



BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – M.Sc.(MB)-2023

Course Name – Industrial Microbiology

Course Code - MMBC302

(Semester III)

Full Marks : 60

Time : 2:30 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 15=15

1. Choose the correct alternative from the following :

- (i) Identify which of the following is a cellulosic raw material used for fermentation medium.
 - a) Sugarcane molasses
 - b) Potatoes
 - c) Wood molasses
 - d) Corn steep Liquor
- (ii) The lowest temperature at which associated microbes get killed within 10 mins is the
 - a) Thermal death time
 - b) Decimal reduction time
 - c) Thermal death point
 - d) Z value
- (iii) in a batch fermenter, pH control is achieved by
 - a) A water jacket
 - b) An autotitrator
 - c) An impeller
 - d) A blade
- (iv) The fermentation media is generally
 - a) Sourced from byproducts or waste products of other industries
 - b) Of laboratory grade to be suitable for fermentation
 - c) Not readily available in the market and therefore influences overall cost of production
 - d) Devoid of carbon and Nitrogen sources
- (v) Define Aspect ratio
 - a) height to diameter ratio of bioreactor
 - b) diameter to height ratio of bioreactor
 - c) height to radius ratio of bioreactor
 - d) radius to height ratio of bioreactor
- (vi) A test tube contains 9ml distilled water. 1g of soil is added to that test tube and the soil is allowed to settle down. Now, 1ml of that stock solution is taken and transferred to the 2nd test tube containing 9ml of distilled water. The process is repeated several times until the requirement is met. For this dilution, it may be said that the solution was diluted
 - a) 100-fold
 - b) 10-fold
 - c) 1000-fold
 - d) 2-fold

- (vii) Microorganisms isolated in the primary screening are critically evaluated in the secondary screening so that
- To determine the product produced by an organism is a new compound or not.
 - A determination should be made about the yield potentialities of various isolated microorganisms those are detected in primary screening for that new compound.
 - Both 1 and 2
 - None of these
- (viii) Select the phase of the microorganism in which it adapts to the new environment.
- Lag phase
 - Death phase
 - Exponential phase
 - Stationary phase
- (ix) Identify the best option to define Submerged fermentation
- Fermentation on semi-solid media
 - Fermentation on liquid media
 - Fermentation on semi-solid surface
 - Fermentation on solid media
- (x) Mixed cultures can be maintained using chemostat cultures in
- Fed-Batch culture
 - Semi-Batch culture
 - Batch culture
 - Continuous culture
- (xi) Yoghurt contains which of the following?
- Non viable microbe
 - Viable microbe
 - Heat attenuated microbe
 - None of these
- (xii) SmF and SSF is compared on the basis of
- substrate requirement
 - organism used
 - time requirement
 - All of them
- (xiii) State which of the following is not a probiotic?
- Fungi
 - Saccharomyces cerevisiae
 - Escherichia coli
 - Lactobacillus
- (xiv) The culture medium should not
- Be sterilized
 - Be cheap and readily available
 - Contain desired products
 - Allow high yield of undesired products
- (xv) Choose the type of fermenter that is mainly used for mixing
- Air-lift fermentor
 - Stirred tank fermentor
 - Bubble tank fermentor
 - Fluidised bed reactor

Group-B

(Short Answer Type Questions)

3 x 5=15

- Identify the various types of cellulosic and starchy materials for fermentation (3)
- Indicate the methods, applications and advantages of chemicals used for sterilization in fermentation. (3)
- Compare the economic implications of producing bioethanol from lignocellulosic biomass to traditional starch sources like corn. (3)
- Analyze the differences between the biochemical pathways of alcoholic fermentation and lactic acid fermentation. (3)
- Explain the various steps required for the production of antibiotics (3)

OR

Justify the term "Microbial Enhanced Oil Recovery" (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

- Correlate the possible environmental advantages of employing immobilized microorganisms in bioremediation techniques to clean up contaminated soil and water. In (5)

what ways might immobilization improve the sustainability and efficiency of bioremediation processes?

8. Write briefly about the applications of a solid-state fermentation or the products that can be developed by using it. (5)
9. Summarize the difference between upstream and downstream bioprocessing technology. (5)
10. Summarize in details the common types of industrial effluent treatment techniques (5)
11. Justify auxanographic technique as a detecting tool for microbial growth factors. (5)
12. Distinguish between primary and secondary screening (5)

OR

Explain the various secondary screening techniques and illustrate with diagrams where necessary. (5)

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