

ANNUAL EXAMINATION

BIO XI-M2

Class 11 - Biology

Time Allowed: 3 hours

Maximum Marks: 70

General Instructions:

- All questions are compulsory.
- The question paper has five sections and 33 questions. All questions are compulsory.
- 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.
- 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.
- Wherever necessary, neat and properly labeled diagrams should be drawn.

Section A

1. What is the correct sequence of taxonomic categories is? [1]
- a) Kingdom - Division - Class - Order - Family - Genus - Species b) Division - Class - Family - Kingdom - Order - Genus - Species
- c) Class - Phylum - Kingdom - Order - Family - Genus - Species d) Phylum - Order - Class - Kingdom - Family - Genus - Species

2. Match the entities in column I with their character in column II : [1]

Column I	Column II
(a) Protozoans	(i) Red tides
(b) Slime molds	(ii) Diatomaceous earth
(c) Euglenoids	(iii) They are believed to be primitive relatives of animals
(d) Chrysophytes	(iv) Pigments are identical to those present in higher plants
(e) Dinoflagellates	(v) Spores are dispersed by air currents

- a) (a)-(iii), (b)-(v), (c)-(iv), (d)-(ii), (e)-(i) b) (a)-(iii), (b)-(v), (c)-(i), (d)-(iv), (e)-(ii)
- c) (a)-(iii), (b)-(v), (c)-(iv), (d)-(i), (e)-(ii) d) (a)-(ii), (b)-(iii), (c)-(v), (d)-(i), (e)-(iv)
3. Choose the wrong statement. [1]
- In Cassia and gulmohur, the aestivation is twisted.
 - In pea and bean flowers, vexillary aestivation present.
 - In papilionaceous aestivation, there are five petals present, the largest one is standard which overlaps the two lateral wings which in turn overlap the two smallest anterior keel petals.
 - A sterile stamen is called staminode.

v. When stamens are attached to the petals, they are epipetalous as in lily.

a) (iv) and (v)

b) (i) and (v)

c) (i), (ii) and (v)

d) (i), (iii) and (v)

4. Vascular bundles in which cambium is present between xylem and phloem is called as: [1]

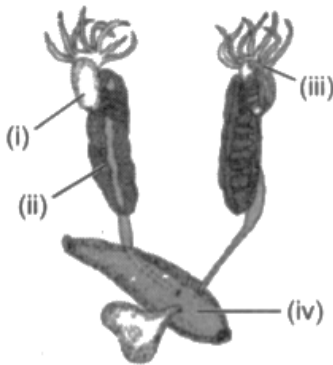
a) Closed

b) Amphivesal

c) Collateral

d) Open

5. Given below is the diagram of reproductive system of an animal labelled by (i), (ii), (iii), (iv). Identify the animal with correct labelling of (i) to (iv): [1]



a) Female frog - (i) Ovary (ii) Oviduct (iii) Adrenal gland (iv) Cloaca

b) Male frog - (i) Testes (ii) Duct of bidder (iii) Adrenal gland (iv) Cloaca

c) Male frog - (i), Testes (ii) - Adrenal gland (iii) Fat bodies (iv) Cloaca

d) Female frog - (i) Kidney (ii) Adrenal gland (iii) Fibres of fat bodies (iv) Cloaca

6. The ribosome is granules formed of: [1]

a) mRNA and rRNA

b) rRNA and protein

c) rRNA and tRNA

d) mRNA and protein

7. Due to close structural similarity with the substrate, the inhibitor competes with the substrate for the substrate-binding site of the enzyme, what happens when an inhibitor added in the medium? [1]

a) All of these

b) The substrate cannot bind with the enzyme

c) Binding of the inhibitor with enzyme shuts off enzyme activity

d) Enzyme action declines

8. Arrange the order of events taking place in anaphase II stage of meiosis: [1]

A. Metaphase plate splits

B. Each chromosome moves away from equatorial plane

C. Centromeres split and chromatids separate

D. Chromatids move to opposite poles

a) B, D, A, C

b) D, C, B, A

c) C, A, D, B

d) A, B, C, D

9. In Krebs cycle, isocitric acid is converted into α - keto glutaric acid by: [1]

a) Decarboxylation

b) Dehydration

c) Condensation

d) Carboxylation

10. What causes a green plant exposed to the light on only one side, to bend toward the source of light as it grows? [1]

a) Green plants need light to perform photosynthesis

b) Auxin accumulates on the shaded side, stimulating greater cell elongation there

c) Green plants seek light because they are phototropic

d) Light stimulates plant cells on the lighted side to grow faster

11. The filtration fraction is the ratio of GFR to RPF where both the values are in ml/min and FF is expressed in percentage. Calculate FF for a normal adult human being, if RPF= 600ml/min: [1]

