

B.Sc. Semester - 5 (Remedial) (CBCS) Examination**March/April-2022(Old Course)****PROCARYOTIC METABOLISM (CORE)****Time: 2:30 Hours****Marks: 70****Instructions:**

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

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- Q.1(A) Answer the following: (Any one) (07)
1. Derive the Michaelis-Menten equation.
 2. Discuss relationships among K'_{eq} , $\Delta G'^{\circ}$ and the direction of chemical reactions under standard conditions.
- Q.1(B) Attempt any one (04)
1. ATP plays an important role in metabolism- Discuss.
 2. Explain allosteric regulation of enzyme activity.
- Q.1(C) Attempt any three: (03)
1. True or false: In response to specific signals, regulatory enzymes do exhibit decreased or increased catalytic activity.
 2. The free-energy change for a reaction depends on the pathway by which the reaction occurs.
 3. What is the importance of reducing power?
 4. True or false: Pyruvate kinase is allosterically inhibited by ATP.
 5. To which of the followings do the uncompetitive inhibitors bind, substrate or ES complex?
- Q.2(A) Answer the following: (Any one) (07)
1. Explain the glyoxylate cycle and its importance.
 2. Discuss β -oxidation of fatty acids.
- Q.2(B) Attempt any one (04)
1. In EMP pathway, how many irreversible reactions take place during conversion of glucose-6-phosphate to pyruvate? Which are they?
 2. Explain principle of Stickland reaction with suitable example.
- Q.2(C) Attempt any three: (03)
1. Which does lead to less ATP generation, EMP pathway or ED pathway?
 2. How many carbon atoms are present in oleic acid?
 3. During TCA cycle, addition of acetyl- CoA to oxaloacetate yields....
 4. During catabolism of an amino acid, always the first step is removal of
 5. True or False: Some intermediates of citric acid cycle play role in its feed back inhibition.
- Q.3(A) Answer the following: (Any one) (07)
1. Discuss oxygenic photosynthesis in bacteria.
 2. Explain anaerobic respiration in bacteria.
- Q.3(B) Attempt any one (04)
1. Explain application of isotopic labeling in studying biosynthetic processes.
 2. Explain general electron transport scheme in aerobic bacteria.

- Q.3(C) Attempt any three: (03)
1. *his⁻* mutants are example of mutants.
 2. How many photochemical reaction centers do purple photosynthetic bacteria have?
 3. Who proposed the chemiosmotic model?
 4. Whether cytochromes are electron carriers or hydrogen and electron carriers?
 5. Name the bacterial quinones useful during respiration.
- Q.4(A) Answer the following: (Any one) (07)
1. Write a detailed note on nitrifying bacteria.
 2. Discuss lactic acid fermentation by a prokaryotic cell.
- Q.4(B) Attempt any one (04)
1. Sulfur oxidizing acidophiles.
 2. Explain carbon assimilation in methanogens.
- Q.4(C) Attempt any three: (03)
1. Name the enzymes involved in the assimilatory reduction of nitrate to ammonia.
 2. True or false: Genera *Pseudomonas* and *Bacillus* are hydrogen oxidizing bacteria.
 3. True or false: Members of the genus *Sulfolobus* are thermophilic alkaliphiles.
 4. True or false: *Thiobacillus ferrooxidans* can oxidize iron and live in acid environment.
 5. Name the membrane protein present in *Halobacterium halobium* which can act as a light-activated proton pump.
- Q.5(A) Answer the following: (Any one) (07)
1. Discuss general model for AHL signaling in bacteria.
 2. Explain the sugar-phosphotransferase system in bacteria.
- Q.5(B) Attempt any one (04)
1. Write a note on membrane lipids.
 2. Explain primary and secondary active transport.
- Q.5 (C) Attempt any three: (03)
1. True or false: Transporters are membrane proteins.
 2. A diffusible signal produced by myxobacteria upon nutrition depletion is known as....
 3. The shock-sensitive systems are characteristics of gram-positive or gram-Negative bacteria?
 4. True or false: Many of the transport system in bacteria are powered by ion gradient.
 5. True or false: Besides proton potentials, sodium potentials are also important in prokaryotes.
