

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Sixth Semester)

Branch – MICROBIOLOGY

INDUSTRIAL MICROBIOLOGY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 Which technique is primarily used for the isolation of industrially important microorganisms from natural sources?
(i) Polymerase chain reaction (ii) Electrophoresis
(iii) Fermentation (iv) Enrichment culture
- 2 In a membrane bioreactor, what is the primary function of the membrane?
(i) To control the temperature inside the fermentor
(ii) To prevent contamination from entering the system
(iii) To facilitate the exchange of gases between the culture medium and the environment
(iv) To separate biomass from the liquid culture medium
- 3 Choose the parameter which is used for determining the flow regime inside a fermenter during stirring and mixing processes?
(i) Temperature gradient (ii) Pressure differential
(iii) Reynold's number (iv) pH level
- 4 Liquid-liquid extraction is most suitable for separating:
(i) High molecular weight products (ii) Intracellular products
(iii) Low molecular weight products (iv) Extracellular products
- 5 Glutamic and aspartic acid are primarily produced through which fermentation process?
(i) Solid state fermentation (ii) Submerged fermentation
(iii) Continuous fermentation (iv) Batch fermentation

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a Summarize the primary and secondary techniques used for isolating industrially significant microorganisms.
OR
b Explain auxotrophic mutants, and how can they help make microorganisms better for industrial use?
- 7 a Highlight the importance of the agitator and aeration system in a fermentor.
OR
b Describe the advantages and disadvantages of using membrane bioreactors compared to traditional fermentors like tower and airlift fermenters.
- 8 a State Reynold's and Fraude's numbers, and how do they relate to turbulent and laminar flow.
OR
b Outline the steps involved in formulating and sterilizing fermentation media.

Cont...

- 9 a Explain in simple terms physical, chemical and biological methods of downstream Process. Give examples for each.
OR
b Describe rotary drum evaporator, and how does it help us get pure substances?
- 10 a Narrate the concept of Solid State Fermentation (SSF) and its significance in various industries.
OR
b Highlight the significance of beta-lactam antibiotics in treating bacterial infections.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Elaborate on the concept of strain improvement. What criteria are used to evaluate the success of strain improvement efforts?
OR
b Infer how feedback inhibition differ from repression in the context of genetic regulation and cellular signaling pathways.
- 12 a Point out the critical factors involved in designing a fermentor to maintain aseptic conditions.
OR
b Examine the significance of stirrer glands and bearings in maintaining aseptic conditions. How do they seal the openings of the bioreactor?
- 13 a Elaborate on the essential components of a growth medium for microbial fermentation.
OR
b Differentiate between Newtonian and Non-Newtonian fluids based on their viscosity behavior. Provide examples of each type.
- 14 a Elucidate the principles behind the extraction and purification of intracellular and extracellular products. How do these processes contribute to obtaining high-purity bio-products?
OR
b Highlight the significance of rotary evaporator and explain its purpose in scientific and industrial applications.
- 15 a Schematically represent the key steps involved in the production of beer with a neat sketch.
OR
b Outline the biochemical basis of citric acid production. How is citric acid used in various industries?

Z-Z-Z

END