Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH (PBIR)/SEM-1/MBT/PHMB/PHMC-101/2012-13

2012

MICROBIAL BIOCHEMISTRY

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer Question No. **1** (compulsory) and

any *five* from the rest.

1. Answer any *ten* of the following very briefly : 10 × 1 = 10

   a) Differentiate between Pasteurization and Tyndallisation.

   b) What is acid fast stain ?

   c) What is the function of bactoprenol in cell wall synthesis ?

   d) What is *O*-antigen ?

   e) Molecular adjuvants are antibiotics. (State *True* or *False*)

   f) Name the biochemical process which can produce both NADPH and ATP.

g) What is denitrifying bacteria ?

h) What is paralogous gene ?

i) Name the gene used for phylogenetic analysis of bacteria.

j) What are allosteric enzymes ?

k) Choose the correct answer :

Mauve is a software for

i) analysis of gene rearrangement

ii) phylogenetic tree construction

iii) metabolic analysis

iv) biochemical characterization.

2. a) Glucose-6-phosphate is enzymatically converted to fructose-6-phosphate at 25°C and pH 7·0. Calculate the free energy change of this reaction taking equilibrium concentration of G-6-P and F-6-P as 1·33 M and 0·67 M respectively.

b) State the condition(s) under which pyruvate can be converted to

i) CO_2 and lactic acid

ii) CO_2 and H_2O. 4 + 8

3. a) What is the difference between physical and chemical mutagens ?

b) Both missense and nonsense mutations are codon mutations but they differ. Explain.

c) How can you test a mutagen ? 4 + 6 + 2

4. a) In mitochondria the outer and inner membrane proteins are functionally different. Explain.

   b) Write how electron from NADH is transported to the terminal acceptor in the respiratory chain.

   c) How many molecules of ATP are produced ? 3 + 6 + 3

5. Write short notes on the following : 4 × 3

   a) Transpeptidase

   b) Reverse TCA cycle

   c) Patchwork assembly theory

   d) Immobilized enzyme.

6. What are the differrences between the scanning electron microscopy and transmission electron microscopy at

   a) optical level ?

   b) application level ? 6 + 6

7. a) What methods are used for genomic analysis based identification of bacteria ?

   b) What are the differences between culture dependent and culture independent analysis in microbial classification ? 6 + 6

8. a) Why nitrate reduction is essential in biological system ?

   b) What is the difference between nitrate assimilation and nitrate respiration in bacteria ?

   c) Is nitrate reductase a molybdoprotein ? 3 + 6 + 3