



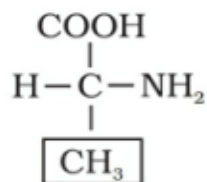
General Instructions :

- (i) All questions are compulsory.
- (ii) The question paper has five sections and 33 questions. All questions are compulsory.
- (iii) Section - A has 16 questions of 1 mark each; Section – B has 5 questions of 2 marks each; Section – C has 7 questions of 3 marks each; Section – D has 2 case based questions of 4 marks each; and Section E has 3 questions of 5 marks each.
- (iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION- A

1. Which among the following is not included in the taxonomic category? 1
- (a) Kingdom
 - (b) Key
 - (c) Family
 - (d) Species.
2. Given below are some bacteria and their shapes. Select the correct match. 1
- | Bacteria | Shape |
|--------------------|--------------|
| A. Lactobacillus | i Comma |
| B. Streptococcus | ii Spherical |
| C. Vibrio cholerae | iii Rod |
| | iv Spiral |
- (a) A-i, B-ii, C-iv
 - (b) A-iii, B-ii, C-i
 - (c) A-iii, B-iv, C-ii
 - (d) A-ii, B-iii, C-iv
3. The cells of this tissue are living and show angular wall thickening. They also provide mechanical strength. Identify the tissue. 1
- (a) Collenchyma
 - (b) Xylem
 - (c) Parenchyma
 - (d) Sclerenchyma

4. A scientist cultured green alga *Cladophora* in a suspension of aerobic bacteria and illuminated the culture by splitting light through a prism. He observed that bacteria accumulated mainly in the region of 1
- (a) violet and green light
 - (b) red and green light
 - (c) red and orange light
 - (d) blue and red light
5. Name the blood cell, whose reduction in number can cause clotting disorder leading to excessive loss of blood from the body. 1
- (a) erythrocytes
 - (b) leucocytes
 - (c) thrombocytes
 - (d) neutrophils
6. Receptor sites for neurotransmitters are present on 1
- (a) pre synaptic membrane
 - (b) tips of axon
 - (c) post synaptic membrane
 - (d) membranes of synaptic vesicles
7. Which among the following is not a part of diffusion membrane responsible for exchange of gases at alveoli? 1
- (a) Squamous endothelium
 - (b) Endothelium of alveolar capillaries
 - (c) Squamous epithelium
 - (d) Basement membrane
8. Amino acids are organic molecules which are building blocks of proteins. Identify the amino acid from the given structural formula: 1

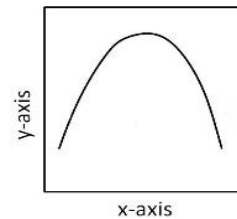


- (a) Alanine
- (b) Glycine
- (c) Serine
- (d) Lysine

9. Bacterial cells have a chemically complex cell envelop. The cell envelop of bacteria is composed of 1
- (a) outermost cell wall followed by glycocalyx and plasma membrane
 - (b) outer plasma membrane, cell wall and capsule
 - (c) outermost glycocalyx followed by cell wall and plasma membrane
 - (d) outermost slimy layer, tough capsule and plasma membrane

10. Which of the following statements are correct with reference to the reproductive system of frog? 1
- a) Pair of testes are found adhered to the lower part of the kidneys.
 - b) Cloaca in male is a common chamber for the passage of faecal matter and sperms.
 - c) Fertilisation is internal and occurs in the oviduct.
 - d) There is no functional connection between ovaries and kidneys.

11. The given graph represents the activity of an enzyme which is affected by the change in the condition which can alter the tertiary structure of a protein. 1
What does X axis and Y axis represent?



- a) X axis- PH , Y axis- Substrate
 - b) X axis- enzyme activity, Y axis- Substrate
 - c) X axis- Substrate, Y axis - PH
 - d) X axis- Temperature, Y axis- enzyme activity
12. Choose the option that gives correct match of joint and its location: 1
- A. Hinge Joint – 1. Carpals
 - B. Saddle Joint – 2. Knee
 - C. Pivot Joint – 3. Thumb
 - D. Gliding Joint – 4. Vertebra
- a) A-2, B-3, C-1, D-4
 - b) A-3, B-1, C-2, D-4
 - c) A-2, B-3, C-4, D-1
 - d) A-3, B-1, C-4, D-2

Question no 13 to 16 consist of two statements- Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- A. Both A and R are true and R is the correct explanation of A.
- B. Both A and R are true but R is not the correct explanation of A.
- C. A is true but R is false.
- D. A is false but R is true

- 13- **Assertion :** Bryophytes are the amphibians of Plant Kingdom. 1
Reason : Bryophytes are found in all kinds of extreme habitats .

