factors 1  
 Prosthetic group – Organic compounds that are tightly bound to protein 1  
 3  
 portion of enzyme.  
 Co-enzyme – Organic compounds temporarily attached to protein portion of enzyme (during the course of catalysis) 1

Q24. Refer Textbook Pg – 297 ( 19.5 ) Para 3  
 3

Q25. Myogenic heart – Because its nodal musculature has the ability to generate action potential without any external stimuli 1  
 P-wave represents the electrical excitation (or depolarization) 1  
 3  
 T-wave represents the return of the ventricles from excited to normal state (repolarization) 1

### SECTION D

Q26. Refer textbook Pg No 163 (10.1.1) 3 }  
 G<sub>0</sub> phase (quiescent stage). The cells that do not divide further, exit G<sub>1</sub> phase to 5 }  
 enter an inactive stage. 2 }

**OR**

Refer textbook pg- 131  
Refer textbook pg- 135,136  
5

Diagram

Description of structure

3  
1  
1

Q27. External character

Internal character

5

C<sub>4</sub> pathway with justification

Diagram

Explanation

$\frac{1}{2}$   
 $\frac{1}{2}$   
2  
2

**OR**

Glycolysis steps

5

Anaerobic respiration pathway textbook pg-230 fig 14.2

3  
2

Q28. Mechanism textbook pg – 274 and 275 (17.4.2)

5

Reaction

4  
1

**OR**

Diagram textbook pg-305, fig 20.2 (b)

5

Steps of muscle contraction textbook pg-306, 307 (20.22)

2  
3

**Note: Q-7, 11, 18 & 20 are HOTS ≈ 10 marks ≈ 15%**

**Marking Scheme of Model question Paper III**  
**Class XI**  
**Subject Biology**

Max Marks: 70

Time 3 Hours.

**SECTION A**

Ans 1: Methanogens are responsible for the production of methane from the dung of ruminating animals. (1)

Ans2: Solanaceae (1)

Ans 3: 14 to 16 segments (1)

Ans 4: The process in which special proteins help move substances across membranes without expenditure of ATP energy is called facilitated diffusion. (1)

Ans 5: Adrenalin (1)

**SECTION B**

Ans 6: Bidder's canal is found in male frog. It connects testis to the kidney so that sperms can come out with urine. (2)

Ans 7: (i) Nodes are represented by eyes. Each eye consists of buds subtended by a leaf scar. Hence potato is a stem.  
(ii) Unicellular outgrowth from sweet potato shows that it is a root hair. Hence sweet potato is a modified root. (2)

Ans 8: Based on the position of centromere, the chromosomes can be classified into four types. (2)

- a) Metacentric chromosome:- Centromere is in the middle of the chromosome forming two equal arms.
- b) Sub-metacentric chromosome:- Centromere is slightly away from the middle of the chromosome resulting in two arms - one shorter arm & one longer arm.
- c) Acrocentric chromosome:- Centromere is situated close to the end of the chromosome forming one extremely short and one very long arm.
- d) Telocentric:- It has terminal centromere. (2)

Ans 9:

- a) Peptide bond formed between two amino acids to form a protein molecule, when the carboxyl group of one amino acid reacts with the amino group of the next amino acid with the elimination of a water moiety.
- b) In a polysaccharide the individual monosaccharides are linked by Glycosidic bond, where the bond is formed between two carbon atoms of two adjacent

monosaccharides.  
(2)

Ans 10(i) When elements like N<sub>2</sub>, K, Mg are actively mobilized within the plants and exported to the young developing tissues, symptoms tend to appear first in the older tissue.

(ii) Whenever elements are immobile and are not transported out of mature organs, deficiency symptoms tend to appear first in young tissues. (2)

Ans11(i) In C<sub>4</sub> plants photorespiration does not occur, because they have a mechanism that increases the concentration of CO<sub>2</sub> at the enzyme site.

(ii) This takes place when the C<sub>4</sub> acid from the mesophyll is broken down in the bundle sheath to release CO<sub>2</sub>. This results in increasing the intracellular concentration of CO<sub>2</sub>. This ensures that RuBisCO functions as carboxylase minimizing the oxygenase activity.  
(2)

Ans12: The crucial events in aerobic respiration are:

I. The complete oxidation of pyruvate by the stepwise removal of all the hydrogen atoms, leaving 3 molecules of CO<sub>2</sub>.

