

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2023  
(Fifth Semester)

Branch – BIOTECHNOLOGY

DISCIPLINE SPECIFIC ELECTIVE – I :

INDUSTRIAL AND MICROBIAL TECHNOLOGY

Time: Three Hours

Maximum: 50 Marks

**SECTION-A (5 Marks)**

Answer ALL questions

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

1. Identify the method which uses liquid nitrogen for the preservation of microbes?  
(i) Lyophilization (ii) Cryopreservation  
(iii) Dry soil (iv) Agar slant with mineral oil
2. Name the method that measure the microbial growth in terms of turbidity?  
(i) Chemostat (ii) Turbidostat  
(iii) Batch culture (iv) Continuous culture
3. Indicate the chromatography method that separates the biomolecules based on its specific interaction with the ligands?  
(i) Gel filtration (ii) Ion exchange  
(iii) HPLC (iv) Affinity
4. Identify the fungi that can be used to produce penicillin?  
(i) *Penicillium chrysogenum* (ii) *Penicillium roqueforti*  
(iii) *Bacillus subtilis* (iv) *Streptomyces griseus*
5. Which fungi can be used for the production of wine?  
(i) *Saccharomyces cerevisiae* (ii) *Bacillus subtilis*  
(iii) *Gibberella fujikorai* (iv) *Penicillium roqueforti*

**SECTION - B (15 Marks)**

Answer ALL Questions

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

6. a. Explain the hydrodynamics and types of Air Lift Fermenter.  
OR  
b. Describe any two methods which you prefer for the preservation and storage of industrial microbes.
7. a. Sketch the growth kinetics of bacteria.  
OR  
b. Summarize the methodologies that can be employed for the design of media.
8. a. Sketch the process of removing solid materials and microbial cells from the fermented broth.  
OR  
b. Outline the importance of quality assurance and compliance.

Cont...

- 9 a. Explain the strategies that you shall follow for the maximum production of penicillin antibiotic using submerged fermentation.

OR

- b. State your strategy for the maximum production of amylase enzyme using bacteria.

- 10 a. Outline the methodology needed for the production of cheese.

OR

- b. Outline the strategies for the production of Single cell protein.

**SECTION -C (30 Marks)**

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 6 = 30)

- 11 a. Highlight the different parts of Fermenter. Add a note on its functions.

OR

- b. Categorize the different methods that can be used for the genetic improvement of industrial strains.

- 12 a. Batch culture or Continuous culture – Point out which method is suitable for the production of secondary metabolites? and Justify your selection.

OR

- b. Compare the substrate utilization mechanisms in both Batch and Fed-Batch culture.

- 13 a. Imagine you are instructed to isolate and purify the extracellular products secreted by the bacteria. Examine the methodologies that are needed for the successful extraction and purification of products.

OR

- b. Discuss the utilization of various chromatography techniques in the purification of intracellular products.

- 14 a. Summarize the strategies needed for the successful production of Lactic acid using *Lactobacillus*.

OR

- b. How will you solve the unnecessary synthesis of byproducts during the production of ethanol? Elucidate your strategies in curbing the byproducts and maximizing ethanol production using yeast.

- 15 a. Outline the methodology that are utilized for the production of bread. Add a note on bread improvers.

OR

- b. Discuss the process that depicts the brewing of beer. List the ingredients that are needed for its production.

Z-Z-Z

END