Unique Paper Code (UPC)   :   32531325-OC

Name of the Paper   :   Microbial Physiology and Metabolism

Name of the Course   :   B.Sc. (Hons.) Microbiology

Semester   :   3

Duration   :   4 hours including time taken for downloading
                                      question paper and uploading answer sheets

Maximum marks   :   75

On first page, please write the following details:
1. Date and time of examination (DD/MM/YYYY, Hours:Min)
2. Examination Roll Number
3. Name of the Program, i.e. B.Sc. (H) Microbiology
4. Semester
5. Unique Paper Code (UPC)
6. Title of the Paper
7. Name of the College
8. Email ID of the student
9. Mobile Number of the student

SET 1

Attempt any *four* questions. **All** questions carry equal marks. Please write your answers on A4 size sheets and put page numbers at the top of each page

1. Draw a schematic outline of the pathway by which major amount of glucose is oxidized to pyruvate in *E. coli.* What modifications would it require in its metabolism if you replace glucose with gluconate in the culture medium? Write the key enzymes of the pathways and the reactions catalyzed by them. How do the organisms lacking in these keys enzymes grow on glucose?   8+2+4+4.75=18.75

2. Write a brief description of a typical bacterial growth curve. Define the terms growth rate and generation time. Write a mathematical expression for their determination. Write an account of adaptations found in microorganisms to grow at extremes of temperatures.   5.75+3+3+7=18.75

3. Describe the process of biological nitrogen fixation in legume-*Rhizobium* symbiotic relationship. How is assimilatory nitrate reduction different from denitrification? Write an account of ammonia assimilation in these organisms.   6+6+6.75=18.75

4. Define C-autotrophs. Differentiate between oxygenic and anoxygenic photosynthesis. Discuss aerobic chemolithotrophic metabolism in a group of bacteria studied by you.

2+8+8.75=18.75

5. What are the salient features of bacterial fermentations? Differentiate between homo- and heterofermentative pathways in lactic acid bacteria. What benefits do bacteria obtain from branched fermentation pathways, explain. 5+8+5.75=18.75

6. What are the salient features of bacterial electron transport chain? Describe chemiosmotic theory of oxidative phosphorylation. Write an example each of an uncoupling agent and an inhibitor with their mode of action. 6.75+6+6=18.75