

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2023
(Second Semester)

Branch- BIOTECHNOLOGY

DISCIPLINE SPECIFIC ELECTIVE- I: BIOPROCESS TECHNOLOGY

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

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

1. Choose the process that requires optimization of many parameters like heat transfer, mixing, aeration mass transfer of substrates and products as they influence the culture and production.
(i) Bench scale (ii) Lab scale. (iii) Maxi Scale (iv) Scale up
2. Identify the static principles used to control flow rate in continuous stirred tank bioreactors to maintain a steady state condition.
(i) Bio static (ii) Chemo static (iii) Di static. (iv) Flexi static
3. Name the amino acid produced by dual fermentation using two different microorganisms an auxotrophic mutant of *E. coli* in the first half of the fermentation and wild type or prototrophic *E. coli* or *Aerobacter aerogenes* in the second half of the fermentation where diaminopimelic acid is converted to desired amino acid.
(i) Alanine (ii) Glutamic acid . (iii) Lysine. (iv) Tryptophan
4. State the class of antibiotic puromycin obtained from the actinomycete *Streptomyces alboniger* that displays antibacterial activity.
(i) Amino acid (ii) Nucleoside. (iii) Peptide (iv) Sugar
5. Specify the biofertilizer rhizobium bacteria type that is commercially used as microbial inoculants to increase Nitrogen, phosphorus and growth of plants.
(i) Gram Negative (ii) Gram Positive.. (iii) Spirallar (iv) Vibrio

SECTION - B (15 Marks)

Answer ALL Questions

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

6. a. Explain the concept of fermentor and bioreactor design.
(or)
b. Illustrate stoichiometric calculation of C: N ratio and mention its significance in media formulation.
7. a. Differentiate batch, fed batch and continuous process of fermentation.
(or)
b. Narrate the methods of fermentation product stabilization, formulation and storage.
8. a. Explain the methods for production of Vit B2 and B12 and mention their uses.
(or)
b. How are PHB and Bioplastics produced and give note on their application.
9. a. Evaluate the microbial production of peptide antibiotics and nucleoside antibiotics.
(or)
b. Discuss the production of milk products, cheese and yogurt.

Cont...

10.a. State the significance of enzymes in medical and analytical methods.

(or)

b. What are bio fertilizer and write a case study on formulation of rhizobium?

SECTION -C (30 Marks)

Answer ALL questions

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

11. a. Elaborate on process optimization by mass, heat transfer turbidostatic and chemo static control.

(or)

b. Summarize the different strain development methods and give a note on preservation of microorganisms.

12. a. Elucidate the kinetics of batch, fed batch, continuous and death and give note on their significance.

(or)

b. Explain downstream processing removal of microbial cell, solid matters and foam separation. Write note on separation by precipitation, drying and centrifugation.

13. a. Discuss microbial production of organic acids, citric acid, succinic and lactic acid by fermentation and give note on their uses.

(or)

b. Enumerate the production of amino acids glutamic acid, lysine and tryptophan by bioprocess technology.

14 a. Summarize the production of microbial enzymes, pectinases, lipases and lactases and give their applications.

(or)

b. Plan microbial production of antibiotics penicillin cephalosporin and give note on their significance.

15 a. Design immobilization process of enzymes as in industrial process and give the application of immobilized enzymes.

(or)

b. Develop the logistics for a MSME project for product development, establishing and marketing strategy .

Z-Z-Z

END