RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SIXTH SEMESTER EXAMINATION, MAY 2025

THIRD YEAR [BATCH 2022-25]

Date : 07/05/2025

MICROBIOLOGY (HONOURS)

Time : 11 am – 1 pm

Paper : CC 14

Full Marks : 50

1. Answer **any ten** questions: [10×2]
   a) Why do you need to add antifoaming agent specifically in protein containing media?
   b) What is dual fermentation?
   c) What are the potential risks associated with maintaining industrial strains through repeated subculturing?
   d) Write down the advantages of using microbes over other sources of enzymes for immobilization.
   e) Name the chromatographic techniques used for the purification of proteins.
   f) Name two organic solvents used for disruption of cells.
   g) What are cryoprotecting agents?
   h) Mention the differences between the working principle of airlift and bubble column bioreactor?
   i) Name the microorganism used for producing glutamic acid. Also mention the raw materials used for glutamic acid production.
   j) Why is strain improvement essential in biotechnology?
   k) Why some microorganisms are called industrial microorganisms not all?
   l) What is the significance of 'auxanographic technique' for screening of microbial strains?
   m) Mention two disadvantages of lyophilisation.
   n) What is a starter culture?
   o) Malting is a critical step in beer production – Explain.

Answer **any three** questions:

2. a) Write down the different stages of downstream processing?
   b) What are the physical methods of cell disruption?
   c) Describe the extraction process of penicillin from fermented broth. [3+3+4]

3. a) How does immobilized enzyme differ from immobilized cells?
   b) How is glucose isomerase immobilized in industry?
   c) What is a cross-linking agent? How it is utilized in immobilization?
   d) How the enzyme/cell immobilization can be used to design biosensors? Describe briefly.
   e) Mention two applications of immobilized enzyme in industrial production and food industry. [2+2+2+2+2]

4. a) Name the microorganisms used for large scale production of-
      (i) Glutamic acid
      (ii) Citric acid
      (iii) Vit B12
      (iv) Penicillin.
   b) How do you improve the penicillin-producing strain?
   c) How is Vit B12 assayed? [(1×4)+3+3]

5. a) What is primary screening? Why primary screening always followed by secondary screening?
   b) How strain improvement can be done using RDT?
   c) Differentiate between still wine and sparkling wine.
   d) Write a short note on – heat and mass transfer in SSF. [(1+2)+2+2+3]

6. a) Corn Steep liquor is a preferred substrate for penicillin production. Why?
   b) When the desired material is a hormone, which chromatographic technique should be chosen for purification? Explain your answer.
   c) Name the by-products formed during ethanol production.
   d) Give a brief account of Black Strap molasses
   e) What are the differences between vitamin and pseudovitamin? [2+2+2+2+2]

———— × ————