II. The passing on of the electrons removed as part of the hydrogen atoms to molecular O<sub>2</sub> with simultaneous synthesis of ATP.

(2)

Ans13: Bile contains bile pigments, bile salts, cholesterol and phospholipids but no enzyme.(2)

Ans14:

<b>Vital Capacity</b>	<b>Total Lung Capacity</b>
1. The maximum volume of air a person can breathe in after a forced expiration.	1. Total volume of air accommodated in the lungs at the end of a forced inspiration.
2. This includes ERV, TV and IRV.	2. This includes EV, ERV, TV and IRV.

**OR**

1. When pCO<sub>2</sub> is high and pO<sub>2</sub> is low as in the tissues, more binding of CO<sub>2</sub> occurs.

2. When the pCO<sub>2</sub> is low pO<sub>2</sub> is high as in the alveoli, dissociation of CO<sub>2</sub> from carbamino- haemoglobin takes place.

(2)

Ans 15 a : Atlas / axis –pivot joint

b : Femur/acetabulum – hinge joint

c : Cranial bones – fibrous joints

d : Between humerus and pectoral girdle – ball and socket joint  
(1+1)

### SECTION C

Ans 16 Three classes of algae – Chlorophyceae, Phaeophyceae, Rhodophyceae - Ref.  
Textbook, Table 3.1 Page -33 (3)

Ans 17 Any 4 characteristics , Economically important insects – Apis , Bombyx, Laccifer  
Gregarious pest- Locusts (3)

### OR

Ans Any three groups of protozoans

1. Amoeboid protozoans – they move and capture prey by putting out pseudopodia – Amoeba
  2. Flagellated protozoans . they have flagella . They cause diseases such as sleeping sickness
  3. Ciliated protozoans – presence of thousands of cilia. They have a cavity that opens to the outside of the cell surface. E.g. Paramecium
  4. Sporozoans – infectious spore – like stage in its life cycle e.g. Plasmodium
- (1+1+1)

Ans- 18 Textbook, Fig – 5.19 , Page 77

Ans- 19 (i) squamous epithelium Ref. pg. – (1)  
(ii) cuboidal epithelium - (1)  
(iii) columnal epithelium - Textbook, Fig – 7.1 , Page 101 (1)

Ans -20 a. Neutral solutes move across the membrane by the process of simple diffusion along the concentration gradient. 1  
 $\frac{1}{2}$   
b. Polar molecules require a carrier protein of the membrane to facilitate their transport across the membrane. 1  
 $\frac{1}{2}$

Ans- 21 Primary proteins – sequential arrangement of amino acids in polymerized straight chain.  
Secondary proteins- protein threads are arranged in helical form.  
Tertiary proteins – long protein chain is folded upon itself, like a hollow woolen ball.

3

22. Textbook. Pg 251 and 253 3

23. Textbook Pg 195 (12.2.1) 3

24. It occurs when in subsequent pregnancies, the Rh antibodies from the mother ( RH-ve) can leak into the blood of the foetus ( Rh +ve) and destroy the foetal RBC

2

It can be avoided by giving anti Rh antibodies to mother immediately after the delivery of the first child.

1

25. Textbook Pg 327

3

#### SECTION D

26 Stages of prophase

1

metaphase

1

anaphase

1

telophase with explanation

1

Diagram of each stage

1

**OR**

Textbook Pg 158, 159 .

27.  $\alpha$  cell – glucagon

1

$\beta$  cell – insulin

1

Role - Textbook Pg 336

3

**OR**

i) Osteoporosis – decreases bone mass and increases chances of fracture.

Decreased level of estrogen.

1

ii) Gout – inflammation of joints due to accumulation of uric acid crystals.

1

iii) Renal calculi – stone or insoluble mass of crystallised salts formed within the kidney

1

iv) Coronary Artery Disease affects the vessels that supply blood to the heart muscle. Deposit of calcium, fat, cholesterol & fibrous tissues

1

v) Emphysema - alveolar walls are damaged due to which respiratory surface is decreased. Cigarette smoking

1

28. Krebs' cycle- Textbook Pg 232

5

**OR**

(a) Textbook Pg – 221, Table 13.1

2

(b) Photophosphorylation – Textbook . Pg 211, 212, Fig 13.5

3