



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 of the following statements are correct? 1
- (i) Genus comprises a group of related species.
 - (ii) Taxon represents a taxonomic group of individual organisms.
 - (iii) Family comprises a group of related genera.
 - (iv) Taxonomic category class includes related orders.
- (a) (i), (ii), and (iv)
(b) (ii) and (iv)
(c) (i), (iii) and (iv)
(d) (ii), (iii) and (iv)
2. Given below are some fungi and their classes. Select the correct match. 1
- | Fungi | Classes |
|---------------|-------------------|
| A. Pencillium | i Basidiomycetes |
| B. Rhizopus | ii Phycomycetes |
| C. Ustilago | iii Ascomycetes |
| | iv Deuteromycetes |
- (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 meristem responsible for producing secondary tissues is 1
- | | |
|----------------------|--------------------------|
| (a) Primary meristem | (c) Intercalary meristem |
| (b) Apical meristem | (d) Lateral meristem |

4. Which of the following pair is not correctly matched ? 1
- (a) C3 plant – Maize
 - (b) C4 plant – Kranz anatomy
 - (c) Calvin cycle – PGA
 - (d) Hatch and Slack pathway – Oxaloacetic acid
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. Which hormone interacts with membrane bound receptor and does not normally enter the target cell? 1
- (a) FSH
 - (b) Estrogen
 - (c) Thyroxine
 - (d) Cortisol
7. A person is suffering from an age related disorder "X". X is characterized by decreased bone mass and increased chances of fractures. Identify X and its common cause. 1
- (a) Tetany, increased levels of estrogen
 - (b) Osteoporosis, decreased levels of estrogen
 - (c) Myasthenia gravis, decreased levels of estrogen
 - (d) Muscular dystrophy, increased levels of estrogen
8. Which of the following statements about enzymes is incorrect? 1
- (a) Enzymes gets denatured at high temperature.
 - (b) Enzymes require optimum pH for maximal activity.
 - (c) Most enzymes are proteins but some are lipids.
 - (d) Each enzyme has four substrate binding sites.
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 regarding frog is correct? 1
- (a) Fertilization is internal and takes place in water.
 - (b) External ear and tympanum can be seen externally.
 - (c) In females the ureters and oviduct open separately in the cloaca.
 - (d) Copulatory pad on the first digit of the fore limbs are present in female frog.

11. Which among the following is a competitive inhibitor of succinic dehydrogenase? 1
 (a) α -ketoglutarate (b) malate
 (c) oxaloacetate (d) malonate.
12. Identify the option that gives correct match of joint and its location: 1
- | | |
|--------------------------|-------------|
| A. Ball and Socket Joint | 1. Carpals |
| B. Saddle Joint – | 2. Shoulder |
| 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** : Artificial system of classification separated closely related species. 1
Reason : Artificial system gave equal weightage to vegetative and reproductive characteristics.
- 14- **Assertion**: Mitochondria and chloroplast have their own genome. 1
Reason : Mitochondria and Chloroplast help in respiration.
- 15 - **Assertion** : Enzymes lower down the activation energy of the reactant molecule. 1
Reason : Enzymes are substrate specific catalysts.
- 16- **Assertion** : If the level of CO₂ increases continuously, there will be an increase in photosynthesis. 1
Reason : The concentration of CO₂ is very low in the atmosphere.

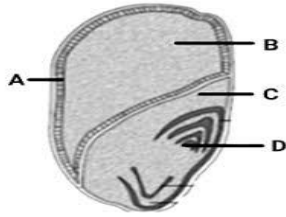
SECTION – B

- 17- Viruses did not find a place in the classification. Justify. 2
- 18- What would be expected to happen if: 2
 a) Gibberellin is sprayed over sugarcane crop.
 b) Stem cuttings are placed in a solution of auxin.
- 19 - Complete the given table by filling in the blanks from A to D. 2

Source/ Action	Animal Hormone
Secreted by Pineal gland	A)-----
Causes hyperglycemia	B)-----
Released from a ruptured follicle	C)-----
Stimulates erythropoiesis	D)-----

- 20- The figure given below depicts the sectional view of a seed. Identify the parts marked A to D in the figure.

2



- 21- What are enzymes? Give the technical term for RNA catalyst. Name the class of enzyme that catalyze the following:
- Transfer of electrons and protons from substrate to an acceptor molecule.
 - Transfer of a group from one substrate to another.

2

OR

Proteins are heteropolymers containing strings of amino acids. Explain the primary and secondary structure of proteins.

SECTION – C

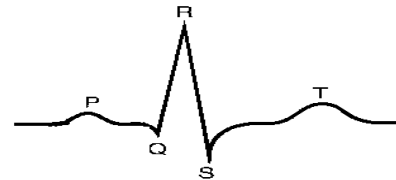
- 22 – What is a centromere? How does the position of the centromere form the basis of the classification of chromosomes? Support your answer with the diagrams.
- 23 - How will you distinguish between a wheat plant and a mustard plant on the basis of arrangement of vascular bundles, mesophyll of leaves and stomata?

