

Class- XI
Subject - Biology

MAX MARKS 70

TIME ALLOWED 3Hrs

GENERAL INSTRUCTIONS :

1. All questions are compulsory.
2. The question paper has five sections and 35 questions.
3. Section A has 18 questions of mark 1 each; Section B has 7 questions of 2 mark each; Section C has 5 questions of 3 marks each; Section D has 2 case-based questions of 4 marks each; Section E has 3 questions of 5 marks each.
4. 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.
5. Where ever necessary, neat and properly labelled diagrams should be drawn

Section - A

1. Which of the following is the correct scientific name of wheat derived by binomial nomenclature?
(a) Triticum vulgare
(b) Triticum aestivum
(c) Oryza sativa
(d) Zea mays
2. Methanogens belong to
(a) Eubacteria
(b) Archaeobacteria
(c) Dinoflagellates
(d) Slime moulds.
3. An example of colonial alga is:
(a) Chlorella
(b) Volvox
(c) Ulothrix
(d) Spirogyra.
4. The term poly adelphous is related to
5. The type of joint between alter and axis is
(a) Fibrous joint
(b) Synovial
(c) Cartilaginous joint
(d) Both (a) and (c)
6. Periplaneta belongs to which Phylum?
7. Which is common in plant and animal cells?
(a) Centrioles
(b) Central vacuole
(c) Mitochondria
(d) Plastids
8. Endo skeleton of a cell is
9. Name one element invariably found in proteins but not in all carbohydrates and lipids.
10. The essential element required for water splitting in Photosynthesis leading to O₂ evolution is :
(a) Mo
(b) Mn
(c) Mg
(d) K

11. Name the most common respiratory substrate.
12. Spraying sugarcane crop with a plant hormone increases length of plants and increases yield by as much as 20 tonnes per acre. The hormone is -
 - (a) Gibberellin
 - (b) Auxin
 - (c) Cytokinin
 - (d) ABA
13. Acetyl co-A is formed from and coenzyme A.
14. Which adrenal hormone accelerates the heart beat under normal conditions?
15. Which of the following is excreted in human urine?

- (a) Ammonia
- (b) Urea
- (c) Uric acid
- (d) Amino acid.

In each of the following questions two statements are given, one is Assertion (A) and other is Reason(R). For A and R, mark the correct answer as

- (a) If both A and R are true and R is correct explanation of A.
- (b) If both A and R are true but R is not correct explanation of A
- (c) If A is true and but R is false.
- (d) If both A and R are false.

16. Assertion: Meiosis II is similar to mitosis.

Reason: Meiosis I cannot occur in haploid cells.

- (a) (b) (c) (d)

17. Assertion: Atherosclerosis is a disease characterised by the thickening of arterial walls.

Reason: Deposition of cholesterol and triglycerides in the arterial walls causes atherosclerosis.

- (a) (b) (c) (d)

18. Assertion: Diabetes insipidus is marked by excessive Urination and too much thirst of water.

Reason: Anti-diuretic hormone (ADH) is secreted by the posterior lobe of pituitary gland.

- (a) (b) © (d)

Section-B

19. Distinguish between intracellular and extracellular digestion.

Or

What is the difference between direct and indirect development.

20. Both gymnosperms and angiosperms bear seeds, then why are they classified separately.

Or

What is heterospory? Briefly comment upon its significance. Give two examples.

21. How is pinnately compound leaf different from a palmately compound leaf?

22. What is a mesosome in a prokaryotic cell? Mention the functions that it performs.

Or

How does the position of centromere form the basis of Classification of chromosomes.

23. Why is the colour of a leaf kept in the dark frequently yellow, or pale green? Which pigment do you think is more stable?

24. Fill in the blanks.

Harmones Target gland

Hypothalamic Harmones

Thyrotrophin (TSH)

Corticotropin (ACTH)

Gonadotropin (LH, FSH)

25. Match column I with column II

(a) Smooth muscle

(b) Tropomyosin

(c) Red muscle

(d) Skull

(i) Myoglobin

(ii) Thin filament

(iii) Sutures

(iv) Involuntary

Section-C

26. Give Comparison between C_3 and C_4 Pathways

Or

Cyclic and non cyclic Photophosphorylation.

