[This question paper contains 4 printed pages.]

6097 *Your Roll No.* .....

B.Sc. (H) Microbiology / III Sem. **B**

Paper – MIHT-305

Microbial Physiology and Metabolism – I

Time : 3 Hours *Maximum Marks : 75*

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any **Five** *questions.*
All *questions carry equal marks.*

1. (a) State giving reasons whether the following statements are true or false

   (i) All chemolithotrophs are strictly aerobic.

   (ii) Bacterial total cell count can be obtained using haemocytometer.

   (iii) At low concentrations of oxygen, ATP is generated by oxidative phosphorylation in Halobacteria.

   (iv) Iron transport in microbes is through group translocation. (3×4=12)

P.T.O.

(b) Name any two light harvesting pigments in phototrophic bacteria. Also mention different functions performed by any one of these. (3)

2. (a) Define the following terms (any **12**) :

Growth rate, generation time, chemo-organotrophs, chlorosome, C-heterotrophs, dilution rate, unbalanced growth, barotolerant, symport, protonophore, micro aerophile, quasi chemolithotroph, electron-hole. (1×12=12)

(b) Write the ecological distribution of the following physiological microbial groups (any **three**) :

(i) Methanogens

(ii) Halophile

(iii) Photosynthetic bacteria

(iv) Thermophile (1×3=3)

3. (a) Write the significance of the following enzymes in microbial metabolism :

(i) Ribulose 1,5 bisphosphate carboxylase

(ii) P-ATpase (2½×2=5)

(b) "*Alcaligenes eutrophus* is a unique hydrogen oxidiser." Comment. (4)

(c) On a redox scale illustrate cyclic/non cyclic electron transport in

(i) Green bacteria

(ii) Heliobacteria (3×2=6)

4. Write short notes on any **three** :

(i) Electrogenic and electroneutral transport

(ii) Kinetics of batch culture

(iii) Tentative scheme of methane production from methanol

(iv) Reductive TCA cycle (5×3=15)

5. (a) How does the rate of addition of fresh medium to the culture vessel determine the growth of continuous culture. (5)

(b) What is catabolite repression ? Who coined this term ? How is it different from glucose effect ? (3,1,2=6)

(c) Give an example of the following microbial group :

(i) Osmophile

(ii) Xerophile

(iii) Psychrophile

(iv) Mixotrophs (4)

P.T.O.

6. (a) How do alkalophile use proton gradient for pH homeostasis ? Explain. (5)

(b) Write the significance of action and absorption spectrum giving a suitable example. (4)

(c) How do aerobes protect themselves from oxygen toxicity ? (4)

(d) What is DCCD ? (2)