

M.Sc. (Biotechnology) (NEP Pattern) Semester-II  
**NEP-99-1 / 02MSCBT04.1 - Elective : Industrial Biotechnology**

P. Pages : 1

Time : Three Hours



**GUG/S/25/15336**

Max. Marks : 80

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- Notes : 1. All questions are compulsory and carry equal marks.  
2. Draw well labeled diagrams wherever necessary.

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|-----------|---|-----------|
| <b>1.</b> | Describe in detail about batch and continuous fermenters.                           | <b>16</b> |
| <b>OR</b> |   |           |
|           | i) Discuss in detail geometry of fermenter.   | <b>8</b>  |
|           | i) Describe in detail general layout of fermentation unit.                          | <b>8</b>  |
| <b>2.</b> | Describe in detail Up-stream processes of fermentation.                             | <b>16</b> |
| <b>OR</b> |   |           |
|           | i) Give the account of Inoculum build up.   | <b>8</b>  |
|           | ii) Discuss in detail aeration and agitation in bioreactor.                         | <b>8</b>  |
| <b>3.</b> | Describe in details ion exchange chromatographic techniques for product separation. | <b>16</b> |
| <b>OR</b> |   |           |
|           | i) Give the account of membrane filtration technique.                               | <b>8</b>  |
|           | ii) Discuss reverse osmosis process for product recovery.                           | <b>8</b>  |
| <b>4.</b> | Describe in detail about industrial production of vitamin B-12.                     | <b>16</b> |
| <b>OR</b> |   |           |
|           | i) Discuss in detail about Immobilization of enzyme.                                | <b>8</b>  |
|           | ii) Give the account of lyophilization.   | <b>8</b>  |
| <b>5.</b> | All questions are compulsory.   |           |
|           | i) Describe rotator disc-reactors.  | <b>4</b>  |
|           | ii) Write a note on Reynold number.   | <b>4</b>  |
|           | iii) Explain bio separation process.  | <b>4</b>  |
|           | iv) Discuss biosensors.   | <b>4</b>  |

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