

Unique Paper Code (UPC)	: 32531325
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 answer on A4 size sheets and mark the page number at the top of each page.

1. Explain the following terms: action spectrum; P:O ratio; compatible solutes, alternate nitrogenases, anaerobic respiration. Differentiate between oxygenic and anoxygenic photosynthesis. 10+8.75
2. Distinguish between primary and secondary active transport with suitable examples. Describe a mechanism for the transport of glucose in *E. coli* with the help of a diagram. How do aerobic and aerotolerant microbes overcome the effects of toxic forms of oxygen? 8+6.75+4
3. Differentiate between batch and continuous cultures. What is diauxic growth and discuss the mechanism underlying it? Discuss the various mechanisms proposed for proton translocation during ETC that drives ATP synthesis. 6+6+6.75
4. Explain the oxidative pentose phosphate cycle and its significance in microbial metabolism. Discuss aerobic chemolithotrophic metabolism in a group of bacteria studied by you. Write the complete balanced equation for the reactions catalyzed by phosphofructokinase and succinate dehydrogenase. 8+6.75+4
5. Describe heterolactate fermentation pathway. What is the advantage that an organism derives from a branched fermentation pathway? Discuss the fate of pyruvate in aerobic respiration. 6.75+4+8

6. Explain in detail the process of biological nitrogen fixation. How do nitrogen fixers protect their nitrogenase from oxygen toxicity? Discuss dissimilatory nitrate reduction in bacteria.

6+6+6.75