27. Give the Schematic representation of an overall view of Kreb's cycle.

28. Draw a neat diagram of digestive system of frog.

Or

Draw a neat diagram of Female reproductive System

29. Explain the arrangement of floral members in relation to their insertion on thalamus.

30. Match the following

(a) Operculum

(b) Parapodia

(c) Radula

(d) Choanocytes

(e) Gill slits

(f) Comb plates

(i) Porifera

(ii) Mollusca

(iii) cyclostomes

(iv) osteichthyes

(v) Ctenophora

(vi) Cnidaria

(vii) Annelida

Section-D

Case study

31. Cells that have membrane bound nuclei are called eukaryotic whereas cells that lack a membrane bound nucleus are prokaryotic. In both prokaryotic and eukaryotic cells, a semi-fluid matrix called cytoplasm occupies the volume of the cell. The cytoplasm is the main arena of cellular activities in both the plant and animal cells. Various chemical reactions occur in it to keep the cell in the 'living state'. Besides the nucleus, the eukaryotic cells have other membrane bound distinct structures called organelles like the endoplasmic reticulum (ER), the golgi complex, lysosomes, mitochondria, microbodies and vacuoles. The prokaryotic cells lack such membrane bound organelles.

1. State the characteristics of prokaryotic cells.

2. Mention a single membrane-bound organelle which is rich in hydrolytic enzymes.

3. Justify the statement, "Mitochondria are powerhouses of the cell"

OR

4. Write the functions of the following:

- a. Smooth ER
- b. Golgi Apparatus



32. A diagrammatic sketch of an actin filament is shown above. Answer the following questions.

- (a) Name the parts labelled A and B
- (b) What is the significance of A during resting stage?
- (c) Name the component marked C and write its monomer.

OR

How myosin binds to actin filament?

Section-E

33. Name the kingdom to which the Protozoans belong? Name the four different groups along with the example of each group.

Or

Write economic importance of algae and gymnosperms.

34. Explain the substages of Prophase - I of Meiosis-I

Or

Write five differences between Mitosis and Meiosis in tabular form.

35. Describe the evolutionary change in the pattern of heart among the vertebrates.

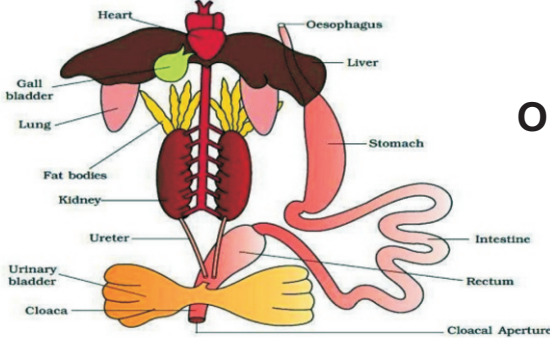
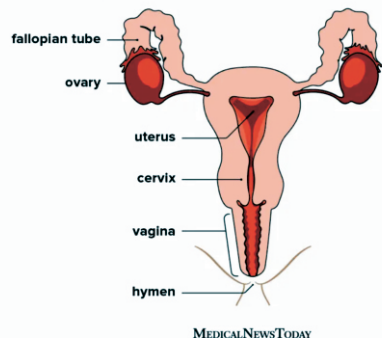
Or

Explain cardiac cycle and cardiac output.