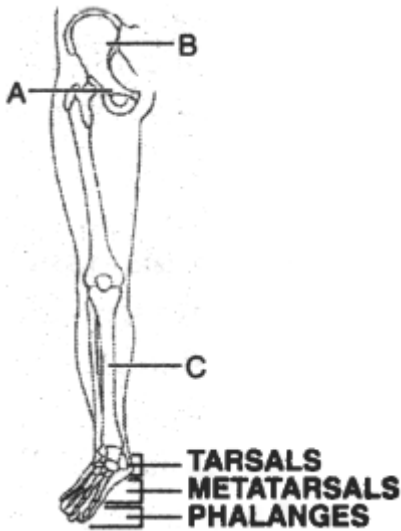
a) 2.08%

b) 10.38%

c) 20.73%

d) 20.83%

12. In given diagram A, B and C represents: [1]



a) A-Coxal bone, B-Pubis, C-Tibia

b) A-Coxal bone, B-Pubis, C-Ischium

c) A-Ilium, B-Ischium, C-Fibula

d) A-Pubis, B-Coxal bone, C-Tibia

13. **Assertion (A):** The cerebral cortex is referred to as the grey matter due to its greyish appearance. [1]

Reason (R): The neuron cell bodies are concentrated here giving the colour.

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.

14. **Assertion (A):** Steroid hormones, iodothyronines, etc., mostly regulate gene expression o chromosome function [1]
by the interaction of the hormone-receptor complex with the genome.

Reason (R): It does not enter the target cell so interacts with membrane-bound receptors.

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.

15. **Assertion (A):** Axoplasm inside the axon contains a high concentration of K^+ and a low concentration of Na^+ [1]
when the neuron is not conducting any impulse.

Reason (R): The axonal membrane is comparatively more permeable to potassium ions (K^+) and nearly impermeable to sodium ions (Na^+).

- 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.

16. **Assertion:** Bone and cartilage are specialised connective tissues. [1]

Reason: The former has a slightly pliable matrix due to chondroitin salts and the latter has a very hard matrix due to calcium salts in it.

- a) Assertion and reason both are correct statements and reason is correct explanation for assertion. b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- c) Assertion is correct statement but reason is wrong statement. d) Assertion is wrong statement but reason is correct statement.

Section B

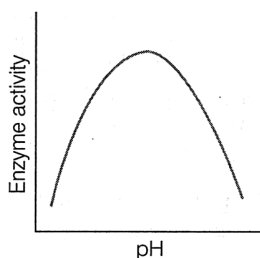
17. How do fungi form a partnership with most plants? [2]
18. How are open Vascular bundles differ from closed vascular bundles? [2]
19. Draw a well labelled diagram of both ventral and dorsal views of the brain of the frog. [2]
20. Distinguish between Anaphase I and Anaphase II. [2]
21. Explain what is meant by the terms auxin precursors, anti-auxins, free auxins and bound auxins. [2]

OR

Explain inhibitory effect of auxins with the help of one example.

Section C

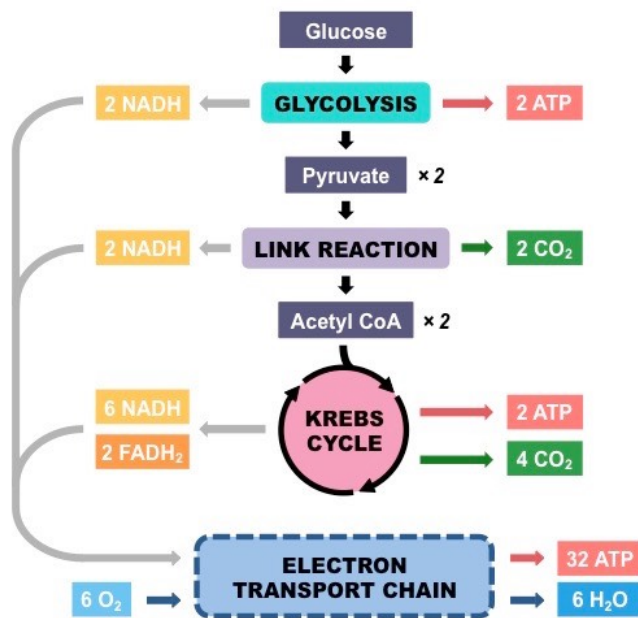
22. A student of taxonomy was puzzled when told by his professor to look for a key to identify a plant. He went to his friend to clarify what Key the professor was referring to? What would the friend explain to him? [3]
23. What is the advantage of development of seed habits in seed plants? [3]
24. The essential functions of roots are anchorage and absorption of water and minerals in the terrestrial plants. [3]
What functions are associated with the roots of aquatic plants? How are the roots of aquatic plants and terrestrial plants different?
25. Enzymes are proteins in which the amino acids are linked to each other by peptide bonds having many functional groups in their structure. As they are weak acids and bases in chemical nature, this ionization is influenced by the pH of the solution. For many enzymes, activity is influenced by the surrounding pH. This is depicted in the curve below, explain briefly. [3]



26. Colchicine is known to be the mitotic poison. How? [3]

[3]

27.