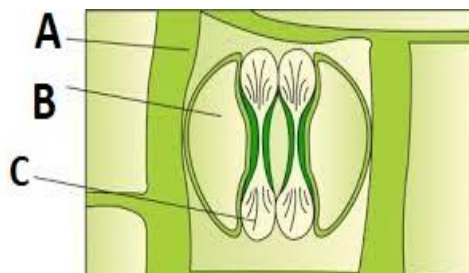
- 14- Assertion:** Prokaryotic cells lack mitochondria. 1
Reason : Prokaryotes have mesosomes which help in respiration. .
- 15 - Assertion :** Mitosis plays no role in evolution. 1
Reason : Mitosis ensures genetic homogeneity.
- 16- Assertion :** C₄ photosynthetic pathway is more efficient than C₃ pathway. 1
Reason : C₃ plants lack photorespiration.

SECTION – B

- 17-** Explain any two ways in which Ascomycetes are beneficial for mankind. 2
- 18-** State the antagonistic effect of the following hormones: 2
- a) Glucagon and Insulin
 b) Thyrocalcitonin and Parathormone
- 19 -** Complete the given table by filling the blanks from A to D. 2

Source/ Action	Plant Hormone
Isolated from corn kernels	A)-----
Synthesised in ripened fruits	B)-----
Stimulates stomatal closure	C)-----
Used in tea plantation	D)-----

- 20-** The given figure shows the stomatal apparatus in a group of plants. Identify the plant group where such stomata are observed and label the parts marked A, B and C in the figure. 2



- 21-** Explain how the enzyme activity would be affected, if an inhibitor closely resembles with the substrate in its molecular structure. Give one such example of a substrate and an inhibitor. 2

OR

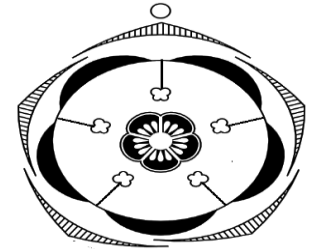
Proteins are heteropolymers containing strings of amino acids. Briefly describe the secondary and tertiary structure of proteins.

SECTION – C

- 22** – Draw a neat diagram of an eukaryotic cell containing chloroplast and label the following cell organelles: 3
- (a) which is involved in the packaging of materials
 - (b) which is the site of aerobic respiration
 - (c) which contains pigment chlorophyll
 - (d) Which contains sap and is bound by tonoplast.

- 23** - Study the floral diagram and answer the following questions : 3

- a) Identify the aestivation shown in the calyx and corolla of the above flower.
- b) Name the type of placentation seen in its ovary. Give example of a flower showing such placentation.
- c) Write the floral formula of the given flower.



- 24** - What is the duration of one cardiac cycle? State the significance of Sino atrial node(SAN) and Atrio-ventricular node (AV node) in the conduction of heart beat. 3

- 25** – Choose the animal from the given list which show characteristic feature of the phylum as mentioned below : 3

Nereis, Asterias, Obelia, Culex, Ancylostoma, Pila, Antedon

- (a)- the animal that shows jointed appendages
 - (b)- presence of parapodia for swimming
 - (c)- mouth contains rasping organ for feeding
 - (d)- exhibits alternation of generation
 - (e)- Sexual dimorphism is seen
 - (f)- excretory system is absent
- 26-** Name the biologist who proposed five kingdom classification? State the criteria followed for the classification. 3

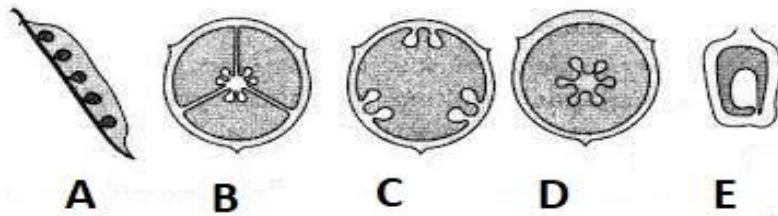
OR

State the economic importance of the following(one point for each):

