

U.G. 3rd Semester Examination - 2020

MICROBIOLOGY

[HONOURS]

Paper : MB-H-CC-L-06

(Bioenergetics and Microbial Metabolism)

Full Marks : 40

Time : 2½ Hours

The figures in the right-hand margin indicate marks.

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

1. Answer the following: 1×10=10
- i) What is non-cyclic photo-phosphorylation?
 - ii) What are the key enzymes involved in Calvin cycle?
 - iii) Differentiate between anabolism and catabolism.
 - iv) How many ATP are needed during dinitrogen fixation by a bacterium?
 - v) How does anaerobic respiration differ from fermentation?

- vi) Name the first stable product of CO₂ fixation in Calvin cycle.
- vii) What is the nature of carbon and energy sources in chemosynthetic bacteria?
- viii) What is homolactic fermentation?
- ix) What is RUBISCO?
- x) Name the substrate of the enzyme, Malate synthase.

2. Answer any **five** of the following: 2×5=10
- i) What is Proton motive force?
 - ii) What is Photophosphorylation?
 - iii) What is Hill reaction?
 - iv) Explain with schematic diagram the process of ATP synthesis during light reaction in cyanobacteria.
 - v) How is dinitrogen fixed by *Klebsiella* sp?
 - vi) Write down the basic physics of light during photosynthesis in microbial system.
 - vii) What is the difference between active transport and facilitated diffusion?

3. Answer any **four** of the following: $5 \times 4 = 20$

- i) Describe with reaction the energy pay off steps in glycolysis.
- ii) Explain with schematic diagram the process of ATP synthesis during light reaction in algae.
- iii) What are the components of pyruvate dehydrogenase complex? How is pyruvate oxidatively decarboxylated to acetyl-CoA by the enzyme complex in the linking reaction to TCA? $2+3$
- iv) Write short note on chemiosmotic hypothesis. What are the effects of rotenone and cyanide on oxidative phosphorylation? $3+2$
- v) What are the sequences and orientation of electron carriers and enzymes involved in Electron Transport System of a Nitrifying bacterium? Mention the point of entry of electron from electron donor and its direction of flow. $3+2$
- vi) Write short notes on: $2 \frac{1}{2} \times 2$
 - a) Substrate level phosphorylation
 - b) Photosystem I and Photosystem II
