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5862

Your Roll No

B.Sc. (Hons.)/II

J

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 State True or False, giving reasons (any 6) –

(2×6=12)

(i) *E coli* can use both glucose and arabinose
simultaneously in a culture medium

(ii) TCA cycle is an amphibolic pathway

(iii) Lactate uptake in *E coli* occurs via antiport
mechanism

(iv) Psychrophiles have greater fatty acids in their
cell membranes

P T O

- (v) All chemolithotrophs are strictly aerobic microorganisms
 - (vi) Methanogens can grow only on C1 compounds.
 - (vii) ED pathway is more common in aerobes
- 2 Differentiate between **any four** of the following (3×4=12)
- (i) Chemostat and Turbidostat
 - (ii) Dissimilatory and Assimilatory nitrate reduction
 - (iii) Linear and Branched fermentative pathways
 - (iv) Glycolysis and gluconeogenesis
 - (v) Primary and Secondary active transport
- 3 (a) Define the following
- (i) P/O ratio
 - (ii) Sequential induction
 - (iii) Psychrotroph
 - (iv) Synchronous culture
 - (v) Liebig's Law of minimum
 - (vi) Specific growth rate (1×6=6)
- (b) Compare aerobic and anaerobic respiration in microorganisms with respect to electron transport chain giving suitable examples (4)

(c) Write the reactions catalysed by

(i) PEP carboxykinase

(ii) Iso citrate lyase (1×2=2)

4 Write short notes on (any 3)

(i) Quorum sensing

(ii) Reductive TCA cycle

(iii) Effect of oxygen on growth of microorganisms

(iv) Regulation of nitrogenase (3×4=12)

5 (a) Discuss the physiological significance of the contributions made by the following scientists (any two)

(i) Wood and Werkman

(ii) Walter Stockenius

(iii) Carnahan (3×2=6)

(b) Explain the importance of glyoxylate cycle (3)

(c) Give an example of an uncoupler and inhibitor of ETC (1)

(d) What is heterotrophic CO₂ fixation? (2)

- 6 (a) Explain the role of catabolite repression during diauxic growth (3)
- (b) Describe the light reaction in any two of the following microorganisms
- (i) Cyanobacteria
 - (ii) Purple bacteria
 - (iii) *Helio bacteria* (3×2=6)
- (c) What is reverse electron transport and its significance ? (2)
- (d) What is interspecies hydrogen transfer ? (1)