- (a) Methanogens
- (b) Chemosynthetic autotrophs
- (c) Heterotrophic bacteria

- 27- The given figure shows the arrangement of ovules in the ovary of different flowers. Answer the following questions:

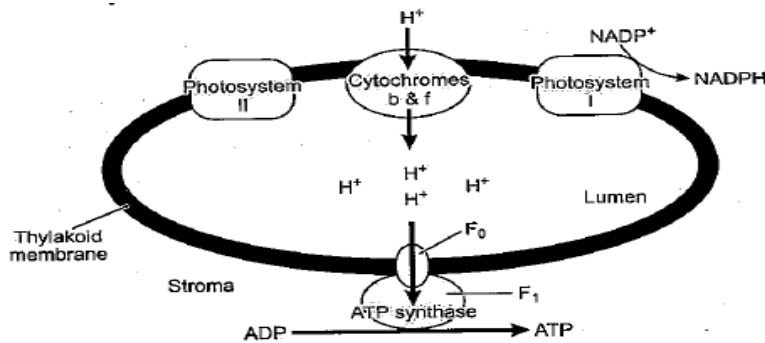
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- (a) Identify the different types of placentation shown in the figure from A to E.
 (b) Mention one example of plant where E type of placentation is seen.

- 28- The given diagram shows chemiosmosis in plants. Answer the following questions:

3



- (a) Explain how the proton gradient is caused across the membrane.
 (b) State its significance.

SECTION - D

Q 29 and 30 are case based questions. Each question has subparts with internal choice in one subpart.

- 29- Read the following and answer the questions that follow :

4

Blood is a fluid connective tissue made up of fluid matrix plasma, and formed elements, Red blood cells, (erythrocytes) white blood cells (leukocytes), and platelets (thrombocytes) constitute the formed elements. The blood of humans is grouped into A, B, AB and O systems based on the presence or absence of two surface antigens A, B on the RBCs. Another blood grouping is also done based on the presence or absence of another antigen called Rhesus factor (Rh) on the surface of RBCs. The spaces between cells in the tissues contain a fluid derived from the blood called tissue fluid. This fluid called lymph is almost similar to blood except for the protein content and the formed elements.

- (a) Which blood group is considered a universal donor and why?
- (b) How is serum different from plasma?
- (c) Name any two plasma proteins and state their significance.

OR

- (c) Name the complication which arises when a Rh+ foetus develop in the womb of a Rh-mother. Why does such a complication arise?

30- Read the following and answer the questions that follow :

4

In a biology class, teacher brought some animals such as roundworms, leeches, earthworms etc. and asked the students to classify them as males and females. One of the students, got confused and classified short earthworms as males and longer earthworms as females. Teacher then explained that in some organisms sexes are separate whereas in others the sexes are not separate.

- (a) How roundworms can be distinguished from flat worms on the basis of coelom and excretory organ?
- (b) What was the mistake committed by student in the classification of earthworms?
- (c) In which phylums will you classify earthworms and roundworms. Mention any one distinguishing feature of these phylums.

OR

- (c) Cnidarians exhibit two basic body forms. State any two differences between these forms.

SECTION – E

31- Explain the different stages of mitosis with a neat and labeled diagrams.

5

OR

Briefly explain the following with reference to cell division and cell cycle;

- (a) Quiescent stage
- (b) Pachytene and diplotene stage
- (c) Cytokinesis in plant cell and in animal cell

32- a) Draw labeled diagram to show the ultra-structure of sarcomere.

5

- b) Represent the mechanism of muscle contraction in the form of a flow chart.

OR

- a) Explain the three main processes that take place along the different parts of the nephron during urine formation.
- b) How does ADH help in regulating kidney functions?

- 33-** a) Name the first stable compound formed in C₄ plants during CO₂ fixation.
b) Diagrammatically represent the Hatch and Slack pathway

5

OR

- a) Differentiate between cyclic and non cyclic photophosphorylation.
- b) Describe the three phases of Calvin cycle