MARKING SCHEME (2024-25)
CLASS – XI
BIOLOGY

| Q. No | Expected Answer/ Value Point | Marks |
|-------|---|------------|
| 1. | b, Triticum aestivum | 1 |
| 2. | b, Archae bacteria | 1 |
| 3. | b, Volvox | 1 |
| 4. | Androecium/stamens | 1 |
| 5. | b, Synovial joint | 1 |
| 6. | Annelida | 1 |
| 7. | C, Mitochondria | 1 |
| 8. | Endoplasmic reticulum | 1 |
| 9. | Nitrogen | 1 |
| 10. | b, Manganese / Mn | 1 |
| 11. | a, Carbohydrate | 1 |
| 12. | a, Gibberellins | 1 |
| 13. | Pyruvic acid | 1 |
| 14. | Adrenaline and nor adrenaline (only one) | 1 |
| 15. | b Urea | 1 |
| 16. | b, A & R both are true but R is not correct explanation of A. | 1 |
| 17. | C, A is true, but R is false. As the narrowing of blood vessels is also due to deposition of calcium and fibrous tissue besides fat and cholesterol. | 1 |
| 18. | B, A & R both are true but R is not correct explanation of A. | 1 |
| 19. | <div>Section-B</div> <div><div><div>Intra cellular digestion</div><div>1. Digestion with in cell</div><div>2. e.g. Amoeba Few enzymes are involved.</div></div><div>Extra cellular digestion</div><div>1.Digestion is in between cells.</div><div>2. e.g. man Number of enzymes involved.(Any two)</div></div> <div>Or</div> <div><div>Direct Development</div><div>1. Young ones resemble the adults in all respect.</div><div>2. No intermediate stage.</div></div> <div>Indirect development</div> <div>1. Young ones do not resemble the adults.</div> <div>2. Larval stage is intermediate stage</div> | 1 |
| | 1 | |
| | 1 | |
| | 1 | |
| 20. | Angiosperms and Gymnosperms are seed procducing plants but they are classified differently because 1. Angiosperms are flowering plants and Gymnosperms are non flowering. 2. In angiosperms seeds are enclosed in fruits but in gymnosperms seeds are naked as there is no fruit formation. | 1 1 |

