2021

BIOCHEMISTRY — **HONOURS**

Paper: DSE-B-1

(Advanced Biochemistry)

Full Marks: 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Group - A

1. Answer any five questions:

 2×5

- (a) What do the letters CAM stand for? Give one example of a CAM plant.
- (b) What is the function of light harvesting complex?
- (c) State the function of bacteriorhodopsin.
- (d) Why are cyanobacteria oxygenic?
- (e) What is C_2 cycle?
- (f) State one application of EMSA.
- (g) How can the association of LHC II and PS II be regulated?
- (h) Can scatchard analysis be applied to unpurified proteins?
- (i) What is surface plasmon resonance?

Group - B

Answer any two questions.

- 2. (a) What are the two processes that photosynthesis in plants encompasses?
 - (b) How does cyanobacteria synthesize ATP?

2+3

- 3. (a) State the factors that prevent the dissipation of energy by internal conversion.
 - (b) What is oxygenic photosynthesis? Where does it occur?

2+2+1

- 4. (a) What are the functional components of ATP synthase?
 - (b) What is the function of rubisco?
 - (c) Synthesis of each triose phosphate from CO₂ requires how many NADPH and ATP molecule?

2+2+1

Please Turn Over

Group - C

Answer any three questions.

- 5. (a) Explain briefly how plants overcome photorespiration.
 - (b) Outline the steps involved in synthesis of starch from UDP-glucose.
 - (c) List the differences between cyclic and non-cyclic photophosphorylation.
 - (d) Name two light harvesting pigments employed by cyanobacteria.

3+3+3+1

- 6. (a) Briefly explain the purpose of each of the three stages of the calvin cycle.
 - (b) Which compartment of mitochondria would be similar to stroma of a chloroplast in terms of function? Give reason.
 - (c) Briefly explain the structural features of peptidoglycan.
 - (d) Which is the final electron acceptor of the whole photosynthetic electron transport chain?

3+3+3+1

- 7. (a) Briefly outline a method used to identify protein-protein interaction.
 - (b) What methods can be employed to get the thermodynamic profile of a biomolecular interaction?
 - (c) What forces may be responsible for a strong protein-ligand interaction?
 - (d) What is CHIP assay? How can it be used to study DNA-protein interaction? Explain. 3+2+2+3
- **8.** (a) What is the relation between K_{ON} , K_{OFF} and Keq?
 - (b) Explain any one method that uses fluorescence, which can be employed to study protein-ligand interaction.
 - (c) What is SPR? What parameters are obtained from SPR for a biomolecular interaction study?
 - (d) Briefly write about any one application of biomolecular interaction in life science research.

1+3+3+3