

B.Sc. Semester - 5 (CBCS) Examination

Oct/Nov. – 2019

PROCARYOTIC METABOLISM (CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q. 1 a. Answer the following: (Any one out of Two) (07 marks)

- 1) Differentiate non-regulatory and regulatory enzymes. Explain importance of conformational changes in regulatory enzymes.
- 2) Derive Michaelis-Menten equation for enzymatic reaction

Q.1 b. Attempt any one. (Out of Two) (04 marks)

- 1) Explain role of ATP in metabolism.
- 2) What are energy rich compounds? Explain any two in brief.

Q.1 c. Attempt any three. (Out of Five) (03 marks)

- 1) What is K_m and V_{max} ?
- 2) Define: Bioenergetics.
- 3) What is ΔG ?
- 4) What are precursor metabolites?
- 5) How much free energy get released when ATP get converted to ADP?

Q. 2 a. Answer the following: (Any one out of Two) (07 marks)

- 1) Discuss in detail: Pentose Phosphate Pathway.
- 2) Discuss the biochemical reactions of citric acid cycle.

Q.2 b. Attempt any one. (Out of Two) (04 marks)

- 1) Explain: β - oxidation of fatty acids.
- 2) How glyoxylate pathway bypass the citric acid cycle?

Q.2 c. Attempt any three. (Out of Five) (03 marks)

- 1) What is Stickland reaction?
- 2) Enlist two enzymes of glycolysis.
- 3) Which enzyme of Entner-Doudroff pathway differentiates it from glycolysis?
- 4) What is transamination?
- 5) Write any one substrate level phosphorylation reaction that occurs during glycolysis.

Q. 3 a. Answer the following: (Any one out of Two) (07 marks)

- 1) How biochemical mutants can be used to study biosynthetic pathway?
- 2) Explain in detail: The Light reaction of bacterial photosynthesis.

Q. 3 b. Attempt any one. (Out of Two) (04 marks)

- 1) Functions of any two components of ETC.
- 2) Write a note on anaerobic respiration.

Q. 3 c. Attempt any three. (Out of Five) (03 marks)

- 1) What is substrate level phosphorylation?
- 2) Name the terminal electron acceptor for aerobic and anaerobic respiration.
- 3) What are cytochromes?
- 4) What is proton motive force?
- 5) Name the isotopes used in isotopic labelling.

Q. 4 a. Answer the following: (Any one out of Two) **(07 marks)**

- 1) Discuss the energy metabolism and carbon-assimilation in Methanogens
- 2) Write a descriptive note on lactic acid bacteria.

Q. 4 b. Attempt any one. (Out of Two) **(04 marks)**

- 1) Discuss Common properties of the enteric group of bacteria.
- 2) Discuss in detail: Photophosphorylation in *Halobacterium*.

Q. 4 c. Attempt any three. (Out of Five) **(03 marks)**

- 1) Name ensheathed iron bacteria.
- 2) Name the enzyme involved in hydrogen oxidation in hydrogen bacteria.
- 3) How does *Nitrosomonas* differ from *Nitrobacter* in terms of nitrogen metabolism?
- 4) What do you mean by Methylotrophs?
- 5) How homofermentative lactic acid bacteria differ from heterofermenter ?

Q. 5 a. Answer the following: (Any one out of Two) **(07 marks)**

- 1) Explain quorum sensing.
- 2) Discuss the phosphotransferase system.

Q. 5 b. Attempt any one. (Out of Two) **(04 marks)**

- 1) Briefly explain: structure of membrane with specific emphasis on its lipid components.
- 2) Draw and discuss the types of cell signalling.

Q. 5 c. Attempt any three. (Out of Five) **(03 marks)**

- 1) Cell membrane is permeable to which molecules?
- 2) What are symport?
- 3) What are antiport?
- 4) Define: Phagocytosis.
- 5) What is pinocytosis?