3

3

- 24 - In the given figure ECG of a normal person is shown.

- What do P wave and T wave represent?
- State the significance of QRS complex.
- Mention any one medical application of this technique.



3

- 25 – Name the phylum corresponding to the features given and mention one example each of the animal belonging to the same phylum :

3

- presence of jointed appendages.
- having water canal system and spicules.
- exhibits bioluminescence.

- 26- Lichens are pioneers in ecological succession. Explain the components of the lichens. How are lichens beneficial for the environment?

3

OR

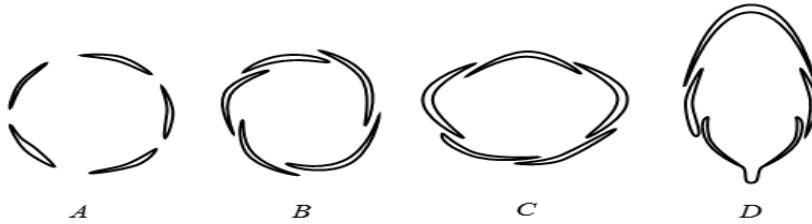
State the economic importance of the following (one point for each):

- Methanogens
- Chemosynthetic autotrophs
- Heterotrophic bacteria

27- The given figure depicts the arrangement of petals in a floral bud.

3

- Identify the patterns shown in the figures from A – D
- Give one example each of a flower showing these patterns.



28- A cyclic process that occurs at high light intensities in C₃ plants, is considered as a wasteful process. 3

- Name the process mentioned above.
- Why is it considered as a wasteful process?
- How do C₄ plants overcome this phenomenon?

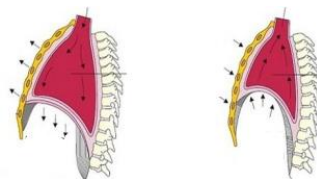
SECTION - D

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

In human beings, the lungs are situated in the thoracic chamber which is formed dorsally by the vertebral column, ventrally by the sternum, laterally by the ribs, and on the lower side by the dome-shaped diaphragm. The anatomical setup of the lungs in the thorax is such that any change in the volume of the thoracic cavity will be reflected in the lung(pulmonary) cavity. Such an arrangement is essential for breathing. Breathing involves two stages - inspiration and expiration. During inspiration, the atmospheric air is drawn in and during expiration, the alveolar air is released out. Volume of air involved in breathing can be estimated by an instrument.



- Name the instrument used for clinical assessment of pulmonary functions.
- What happens to the ribs and diaphragm during inhalation?
- Distinguish between breathing and respiration.(any two points)

OR

- Define residual volume and tidal volume with reference to breathing?

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

4

Pteridophytes are primitive seedless vascular plants. Haeckel (1860) called these groups of plants as 'Pteridophytes' because of their pinnate or feather like fronds (leaves). These shade loving plants are few centimeters to 20 m long. The plant body of pteridophytes is well differentiated. In pteridophytes, spores are produced through meiosis in spore mother cells. Most of these plants are homosporous with a few exceptional heterosporous species. The sporophyte produces spores and gametophyte bears male and female sex organs

- (a) Why are majority of pteridophytes considered as homosporous ?
- (b) Name the male and female sex organs of pteridophytes?
- (c) How do pteridophytes differ from bryophytes with respect to their body designs and vascular tissues ?

OR

- (c) State any two uses of pteridophytes for mankind.

SECTION – E

31- Mention any one function of the following cell organelles/structures:

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- a) Vacuole in a plant cell
- b) Golgi apparatus
- c) Nucleolus
- d) Centrosome
- e) Cell wall

OR

- a) If the DNA content of a cell after M phase is 4C, then what will be the DNA content at G₁, after S and at G₂ phase of cell cycle. Explain giving reason.
- b) Describe the stage of mitosis in which chromosome morphology can be best studied. Draw a labelled diagram of this stage.

- 32-** a) Depict the mechanism of muscle contraction in the form of a flow chart.
- b) Illustrate the structure of a sarcomere with a labeled diagram.

5

OR

- a) Explain the processes involved in urine formation, which occur in various parts of a nephron.
- b) What will be the consequences, if the stretch receptors in the wall of urinary bladder become non-functional?

- 33-** a) Schematically represent the 'Z'-scheme of photosynthesis.
- b) How Z-scheme can be distinguished from cyclic photophosphorylation?

5

OR

- a) Schematically represent the fate of pyruvic acid in the mitochondria.
- b) What is the net gain of ATP molecules, when one molecule of glucose is oxidized during glycolysis.