| Q. No | Expected Answer/ Value Point | Marks | | | | | | | | | | | | |
|--|--|---|------------------------------|-------------------------|-----------------------|--|---|---|--------------|---|-----|-----|-----|-----|
| | <p>Or</p> <p>Heterospory is a phenomenon in which two kinds of spores are borne on the same plant. The two kinds of spores differ in size & produce male & female gametophyte.</p> <p>Formation & retention of zygote takes place on female gametophyte.</p> <p>Heterospory is thus considered an important step in evolution as it is a precursor to the seed habit.</p> | 2 | | | | | | | | | | | | |
| 21. | <table><tr><td>Pinnately Compound leaf</td><td>Palmate compound leaf</td></tr><tr><td>1. Midrib is elongated.</td><td>Midrib is disc shaped</td></tr><tr><td>2. Leaf lets are present along the midrib.</td><td>Leaf lets are attached to a common point.</td></tr></table> | Pinnately Compound leaf | Palmate compound leaf | 1. Midrib is elongated. | Midrib is disc shaped | 2. Leaf lets are present along the midrib. | Leaf lets are attached to a common point. | <table><tr><td>1</td></tr><tr><td>1</td></tr></table> | 1 | 1 | | | | |
| Pinnately Compound leaf | Palmate compound leaf | | | | | | | | | | | | | |
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| 1 | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | |
| 22. | <p>Mesosomes. Invagination/ interdigitation of plasma membrane in bacterial cell.</p> <p>Functions :</p> <p>1. Involved in cytokinesis.</p> <p>2. Bears enzymes esential for oxidising food.</p> <p>Or</p> <p>Metacentric : Centromere is exactly in the centre and the two arms are equal.</p> <p>Submetacentric : Centromere is slightly away from centre and the two arms are unequal.</p> <p>Telocentric : Centromere is towards the terminal area.</p> <p>Acrocentric : Centromere is is subterminal.</p> | <table><tr><td>1</td></tr><tr><td>1/2</td></tr><tr><td>1/2</td></tr><tr><td>1/2</td></tr><tr><td>1/2</td></tr><tr><td>1/2</td></tr></table> | 1 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | | | | | | |
| 1 | | | | | | | | | | | | | | |
| 1/2 | | | | | | | | | | | | | | |
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| 1/2 | | | | | | | | | | | | | | |
| 1/2 | | | | | | | | | | | | | | |
| 23. | A leaf kept dark for long becomes yellow or pale green because of disintegration of chlorophyll Carotenoid which provide yellow colour are more stable. | <table><tr><td>1</td></tr><tr><td>1</td></tr></table> | 1 | 1 | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | |
| 24. | <table><tr><td>Hypothalamic Harmones -</td><td>Pituitary.</td></tr><tr><td>Thyrotrophin (TSH) -</td><td>Thyroid.</td></tr><tr><td>Corticotropin -</td><td>Adrenal cortex.</td></tr><tr><td>Gonadotropin (LH, FSH) -</td><td>Ovary/Testis</td></tr></table> | Hypothalamic Harmones - | Pituitary. | Thyrotrophin (TSH) - | Thyroid. | Corticotropin - | Adrenal cortex. | Gonadotropin (LH, FSH) - | Ovary/Testis | <table><tr><td>1/2</td></tr><tr><td>1/2</td></tr><tr><td>1/2</td></tr><tr><td>1/2</td></tr></table> | 1/2 | 1/2 | 1/2 | 1/2 |
| Hypothalamic Harmones - | Pituitary. | | | | | | | | | | | | | |
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| Corticotropin - | Adrenal cortex. | | | | | | | | | | | | | |
| Gonadotropin (LH, FSH) - | Ovary/Testis | | | | | | | | | | | | | |
| 1/2 | | | | | | | | | | | | | | |
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| 1/2 | | | | | | | | | | | | | | |
| 1/2 | | | | | | | | | | | | | | |
| 25. | <table><tr><td>(a) Smooth muscless</td><td>iv) Involuntary</td></tr><tr><td>(b) Tropomyosin</td><td>Thin filament</td></tr><tr><td>(c) Red muscle</td><td>I) myoglobin</td></tr><tr><td>(d)Skull</td><td>iii)Sutures</td></tr></table> | (a) Smooth muscless | iv) Involuntary | (b) Tropomyosin | Thin filament | (c) Red muscle | I) myoglobin | (d)Skull | iii)Sutures | <table><tr><td>1/2</td></tr><tr><td>1/2</td></tr><tr><td>½</td></tr><tr><td>1/2</td></tr></table> | 1/2 | 1/2 | ½ | 1/2 |
| (a) Smooth muscless | iv) Involuntary | | | | | | | | | | | | | |
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| 1/2 | | | | | | | | | | | | | | |

| Q. No | Expected Answer/ Value Point | Marks |
|-------|--|--------------------------------|
| 26. | <div> <div> C₃ Pathway <ol style="list-style-type: none"> 1 .RUBP is Primary acceptor . 2 .Optimum temperature for photosynthesis is 10 25 °C . 3 .Phosphoglyceric acid is first product . </div> <div> C₄ Pathway <ol style="list-style-type: none"> 1 PEP is Primary acceptor . Optimum temperature is 30 45 °C Oxaloacetic acid is first product . </div> </div> <p>Or</p> <div> <div> Cyclic Photophosphorylation <ol style="list-style-type: none"> 1 .Performed by photo system I independently . 2 .It synthesises ATP only . 3 .It is not connected with photolysis of water . </div> <div> Non Cyclic Photophosphorylation <ol style="list-style-type: none"> 1 Performed by both photosystem I & II It synthesises ATP and NADH₂ It is connected with photolysis of water </div> </div> | 1 1 1 1 1 1 |
| 27 . | Kreb 's cycle | |
| | <div> $\text{CO}_2 + \text{PEP} \xrightarrow{\text{Decarboxylation}} \text{C}_4 \text{ acid}$ $\text{C}_4 \text{ acid} \xrightarrow{\text{Co}_2} \text{C}_3 \text{ Acid} \xrightarrow{\text{Calvin cycle}}$ $\text{C}_3 \text{ acid} \xrightarrow{\text{Regeneration}} \text{PEP}$ </div> <div> <p>Mesophyll cell .</p> <p>Bundle Sheath cells</p> <p>Mesophyll cells</p> </div> | 1 1 1 |
| 28 | <div>  </div> <p>OR</p> <div>  </div> | 3 |

