'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 5th Semester Examination, 2023

CC11-MICROBIOLOGY

INDUSTRIAL MICROBIOLOGY

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.

1. Answer any ***five*** of the following: 1×5 = 5

   (a) Define lyophilization.
   (b) State the difference between solid-state and submerged fermentations.
   (c) Name a microbial strain producing Vitamin B12.
   (d) What is the function of a sparger?
   (e) What is spray drying?
   (f) What is sulphite waste liquor?
   (g) Name one microorganism used in the production of protease.
   (h) What is ale?

2. Answer any ***three*** of the following: 5×3 = 15

   (a) Discuss about the measurement and control of pH and foaming during fermentation. $2\frac{1}{2}+2\frac{1}{2}$
   (b) Write down the process of isolation and maintenance of an industrially important microbes. 2+3
   (c) Write a note on advantages and disadvantages of enzyme immobilization.
   (d) How does solvent extraction used during down-stream processing?
   (e) With the help of a suitable flowchart describe the microbial production of citric acid.

3. Answer any ***two*** of the following: 10×2 = 20

   (a) What is alginate? How is it used for enzyme immobilization? Write a note on applications of immobilization. 2+4+4
   (b) With a flowchart, describe the production of a protease. Also mention the applications of proteases. 7+3
   (c) Discuss the composition of media, fermentation conditions, downstream processing of penicillin. Name two industrially important micro-organisms used for the production of lipases. 8+2
   (d) With a labelled diagram, describe the construction of an aerobic fermenter. State the limitations and advantages of stirred tank bioreactor. 7+3

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