विद्या सर्वार्थि साधिका

ANANDALAYA
ANNUAL EXAMINATION
Class : XI

Subject: Biology (044) MM : 70
Date : 28-02-2024 Time: 3 hours

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 labelled diagrams should be drawn.
(vi) Do not give irrelevant expansion/information while answering the questions.
(vii) Support your answer with suitable diagrams/ flowcharts/ sketches wherever necessary.

SECTION A

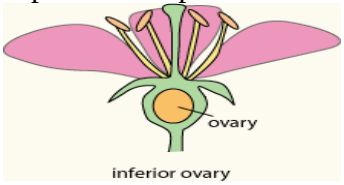
1. Animals with metameric segmentation, bilateral symmetry and closed circulatory system belong to _____. (1)
(A) Annelida (B) Arthropoda
(C) Mollusca (D) Echinodermata

2. The K_m value of the enzyme is the value of the substrate concentration at which the reaction reaches to _____. (1)
(A) ½ V_{max} (B) Zero (C) ¼ V_{max} (D) 2 V_{max}

3. Archaebacteria can endure harsh environments because they_____. (1)
(A) are the oldest living organisms on the Earth.
(B) have complicated metabolic processes in their bodies
(C) have a rigid wall
(D) possess double membrane nuclei

4. Rearrange the following zones as seen in the vertical section of the root: (1)
(i) Root hair zone
(ii) Zone of meristems
(iii) Root cap zone
(iv) Zone of Maturation
(v) Zone of elongation
(A) iii, ii, v, i, iv (B) i, ii, iii, iv, v
(C) ii, iv, v, i, iii (D) v, iv, iii, ii, i

5. The following diagram can represent the position of the ovary in _____. (1)



(A) Brinjal (B) Guava (C) Mustard (D) Rose

6. What would be the number of chromosomes in the male gamete produced by the plant with 42 chromosomes in its root tip cells? (1)
(A) 21 (B) 42 (C) 63 (D) 84

7. Why plants can get along without the need for specialised respiratory organs? (1)
(A) It would be an extra expense
(B) They don't like it
(C) Each plant part takes care of its own needs
(D) Oxygen is easily available for all the parts of the plants

8. Cytokinin does not help in _____. (1)
(A) Lateral shoot growth (B) Overcoming apical dominance
(C) Adventitious shoot formation (D) Promoting leaf senescence

9. During the transmission of nerve impulses through a nerve fibre, the potential on the inner side of the plasma membrane has which type of electric change? (1)
(A) First positive, then negative and continue to be positive
(B) First negative, then positive and continue to be positive.
(C) First positive, then negative and continue to be negative.
(D) First negative, then positive and again back to negative

10. In the C_4 pathway which of the following molecules combines with carbondioxide? (1)
(A) glyceraldehyde phosphate (B) ribulose bisphosphate
(C) phosphoenol pyruvate (D) citric acid

11. Which of the following has an ATPase binding site? (1)
(A) Actin filament (B) Troponin site
(C) Tropomyosin (D) Head of Myosin

12. Which of these is not a thyroid hormone function? (1)
(A) Controlling the basal metabolic rate (B) Regulates the function of the heart
(C) Controls digestive function (D) Controls diurnal cycle

Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions by 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 and 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: In Funaria, gemmae formation occurs during unfavourable conditions. (1)
Reason: The gemmae are formed on the stem and leaves.

14. Assertion: Columnar epithelium lining the intestinal mucosa appears to have a brush-like appearance called cilia. (1)
Reason: Many microvilli are present on brush-bordered columnar epithelium.

15. Assertion: Rudolf Virchow modified the hypothesis of cell theory given by Schleiden and Schwann. (1)
Reason: The cells are always living units.

16. Assertion: Both at the root apex and the shoot apex, the constantly dividing cells show the meristematic phase of growth. (1)
Reason: The cells of this region are rich in protoplasm and lack nuclei.

SECTION B

17. (a) What is bioluminescence? (2)
(b) Name the phylum and animal that exhibits the phenomenon of bioluminescence.

18. Sort the following substances into actively or passively transported substances during reabsorption of GFR: (2)

Glucose, amino acids, Nitrogenous wastes, Na^+, Water

19. What are Casparian strips? Write its significance. (2)

20. The energy yield in terms of ATP is higher in aerobic respiration than during anaerobic respiration. Why is there anaerobic respiration even in organisms that live in aerobic conditions like human beings? (2)

21. Write an example for each of the following: (2)
Amino acid, Polysaccharide, Structural protein, Sugars.

OR

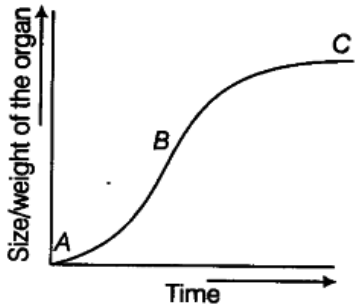
(a) What is the difference between a nucleotide and a nucleoside?
(b) Draw the structure of a nucleotide and nucleoside.

SECTION C

22. On an educational trip to Uttaranchal, Ketki and her friends observed that many local people were having swollen necks. Ketki and her friends being curious, interacted with the localities and found that these people were suffering from goitre. (3)
(a) What is goitre? How is it caused?
(b) What effect does this condition have on pregnancy?
(c) Can it be treated completely? Justify your answer.

23. (a) The gametophytes of bryophytes and pteridophytes are different from that of gymnosperms. Explain how? (3)
(b) Name two bryophytes that exhibit heterospory and seed habit.

