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| Description: col LOGO outline  **ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27** | | | | | | |
| **M.Sc. MICROBIOLOGY – II SEMESTER** | | | | | | |
| **SEMESTER EXAMINATION: APRIL 2017** | | | | | | |
| **MB 8116: Microbial Physiology** | | | | | | |
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| **Time- 2 1/2 hrs** | |  | **Max Marks-70** | | |  |
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| **This paper contains 2 printed pages and 4 parts**  **I. Answer any FIVE of the following 5x3=15**  **1.** Explain substrate level phosphorylation with suitable examples.  **2.** What are heat shock proteins? Give examples.  **3.** What do you understand by saponification? Give the chemical reaction involved in it.  **4.** Define stereoisomers. A sugar molecule X has 3 chiral centers. How many stereoisomers will it  have?  **5.** Differentiate between homolactic and heterolactic fermentation.  **6.** Why does the helix form more readily than many other possible conformations in a protein?  **7.** Define: a. Domain b. Isozyme  **II. Answer any FIVE of the following 5x5=25**  **8.** Name the four classes of ATP-powered pumps that produce active transport of ions and  molecules. Indicate whichof these classes transport ions only and which transport primarily  small molecules.  **9.** What are enzyme inhibitors? Plot the Lineweaver-Burk plot for competitive and uncompetitive  inhibition.  **10.** Explain how conformational changes in the β subunit of F0F1 ATPase leads to ATP synthesis.  **11.** How does monosaccharides behave as reducing sugars? Why sucrose is not a reducing sugar?  **12.** Differentiate between oxygenic and anoxygenic photosynthesis.  **13.** Sketch a titration curve for the amino acid glycine, and indicate the pKa values for all titratable  groups. Also indicate the pH at which the amino acid has no net charge.  **14.** Discuss the steps of alcohol fermentation.  **III. Answer any TWO of the following 2x10=20**  **15. a.**Calculate the standard free-energy change of the reaction catalyzed by the enzyme  hexokinase:  Glucose → Glucose-6-phosphate  Given that starting with, 30 mM glucose (but no glucose-6-phosphate), the final equilibrium  mixture at 25oC and pH 7.0 contain 1 mM glucose and 29 mM glucose-6-phosphate. Does the  reaction in the direction of glucose-6-phosphate formation proceed with a loss or gain of  energy?  **b.** Briefly explain the different structural organization of proteins.  **16.** Explain the concerted and sequential models for the behavior of allosteric enzymes.  **17. a**. Discuss the payoff phase of glycolysis.  **b.** Why is citric acid cycle said to be an amphibolic pathway.  **III. Answer the following 1x10=10**  **18.** In samples of DNA isolated from two unidentified species of bacteria, X and Y, adenine makes  up 15% and 35%, respectively, of the total bases. What relative proportions of adenine, guanine,  thymine, and cytosine would you expect to find in the two DNA samples? One of these species  was isolated from a hot spring (64°C). Which species is most likely the thermophilic bacterium,  and why? | | | | | | |
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