RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIFTH SEMESTER EXAMINATION, FEBRUARY 2022

THIRD YEAR [BATCH 2019-22]

Date : 28/02/2022

MICROBIOLOGY (HONOURS)

Time : 11 am – 1 pm

PAPER : XII [CC12]

Full Marks : 50

Question No 1 is compulsory.

1. Answer the following Questions: [10×1]
   a) Name two organic solvents used for disruption of cells.
   b) Name the chromatographic technique used for the purification of proteins.
   c) Write down the advantages of using microbes over other sources of enzymes for immobilization.
   d) Write two disadvantages of enzyme immobilization.
   e) What is "gasohol"?
   f) Differentiate between Vitamin B12 and pseudovitamin
   g) What is 'corn steep liquor'?
   h) What are enriched media?
   i) What are secondary metabolites?
   j) What is lyophelization?

Answer **any four** questions of the following : [4×10]

2. a) write down the different stages of downstream processing?
   b) What are the physical methods of cell disruption?
   c) In what way filtration and centrifugation help in the process of downstream processing? [3+3+(2+2)]

3. a) what is an immobilized enzyme? How does it differ from immobilized cells?
   b) Name the most frequently used cross linking agent for Enzyme immobilization.
   c) Write down the applications of immobilized enzyme in industrial production and food industry.
   d) Explain the methods of covalent bonding of immobilization with advantages and disadvantages.

   [(1.5+1.5)+2+2+3]

4. a) Write down the effect of Immobilization on Properties of enzymes.
   b) What should be the criteria to be ideal carrier matrices for enzyme immobilization?
   c) 'An immobilized glucose isomerase which is active and stable in concentrated glucose solution has been developed'-explain. (3+3+4)

5. a) 'Upstream and downstream processing are integral parts of an overall industrial process'-explain.
   b) Write short notes on: enzymatic methods of cell disruption for release of intracellular products.
   c) In what way formulation of product can be done explain. (3+3+4)

6. a) The industrial production of alpha amylase requires stringent control of

   i) producer organism

   ii) raw material

   iii) temperature

   iv) pH and

   v) product separation and purification.

   Explain the measures taken under each factor to maximize product formation. (2×5)

7. a) Write the following with respect to lysine production:

   i) Strain used

   ii) Media formulation

   iii) Fermentation conditions

   iv) Recovery

   b) Explain why:

   i) Control of biotin level is very important for large scale production of L-lysine.

   ii) Aeration and agitation cause problem in alpha amylase production. [(1.5×4)+(2×2)]

8. Briefly describe the industrial production of ethyl alcohol (steps to be discussed: choice of producer strain, formulation of medium taking economic consideration, recovery of product and disposal of wastes generated). (2+4+4)

9. a) Explain the gradient plate techniques for selection of analogue resistant mutant.

   b) How does crowded plate techniques is useful for primary selection process of industrially important microbes? (5+5)

10. a) Explain the process of Random Mutagenesis with Degenerate Oligonucleotide Primers .

    b) Mention the activity of dUTPase (dut) and uracil N-glycosylase (ung) in oligo nucleotide directed mutagenesis with M13 DNA.

    c) What is error prone PCR? [5+3+2]

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