24. (a) Growth is one of the characteristics of all living organisms. Do unicellular organisms also grow? If so, what are the parameters? (3)
(b) In the figure of the sigmoid growth curve given below, comment on the segments labelled as A, B and C.



25. An organism has two pairs of chromosomes (i.e., chromosome number = 4). Diagrammatically represent the chromosomal arrangement during different phases of meiosis-II. (3)

26. A cyclic process is occurring in the C_3 plant, which is light-dependent, and needs O_2. This process does not produce energy rather it consumes energy. (3)
(a) Identify and name the given process.
(b) Where does it occur?
(c) What are the end products of this process?

27. Give an example for each of the following: (3)
(a) A limbless animal ‘
(b) A cold-blooded animal
(c) A warm blooded animal
(d) An animal possessing dry and cornified skin
(e**)** An animal having canal system and spicules
(f**)** An animal with cnidoblasts

28. (a) Draw the structure of the Golgi apparatus and label all its parts. (3)
(b) The Golgi apparatus is considered as one of the components of the endomembranous system. Why?

OR

Justify the statement, ‘Mitochondria are powerhouses of the cell’ by writing scientific reasons.

SECTION D

Q. No. 29 and 30 are case-based questions. Read the passages and answer the following sub-questions.

29. Algae are chlorophyll-bearing, simple, thalloid, autotrophic and largely aquatic organisms. They occur in a variety of other habitats: moist stones, soil and wood. Some of them also occur in association with fungi and animals. The form and size of algae is highly variable and exist as colonial forms and filamentous forms. (4)
The algae reproduce by vegetative, asexual and sexual methods. Asexual reproduction is by fragmentation and the production of different types of spores, the most common being the zoospores. Sexual reproduction shows considerable variation in the formation of sex cells and it may be isogamous, anisogamous or oogamous.

(i) _____ is a microcompartment storage body located in the chloroplasts of members of class Chlorophyceae.
(A) Algin (B) Mannitol
(C) Pyrenoid (D) Fucoxanthin

(ii) _____ is an example of the colonial form of algae.
(A) *Volvox* (B) *Ulothrix* (C) *Spirogyra* (D) *Chara*

(iii) The members of _____ algae possess chlorophyll a, c, carotenoids and xanthophylls.

(iv) Why are asexual-produced spores by algae called zoospores?

OR

Write the difference between isogamous and oogamous.

30. Enzymes are catalysts that, within the mild conditions of temperature, pH, and pressure of the cells, carry out chemical reactions at an amazing high rate. They are characterized by remarkable efficiency and specificity. Substrates are the substances on which enzymes act. Structurally, most enzymes are proteins. Also, RNA molecules have catalytic activity. Coenzymes are small non-protein molecules that are associated with some enzymes. Many coenzymes are related to vitamins. The apoenzyme is responsible for the enzyme’s substrate specificity. Coenzymes change to compensate for the transformations occurring in the substrate. (4)
(i) What are RNA molecules that have catalytic activity known as?
(A) ribosome (B) ribozyme
(C) RNA polymerase (D) r RNA

(ii) The rate of the enzymatic reaction is directly proportional to the amount of enzyme present in the sample. If we go on increasing the substrate concentration the enzyme activity will increase till _____.

(A) all substrate molecules are saturated (B) all enzyme molecules are saturated
(C) all the conditions are favourable (D) none of the above

(iii) Coenzymes and the proteinous apoenzyme form _____. (Fill in the blank)

(iv) _____ is the minimum amount of energy required to initiate a chemical reaction.

(A) Enzymatic energy (B) Initiation energy
(C) Substrate energy (D) Activation energy

SECTION E

31. The arrangement of ovules within the ovary is known as placentation. (5)
(a) What does the term placenta refer to?
(b) Explain and draw various types of placentation in the flower with appropriate examples.

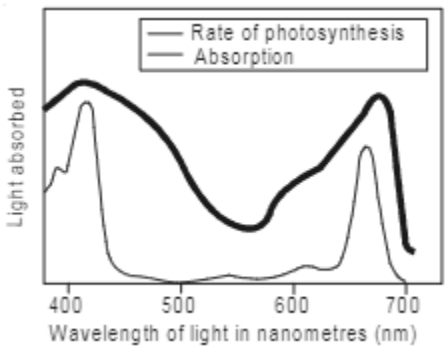
OR

(a) A typical angiosperm flower consists of four floral parts. Give the names of the floral parts and their arrangements sequentially.
(b) State the difference between
(i) Pulvinus and Petiole
(ii) Pedicel and Peduncle
(iii) Raceme and Cymose inflorescence

32. Oxygen is critical for aerobic respiration. Explain its significant role in the electron transport system (ETS). (5)

OR

In the figure given below, the light black line indicates the action spectrum for photosynthesis and the dark black line indicates the absorption spectrum of chlorophyll a.



(a) What does the action spectrum indicate? How can we plot an action spectrum? Explain with an example.
(b) How can we derive an absorption spectrum for any substance?
(c) If chlorophyll a is responsible for the light reaction of photosynthesis, why do the action and absorption spectra not overlap?

33. Explain the conduction of nerve impulses along a nerve fibre with the help of diagrams. (5)

OR

(a) Describe the sequence of events that occurs in humans' cardiac cycle.
(b) Where and how are the sounds of ‘lub’ and ‘dub’ produced in the heart during this cycle?