

2022

**MICROBIOLOGY — HONOURS**

**Paper : CC-12**

**(Industrial Microbiology)**

**Full Marks : 50**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer **question no. 1** and **any three** questions from the rest.

2×10

1. Answer **any ten** questions :

- (a) Mention the characteristics of producer strain.
- (b) Best medium for growth may not necessarily be the best for maintenance and preservation of microorganism. Why?
- (c) Corn Steep liquor is a preferred substrate for penicillin production. Why?
- (d) What is the role of bifunctional reagent in immobilization technique? Give example.
- (e) In entrapment method, pore size of the matrix is important. Why?
- (f) Define the role of flocculating agent in downstream processing.
- (g) When cell immobilization becomes more advantageous than enzyme immobilization?
- (h) When the desired material is a hormone, which chromatographic technique should be chosen for purification? Explain your answer.
- (i) Name two natural and two synthetic polymers used as matrix for immobilization method.
- (j) What is the difference between penicillin and semisynthetic penicillin?
- (k) The C/N ratio of the medium can influence the product yield during fermentation process. Justify.
- (l) Change in pH caused by an acidic or basic fermentation product does not affect the yield of fermentation. State True or False for the above statement with explanation.
- (m) Why do you need to add antifoaming agent specially in protein containing medium?
- (n) Explain why immobilization by covalent bonding can render an enzyme inactive.
- (o) Why crude media is always preferred over synthetic media for large scale fermentation?

2. (a) Briefly describe the significance of secondary screening.
- (b) How does Batch, Fed-batch and continuous fermentation differ from each other?
- (c) Semisynthetic antibiotics are prepared to overcome antibiotic resistance. Justify.
- (d) Why stamping/sponging method is popular for isolation of microorganisms from soil?

2½×4

**Please Turn Over**

3. Justify the following statement whether they are true or false : 2×5
- (a) Small change in ionic strength of the medium is advantageous for immobilization by adsorption method.
  - (b) Aeration is mainly needed to organism present in submerged culture.
  - (c) Crowded plate technique is useful for isolation of microorganisms having ability to produce growth factor.
  - (d) The basic function of a fermentor is to recover and purify the desired product.
  - (e) Cell disruption is required in downstream processing when the desired products are intracellular.
4. (a) Name the microorganism used for large scale production of
- (i) Penicillin
  - (ii) Glutamic acid
  - (iii) Citric acid
  - (iv) Vitamin B<sub>12</sub>
  - (v) Ethanol.
- (b) What are the basic requirement for industrial production of citric acid?
- (c) How is large volume of inoculum prepared without contamination and aseptically added to the fermenter? (1×5)+3+2
5. (a) How is Vitamin B<sub>12</sub> assayed?
- (b) What are the basic requirements for industrial production of amylase?
- (c) Name the byproducts formed during ethanol production.
- (d) How much percentage of alcohol is present in wine and beer? 2+4+2+2
6. Write short notes on *any four* : 2½×4
- (a) Beer production
  - (b) CSTR
  - (c) Immobilization of penicillin acylase
  - (d) Chemostat
  - (e) Auxanographic technique
  - (f) Black strap molasses.
-