With the help of the schematic flow chart answer the following questions:

- Calculate the total number of ATP produced from the complete oxidation of one molecule of glucose under aerobic respiration in the prokaryotic organism and eukaryotic organism?
 - When do cells liberate its most of the energy?
28. Predict what will happen to the body of an adult human being if his spleen is removed? List at least four functions of it also. [3]

OR

What is the significance of hepatic portal system in the circulatory system?

Section D

29. Read the following and answer any four questions: [4]

The detailed structure of the membrane was studied only after the advent of the electron microscope in the 1950s. Meanwhile, chemical studies on the cell membrane, especially in human red blood cells (RBCs), enabled the scientists to deduce the possible structure of the plasma membrane. These studies showed that the cell membrane is composed of lipids, proteins and carbohydrates.

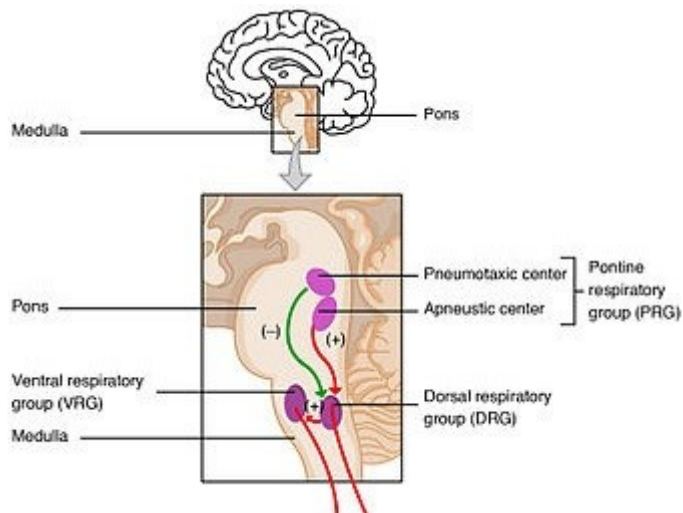
- Which component of the plasma membrane is arranged as a bilayer?
- The lipid component of the membrane mainly consists of _____.
 - Phosphoglycerides
 - Amino
 - acids
 - Glycoproteins
- What percentage of the membrane of human erythrocytes consists of proteins?
- Depending on the ease of extraction, membrane proteins can be of _____ types.
- Assertion:** The plasma membrane is selectively permeable to some molecules present on either side of it.
Reason: Neutral solutes may move across the membrane by the process of simple diffusion.
 - Both assertion and reason are true, and reason is the correct explanation of the assertion.
 - Both assertion and reason are true, and reason is not the correct explanation of the assertion.
 - Assertion is true but reason is false.
 - Both assertion and reason are false.

30. Read the following and answer any four questions:

[4]

Human beings have a significant ability to maintain and moderate the respiratory rhythm to suit the demands of the body tissues. This is done by the neural system. A specialised centre present in the medulla region of the brain called respiratory rhythm centre is primarily responsible for this regulation. The disorders of the respiratory system can lead to asthma, emphysema and occupational respiratory disorders.

- i. The respiratory rhythm centre is present in the _____ region of the brain.
- ii. Which is a difficulty in breathing that causes wheezing.
- iii. A chemosensitive area situated adjacent to the rhythm centre, is highly sensitive to CO_2 and _____ ions.
 - a. Bicarbonate
 - b. Oxygen
 - c. Hydrogen
 - d. Sodium
- iv. Write the major causes of cigarette smoking.
- v. The following statements are drawn as conclusions for the image shown. Choose the correct statement.



- I. A centre present in the pons region of the brain called pneumotaxic centre can moderate the functions of the respiratory rhythm centre.
- II. There are two specialised respiratory centres in the brain.
- III. Receptors associated with aortic arch and carotid artery also can recognise changes in CO_2 and H^+ concentration and send necessary signals to the rhythm centre for remedial actions.
- IV. The role of oxygen in the regulation of respiratory rhythm is quite significant.

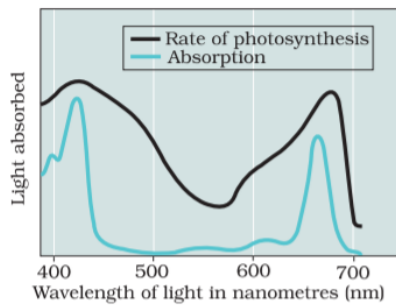
Section E

31. Give a comparative account of chordates and non-chordates. Discuss certain characters of chordates which are beneficial from evolutionary point of view. [5]

OR

Amphibians are supposed to be the linking point between aquatic and terrestrial life. Explain.

32. In the figure given below, the black line (upper) indicates action spectrum for photosynthesis and the lighter line (lower) indicates the absorption spectrum of chlorophyll a. Answer the following: [5]



- i. What does the action spectrum indicate? How can we plot an action spectrum?
 - ii. How can we derive an absorption spectrum for any substance?
 - iii. List the important events and end products of the light reaction?
33. Draw a labelled sketch of the human urinary system with its associated blood vessels and explain it. [5]