

[This question paper contains 4 printed pages.]

1452

Your Roll No.

B.Sc. (Hons.) / II

A

MICROBIOLOGY – Paper VIII

(Microbial Physiology & Metabolism)

(Admissions of 2004 & onwards)

Time : 3 Hours

Maximum Marks : 60

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

Attempt five questions in all.

Q. No. 1 is compulsory.

All questions carry equal marks.

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

(i) *E. coli* transports glycerol by PEP-PTS.

(ii) *Spirulina* fixes carbon dioxide by reductive TCA cycle.

(iii) Assimilatory nitrate reduction is regulated by ammonium ion concentration in the cell.

(3×3=9)

P.T.O.

- (b) Give an example of the following :
- (i) Anaerobic chemolithotroph
 - (ii) Photoheterotroph
 - (iii) An acetone producer (1×3=3)
2. (a) What do you understand by a synchronous culture? Write about the various methods to achieve synchrony. Also add a note on its significance. (5)
- (b) Elucidate oxidative pentose phosphate pathway. Comment on its multifunctional aspect. (4)
- (c) Define the following terms giving suitable example (Attempt any **three**):
- (i) Micronutrient
 - (ii) Siderophores
 - (iii) Bacterial uncoupler
 - (iv) Cumulative enzyme inhibition (1×3=3)
3. (a) How is nitrogenase enzyme regulated at :-
- (i) physiological level ?
 - (ii) genetical level ? (2,4)
- (b) What is Pasteur effect? Explain giving a suitable example. (3)

- (c) Elucidate "Z-scheme" of photophosphorylation on a redox scale in a photosynthetic system. (3)
4. Write short notes on **any three** of the following :
- (i) Propionate fermentation
 - (ii) Molecular adaptations found in psychrophiles
 - (iii) Bacterial ETC
 - (iv) ABC proteins (4×3=12)
5. (a) Briefly write about the concept given by the following scientists (**any two**) :
- (i) Yanofsky
 - (ii) O. Warburg
 - (iii) R. Emerson (2×2=4)
- (b) Describe the chemolithotrophic metabolism in Iron OR hydrogen bacteria. (4)
- (c) Write a short note on halobacterial photosynthesis. (4)
6. Differentiate between the following (**Any four**) :
- (i) Anaerobic respiration & fermentation
 - (ii) Heterolactate & bifidium fermentation

- (iii) Electrogenic & Electroneutral transport
- (iv) Coordinated & sequential induction of enzymes
- (v) Carboxysomes & Chlorosomes (3×4=12)