

63/1 (SEM-3) CC7/BITHC3076

2023

BIOTECHNOLOGY

Paper : BITHC3076

(Biophysical Chemistry)

Full Marks : 60

Pass Marks : 24

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Choose the correct answer from the following (any five) : 1×5=5

(a) Lipids are primarily composed of which three elements?

- (i) Carbon, oxygen and nitrogen
- (ii) Carbon, hydrogen and oxygen
- (iii) Hydrogen, oxygen and nitrogen
- (iv) Carbon, nitrogen and sulfur

(2)

(b) Enthalpy of an ideal gas depends on which of the following factors?

- (i) Pressure
- (ii) Temperature
- (iii) Volume
- (iv) Internal energy

(c) Photosynthesis begins with which of the following steps?

- (i) ATP formation
- (ii) Glucose formation
- (iii) Photolysis of water
- (iv) Activation of chlorophyll by light

(d) Beer's law states that the intensity of light decreases with respect to

- (i) concentration
- (ii) distance
- (iii) composition
- (iv) volume

(3)

(e) The type of coiling in DNA is

- (i) zig-zag
- (ii) left-handed
- (iii) opposite
- (iv) right-handed

(f) Which of the following vitamin deficiencies causes beriberi?

- (i) Vitamin B1
- (ii) Vitamin B2
- (iii) Vitamin B6
- (iv) Vitamin B12

(g) What is the value of ΔG , when a system is in equilibrium?

- (i) $\Delta G = 0$
- (ii) $\Delta G = 1$
- (iii) $\Delta G = -1$
- (iv) $\Delta G = \Delta G^\circ$

(4)

(h) Each molecule of CO_2 fixed and reduced in photosynthesis in the Calvin cycle requires how much ATP and NADPH?

(i) 2 ATP and 2 NADPH

(ii) 2 ATP and 3 NADPH

(iii) 3 ATP and 2 NADPH

(iv) 4 ATP and 3 NADPH

(i) Which of the following RNAs can induce gene silencing?

(i) miRNA

(ii) snoRNA

(iii) ssRNA

(iv) ncRNA

(j) Covalent molecules are held together in a crystal by

(i) attraction between dipoles

(ii) hydrogen atoms

(iii) attraction of van der Waals

(iv) attraction of electrostatic

(5)

2. Answer any *five* of the following questions :

2×5=10

(a) What are the two functions of lipids?

(b) Distinguish between cyclic and non-cyclic photophosphorylations.

(c) Write the applications of chlorophyll.

(d) What is bioenergetics?

(e) Define B-DNA.

(f) State any two examples of disaccharides.

(g) What is the difference between covalent and ionic bonds?

3. Answer any *five* of the following questions :

5×5=25

(a) Define pH. Explain the role of buffer in biological system with an example.

(b) Write a note on structure of cellulose.

(6)

- (c) Describe paper chromatography.
- (d) Write a note on ATP.
- (e) Explain Ramachandran's plot.
- (f) Give the principle and applications of electrophoresis.
- (g) Explain the first and second laws of thermodynamics.
- (h) Describe the structure of t-RNA.
- (i) What are colligative properties? Explain the different types of colligative properties of solution.

4. Answer any *two* of the following questions :

10×2=20

- (a) What are nucleic acids? Describe the structure of DNA with the help of diagram.
- (b) Discuss in detail about the principle and working of UV-visible spectroscopy.

(7)

- (c) What is oxidative phosphorylation? Give a brief account on electron transport chain, showing ATP formation.
- (d) Describe the secondary, tertiary and quaternary structures of a protein molecule.
