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M.Sc. (Semester-II) Examination, June-2025

(Backlog)

MICROBIOLOGY

(Microbial Physiology & Metabolism)

Time Allowed : Three Hours

Maximum Marks : 70

Note : Question paper is divided into **four** sections. Attempt questions of **all four** sections as per direction. Distribution of marks is given in each section.

SECTION-A

(Objective Type Questions)

Note : Attempt **any ten** questions. Each question carries **1** mark.

[10×1=10]

1. (A) Fill in the blanks :

(i) Conversion of nitrates to nitrogen is called ____.

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(1)

[P.T.O.]



- (ii) Beta-oxidation of fatty acids occur in ____ organelles of cell.
- (iii) Antibiotic penicillin that inhibits cell wall synthesis can be most effective during which phase of bacterial growth ____.
- (iv) Endocytosis is an example of ____ transport in microorganisms.
- (v) How many molecules of ATP are required to fix one molecule of nitrogen ____.

(B) Choose the correct option :

- (vi) In which phase of growth maximum endospores can be expected in a Bacillus cell culture?
 - (a) Lag phase
 - (b) Death phase
 - (c) Log phase
 - (d) Stationary phase
- (vii) Bacteria isolated from hot water springs are called :
 - (a) Thermophiles

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(2)

- (b) Psychrotrophs
- (c) Mesophiles
- (d) Hyperthermophiles
- (viii) Which of the following is example of passive transport?
 - (a) Simple diffusion
 - (b) Facilitate diffusion
 - (c) Osmosis
 - (d) All of the above
- (ix) Which of the following is not precursor of purine ring?
 - (a) Glutamine
 - (b) Lysine
 - (c) Glycine
 - (d) Aspartate
- (x) Beta-oxidation of fatty acids occurs in :
 - (a) Peroxisome
 - (b) Endoplasmic reticulum

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(3)

[P.T.O.]



- (c) Mitochondria
 - (d) All of the above
- (xi) The bacterial ftsZ gene is required for :
- (a) Septum formation
 - (b) Periseptal annulus formation
 - (c) DNA replication
 - (d) Transport of DNA
- (xii) Which of the following is not an example of oleaginous yeasts?
- (a) Candida
 - (b) Rhodotorula
 - (c) Saccharomyces
 - (d) Trichosporon

SECTION-B

(Very Short Answer Type Questions)

Note: Attempt **any five** questions. Each question carries 2 marks.(Word limit : 25-30 words) : [5×2=10]

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(4)

2. (i) Why is pyruvate dehydrogenase enzyme called enzyme complex?
- (ii) Explain glucose transporter or GLUT-I.
- (iii) What is Na^+ / K^+ pump?
- (iv) What is meant by growth yield in microbiology?
- (v) Define Metabolism.
- (vi) What are Nucleotides?
- (vii) Define Homeostasis.

SECTION-C

(Short Answer Type Questions)

Note: Attempt **any five** questions. Each question carries 4 marks.(Word limit : 250 words) [5×4=20]

3. Explain the following :
- (i) Stringent response
 - (ii) Heat shock response.
 - (iii) Structural organization of ABC transport proteins
 - (iv) Drug transport systems

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(5)

[P.T.O.]



- (v) What kind of pathway is glycolysis? Describe the process.
- (vi) Lipid composition of microorganisms
- (vii) Inhibitors of nucleotide synthesis

SECTION-D

(Essay Type Questions)

Note: Attempt **any three** questions. Each question carries **10** marks. (Word limit : **500** words) [3×10=30]

4. (i) Explain growth, different phases of growth curve and measurement of microbial growth.
- (ii) Describe amino acid biosynthesis highlighting the enzymes involved and regulatory mechanisms.
- (iii) Write a detailed note on lipid accumulation in yeasts and their application.
- (iv) What is Quorum Sensing ? Explain the mechanism of quorum sensing?

—x—