

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. FOURTH SEMESTER EXAMINATION, MAY 2012

SECOND YEAR

MICROBIOLOGY (Honours)

Date : 21/05/2012

Time : 11 am – 2 pm

Paper : IV

Full Marks : 75

[Use Separate Answer Books for each Group]

## Group - A

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

1. a) How did Winogradsky classify soil bacteria? Mention their features and cite suitable examples. [5]  
b) What are the disadvantages of Agar plate method in enumeration of bacteria. [2]
2. a) Name the causal organism and briefly state the symptoms, dissemination and control measures of late blight of potato. [1+1+1+2]  
b) What are the differences between commensalism and ammensalism? [2]
3. a) What is a diazotroph? Discuss the characteristic enzymatic pathway that is responsible for diazotrophy. [1+4]  
b) Distinguish between total count and viable count. [2]
4. a) Present the sulphur cycle with the help of a flow chart. [3]  
b) Mention the similarities between the nitrogen and sulphur cycle. [4]
5. a) State the molecular mechanism of cell cycle regulation involving cdk and cyclins. [5]  
b) What is ubiquitination of protein? [2]
6. a) What do you mean by restriction point of the cell cycle? [1]  
b) If the gene cdc25c is mutated, what would be the effect on cell cycle progression? [2]  
c) Briefly explain the role of “protein disulfide isomerases” in protein folding. [3]  
d) What are sec mutants? [1]
7. a) Discuss how milk is tested for safe consumption. [3]  
b) What is meant by ripening of cheese? State the role of fungi in this process. [2+2]
8. a) What are the disadvantages of Canning? [2]  
b) Why poor canning might fatally contaminate the preserved meat? [2]  
c) What are the bacteriological properties of egg white? [2]  
d) Name one halophilic micro-organism causing spoilage of salted fish. [1]
9. a) How would you define fermented foods? [2]  
b) Name the starter cultures of yoghurt. [2]  
c) Name a probiotic organism and state its characteristics. [1+2]

## Group - B

(Answer **any five** questions)

10. a) What will be the effect on glycolysis if triose phosphate isomerase is deficient? [2]  
b) Write down the steps of urea cycle which requires ATP. [2]  
c) What is the biochemical basis of Phenyl-ketonia? [2]  
d) Cyanide inhibits electron transport chain completely whereas rotenone inhibits it partially – justify. [2]

11. a) Illustrate the reaction that links pyruvate to TCA cycle, mentioning all steps with enzymes and co-enzymes. [4]  
 b) Iodoacetate is an inhibitor of an enzyme in glycolysis. What is the name of the enzyme and how does it inhibit? [2]  
 c)  $\text{Acetyl-KS} \xrightarrow[\text{?}]{\text{?}} \text{Acetyl-KS-Malonyl-ACP}$ . [2]
12. a) In case of odd chain fatty acid oxidation propionyl CoA is formed along with acetyl CoA. How does the former enter TCA cycle? [3]  
 b) When fat breakdown predominates and concentration of oxaloacetate is lowered, what will happen with acetyl CoA in liver? [3]  
 c) How does fatty acid from cytosol enter the mitochondria? [2]
13. a) Explain atleast one way of linking carbohydrate and amino acid metabolism. [2]  
 b) Briefly describe microbial catabolism of lysine. [4]  
 c) "Patients with Alkaptonuria excrete homogentisic acid in urine." – Explain [2]
14. a) Explain briefly how are  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$ ,  $\text{CO}_2$  used as electron acceptors? [3]  
 b) State the differences between prokaryotic and eukaryotic photosynthesis. [3]  
 c) In which form is Vitamin B<sub>6</sub> used in amino acid metabolism? [2]
15. Comment on the reactions catalysed by the following enzymes:–  
 a) Thymidylate Synthase, Carbamoyl Phosphate synthetase–II [2+2]  
 b) Isocitrate Dehydrogenase [2]  
 c) What is Stickland reaction? [2]
16. a) How does Pasteur effect differ from Crabtree effect? [3]  
 b) Mention the role of rubisco in Calvin cycle. [2]  
 c) What are the advantages of ED pathway over EMP pathway. [2]  
 d) What is the importance of anaerobic respiration? [1]
17. a) What is the reaction catalysed by DHFR? Mention the significance of Trimethoprim. [2+1]  
 b) What are C3 and C4 plants? How does it differ from CAM plants? [3]  
 c) Describe briefly the component of ATP synthase complex. [2]
18. a) What is the significance of salvage pathway for purine synthesis? [2]  
 b) State the significance of carnitine in fat metabolism. [2]  
 c) How the problems arisen during unsaturated fatty acid oxidation could be solved? [2]  
 d) What is futile cycle? [2]

