

2016

MICROBIOLOGY — HONOURS

Fifth Paper

(Group – B)

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*

Part – A

Answer *Question No. 1* and *any two* from the rest

1. Briefly justify whether the following statements are *True* or *False* (any five) : 2×5
- (a) Air lift bioreactors are known as pneumatic reactors.
 - (b) Citric acid is an example of secondary metabolite.
 - (c) Anaerobic microorganisms usually do not have superoxide dismutase and catalase.
 - (d) Skimmed milk is a good example of cryoprotective agent.
 - (e) Continuous culture is more prone to contamination than batch culture.
 - (f) Wild type *Saccharomyces cerevisiae* can be used to produce industrially high yields of alcohol.
 - (g) The carbon to nitrogen ratio of the media can influence the yield of an antibiotic during fermentative production.
 - (h) Fed-batch is an extension of the batch mode of fermentation.
2. (a) What is an immobilized enzyme ?
- (b) How does it differ from immobilized cells ?
- (c) Discuss the role of immobilized enzymes in industrial microbiology citing examples. 2+2+3½
3. (a) State the functions of : 1×3
- (i) Agitators
 - (ii) Baffles
 - (iii) Spargers
- fitted with a stirred tank bioreactor.
- (b) Why some microorganisms are called industrial microorganisms, not all ? 2
- (c) What are the disadvantages of cryopreservation methods ? 2½

[Turn Over]

4. (a) Starch is a large macromolecule present outside the cell. How does it then induce α -amylase production in cells present in starch containing medium ?
- (b) Mention one bacterial and one fungal strain used for industrial production of α -amylase. Add a note on the uses of α -amylase in industries.
- (c) How would you purify α -amylase present in the broth ? $2\frac{1}{2}+(2+1)+2$
5. Write short notes on (**any three**) : $2\frac{1}{2}\times 3$
- Cryopreservation
 - Aeration system of bioreactors
 - Whey as substrate for ethanol production
 - Strains used for industrial production of Lysine
 - Rotary vacuum filters.

Part - B

Answer **Question No. 6** and **any two** from the rest

6. Briefly justify whether the following statements are **True** or **False** (**any five**) : 2×5
- Alkaline phosphatase treatment of both the insert as well as the vector, improves efficiency of cloning.
 - RFLP can be done with only a single primer.
 - Human insulin expressed in recombinant bacteria is biologically inactive.
 - For directional cloning, sticky end ligation is preferred over blunt end ligation.
 - Transformation of *Bacillus subtilis* with plasmid DNA is more efficient than chromosomal transformation.
 - Cells that contain plasmid p^{BR325} with inserted Sequences can be identified easily.
 - Strong promoters are required for the construction of expression vectors.
 - Colony hybridization is a technique that can be used to detect the presence of a specific DNA sequence in a cell.
7. (a) Explain the functions of 2×3
- Type II restriction enzymes
 - E coli* DNA Ligase
 - Polynucleotide Kinase.
- (b) What is reporter gene ? $1\frac{1}{2}$