| Q. No | Expected Answer/ Value Point | Marks | | |
|--|---|--|---|--|
| 33. | <p>Or</p> <p>Economic importance Algae :-</p> <p>1. Half of the CO₂ fixation is carried out by algae Porphyra , Laminaria and Sargassum are used as food .</p> <p>2. Water holding are Substances like algin carrageen are obtained from algae .</p> <p>3. Chlorella is used as food supplement .</p> <p>Economic importance of gymnosperms .</p> <p>1. In cycas small specialised roots called coralloid roots are associated with N₂ fixing cyanobacteria .</p> <p>2. In Pinus the roots are associated with fungus in the form of mycorrhiza .</p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | | |
| 34 . | <p>Substages of Phase I of Meiosis -I</p> <p>1 .Leptotene :Chromosomes show compaction and it continues throughout the stage .</p> <p>2 .Zygotene :Homologous chromosomes start pairing together and this process of association is called synapsis . The paired chromosomes are called bivalents .</p> <p>3 .Pachytene :The bivalent is seen as tetrad Crossing over occurs between non -sister chromatids .</p> <p>4 .Diplotene :It is characterised by the dissolution of syraptonemal complex and formation of Chiastmata takes place .</p> <p>5 .Diakinesis :It is marked by terminalisation of chiasmata .</p> <p>Or</p> <table><tr><td><p>Mitosis</p><p>1 .occurs in somatic cells / General body cells .</p><p>2 .It is equational division .</p><p>3 .From one parent cell ,bour two daughter cells are produced .</p><p>4 .No Crossing over .</p><p>5 .It is short process .</p></td><td><p>Meiosis</p><p>Occur in germinal cells .</p><p>It is Reductional division .</p><p>From one Parent cell our daughter cells are produced .</p><p>Crossing over lakes place .</p><p>It is long process .</p></td></tr></table> | <p>Mitosis</p> <p>1 .occurs in somatic cells / General body cells .</p> <p>2 .It is equational division .</p> <p>3 .From one parent cell ,bour two daughter cells are produced .</p> <p>4 .No Crossing over .</p> <p>5 .It is short process .</p> | <p>Meiosis</p> <p>Occur in germinal cells .</p> <p>It is Reductional division .</p> <p>From one Parent cell our daughter cells are produced .</p> <p>Crossing over lakes place .</p> <p>It is long process .</p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> |
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| Q. No | Expected Answer/ Value Point | Marks |
|-------|--|---|
| 35 . | <p>Fishes have a 2 chambered heart with an atrium and a ventricle .</p> <p>Amphibian an reptiles except crocodile)have a 3 chambered heart with two atria and a single ventricle .</p> <p>Crocodile ,birds and mammals possess a 4 chambered heart with two atria and two ventricles .</p> <p>Or</p> <p>Cardiac cycle : All the four chambers are in relaxed state i e .diastole .</p> <ul style="list-style-type: none"> * The bicuspid and tricuspid values are open and blood flow into left and right ventricles . * Semi lunar values are closed * SAM now generates an action potential which stimulates simultaneous contraction of atria . • This increases the blood flow in ventricles, due to which the action potential is conducted in ventricles through AVN & AV bundle, and bundle of HIS, as a result the ventricles contract and atria relax. * Ventricular systole causes closure of bicuspid & tricuspid values semi lunar values open. * Ventricles diastole causing closure of semilunar values. * As the pressure declines the tricuspid & bicuspid values are pushed open & the joint diastole is achieved. <p>Cardiac output: In one cardiac cycle 70 mL of blood is pumped and heart pumps 72 minutes so total volume of blood pumped 70 x 72= approximately 5000ml or 5 litres.</p> | <p>1</p> <p>2</p> <p>2</p> <p>1</p> <p>½</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1</p> |