



45698

**BRAINWARE UNIVERSITY****Term End Examination 2025-2026****Programme – M.Sc.(MB)-2025****Course Name – Industrial Fermentation****Course Code - MMB27506 (T)****(Semester II)****Full Marks : 40****Time : 2:0 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A**(Multiple Choice Type Question)****1 x 10=10**

1. Choose the correct alternative from the following :

- (i) Mechanical agitation is required only in _____
a) Packed bed
b) Airlift reactor
c) Stirred tank
d) Bubble column
- (ii) Select the organism who can not produce secondary metabolites.
a) Filamentous fungi
b) Filamentous bacteria
c) Sporing bacteria
d) Enterobacteria
- (iii) Identify that is not used as nitrogen source in Bioprocess Technology
a) Waste liquor
b) Corn steep
c) Yeast extract
d) Peptone
- (iv) Employ the operational condition of a biochemical plant _____
a) Metallic catalyst
b) Chemical catalyst
c) Elevated temperature
d) Non-pathologic state of the organism
- (v) Choose from the following that is an example of a feedback control strategy in bioprocessing
a) Feedforward control
b) Open-loop control
c) On-off control
d) Cascade control
- (vi) Identify the correct answer, The exponential phase may be described by the equation _____
a) $dx/dt = \mu x$
b) $dt/dx = \mu$
c) $dx/dt = \mu t$
d) $dx^2/dt^2 = \mu$
- (vii) Classify The Batch culture is a/an _____ culture system.
a) Open
b) Closed
c) solated
d) semi-closed
- (viii) Select from the following, medium used for culturing should not _____
a) Be sterilized
b) Be cheap and readily available
c) Contain desired products
d) Allow high yield of undesired products

- (ix) Choose the correct sparger to provide air bubble stream for single open or partially-closed pipe.
- | | |
|-----------------------|--------------------|
| a) Perforated sparger | b) Orifice sparger |
| c) Nozzle sparger | d) Porous sparger |
- (x) Select the proper name for bioethanol that is "denatured alcohol" _____
- | | |
|----------------------|-------------|
| a) methylene | b) ethylene |
| c) methylated spirit | d) beer |

Group-B

(Short Answer Type Questions)

3 x 5=15

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| 2. Explain the lyophilization and vacuum drying technique | (3) |
| 3. Describe the participation of bioprocess engineers in developing biopharmaceuticals | (3) |
| 4. Explain how enzyme immobilization happens through covalent binding | (3) |
| 5. Evaluate the role of chromatography in protein purification? | (3) |
| 6. Illustrate the role of lactic acid bacteria (LAB) in the microbial production of lactic acid. | (3) |

OR

Explain the concept of single-cell protein (SCP) production and its potential benefits. (3)

Group-C

(Long Answer Type Questions)

5 x 3=15

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|---|-----|
| 7. Employed a different type of filtration methods used for sterilization? | (5) |
| 8. Explain the production of ethanol by <i>Saccharomyces cerevisiae</i> on large scale. | (5) |
| 9. Describe the steps involved in oxygen transfer from air to cell during fermentation? | (5) |

OR

Prioritize the consequence of Specific Variables for Oxygen Mass Transfer in Bubble Column Bioreactors (5)
