विद्या सर्वार्थ साधिका

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PERIODIC TEST - 3

Class: XI

Subject: Biology (044) MM : 40

Date : 06-01-2024 Time: 1 Hr. 30 min.

General Instructions:

1. There are 20 questions in all. All questions are compulsory.
2. This question paper has five sections: Section A, Section B, Section C, Section D and Section E. All the sections are compulsory.
3. Section A consists of twelve Multiple Choice Questions of 1 mark each, Section B consists of two questions of 2 marks each, Section C consists of two questions of 3 marks each, Section D consists of two long questions of 5 marks each and Section E consists of two case study-based questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in sections D and E. You must attempt only one of the choices in such questions.
5. Draw neat diagrams wherever necessary.

SECTION A

1. The endomembrane system of a eukaryotic cell does not include _____. (1)
   (A) Golgi Body (B) Lysosome (C) Vacuole (D) Peroxisome

2. How much time will two *E.coli* bacteria cells take to become 32 cells if the average duplication time of *E.coli* is 20 minutes? (1)
   (A) 1 hour 20 minutes (B) 1 ½ hours (C) 2 hours 40 minutes (D) 2 ½ hours

3. In C_3 plants, what is the first stable compound formed during carbon fixation in the Calvin cycle? (1)
   (A) Glyceraldehyde-3-phosphate (B) 3-phosphoglyceric acid
   (C) Ribulose-1,5-bisphosphate (D) Phosphoenolpyruvate

4. Acetyl CoA forms a 6-C compound after combining with _____. (1)
   (A) oxygen (B) pyruvic acid (C) citric acid (D) oxaloacetic acid

5. Three of the following statements regarding cell organelles are correct, while one is incorrect. Identify the incorrect statement from the given. (1)
   (A) Lysosomes are double membraned vesicles that contain digestive enzymes.
   (B) ER consists of network like membranous tubules and helps in secretion and synthesis.
   (C) Leucoplast is bound by a double membrane and has its own DNA.
   (D) Nucleolus is not membrane bound structure.

6. What is true about the mitotic spindle? (1)
   (A) It is composed of actin and myosin microfilaments.
   (B) It includes the kinetochore at the metaphase plate.
   (C) It is composed of microtubules that separate chromosomes at opposite poles of the cell.
   (D) It originates only from centrioles of centrosome.

7. Which among the following are raw materials required for the light reaction? (1)
   (A) $NADPH_2$ and H_2O (B) ADP and OH_2
   (C) ATP only (D) ADP, H_2O, and NADP

8. The breaking of which of the following bonds leads to release of energy? (1)
   (A) P-P bonds (B) C-C bonds (C) N-N bonds (D) S-S bonds

9. How many times does the Calvin cycle operate for the synthesis of one glucose molecule? (1)
(A) 8 times (B) 6 times (C) 4 times (D) 2 times

10. In many bacteria, cell membrane is invaginated and folded to form _____. (1)
(A) pili (B) cristae (C) glyoxysome (D) mesosome

For Question Number 11 and 12, two statements are given, one labelled Assertion and the other labelled Reason. Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.
(A) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(B) Both Assertion and Reason are true but Reason is NOT the correct explanation of Assertion.
(C) Assertion is true but Reason is false.
(D) Assertion is false and Reason is also false.

11. Assertion: The number of cells in a multicellular organism is inversely proportional to size of body. (1)
Reason: All cells of biological world are alive.

12. Assertion: Fructose-1, 6 diphosphate is converted into glyceraldehyde-3-phosphate and dihydroxy-acetone-3-phosphate. (1)
Reason: In the presence of enzyme aldolase, conversion of fructose-1,6 diphosphate into 3-phosphoglyceraldehyde and dihydroxyacetone-3-phosphate is facilitated.

SECTION B

13. Is a multicellular organisation more advanced than a unicellular organisation? Justify your answer. (2)

14. What is the importance of F_0 F_1 particles in ATP production during aerobic respiration? (2)

SECTION C

15. RuBisCO is an enzyme that acts both as a carboxylase and oxygenase. Does RuBisCO carry out more carboxylation than oxygenation in C4 plants? Write scientific reasons. (3)

16. Analyse the following events that occur during meiosis and explain the stages at which these events occur during reduction division. (3)
(i) Number of chromosomes changed per cell
(ii) Amount of DNA content changed per cell

SECTION D

17. Describe the different phases of meiotic prophase I. Mention the chromosomal events during each stage. (5)

OR

(a) Telophase is the reverse of prophase. Justify the statement. (3)
(b) Draw cell cycle to representing the various phases of cell cycle. (2)

18. Yeast cell respires anaerobically whereas human cell respires aerobically. (5)
(a) Name the carbohydrate that serve as substrate in both the types of respiration and its products.
(b) What is Glycolysis? Explain the steps that occur during Glycolysis

SECTION E

Questions 19 and 20 are Case Study Based questions and are compulsory. Each question carries 4 marks.

19. 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.

(i) Which component of the plasma membrane is arranged as a bilayer? (1)

(ii) The lipid component of the membrane mainly consists of _____. (1)

(iii) Why is the plasma membrane necessary for the life of a cell? (2)

OR

(iii) The cell membrane is called selectively permeable membrane. Why?

20. In photophosphorylation, the photolysis of water is associated with the PS II. This creates oxygen, one of the net products of photosynthesis. The electrons needed to replace those removed from photosystem I are provided by photosystem II. Water splitting complex is associated with the PS II, which itself is physically located on the inner side of the membrane of the thylakoid.

(i) Represent photolysis of water in the form of chemical equation. (1)

(ii) By which mechanism two photosystem can be connected and work in series? (1)

(iii) Schematically represent cyclic photophosphorylation. (2)

OR

(iii) Explain the components of PS I.