



Register Number:

DATE:

**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27**  
**M.Sc MICROBIOLOGY- III SEMESTER**  
**SEMESTER EXAMINATION- OCTOBER 2019.**  
**MB 9318- INDUSTRIAL MICROBIOLOGY**

**Time: 2 ½ hrs**

**Max Marks: 70**

This question paper has **2** printed pages and **4** parts.

**I. Answer any Five of the following questions:**

**5X3 =15**

1. Draw a labeled diagram of an Air Lift fermenter.
2. Name the types of industrial centrifuges.
3. List three substrates used for solid state fermentation and the products recovered using them.
4. List the applications of protoplast fusion.
5. What is reverse osmosis; state its importance in product recovery.
6. Name the microbes that are used for the production of the following:  
i) Protease                      ii) Citric acid                      iii) Xanthan gum
7. Draw the Rheogram of Newtonian and Pseudoplastic fluids giving an example of each fluid.

**II. Answer any Five of the following questions:**

**5x5= 25**

8. Explain the importance of recombinant DNA technology in strain improvement strategies, stating an example of a recombinant product.
9. What are the mechanisms involved in media and air sterilization?
10. List any two monitoring and control devices used in a fermentation industry and explain the principle involved.
11. What is volumetric mass transfer coefficient? What are the factors that affect it?
12. What are the advantages of continuous sterilization over batch sterilization?
13. Explain the production of Cobalamin.
14. Write notes on : i) Fluidized bed fermenter    ii) Photo bioreactor

**III. Answer any Two of the following questions:**

**2x10 =20**

15. a. Discuss the mechanisms involved in improving the levels of end products of a branched pathway. **5m**  
b. Discuss how cell permeability and modification of metabolic pathway improved Glutamic acid production. **5m**
16. Explain the detailed process in the industrial production of Penicillin.

17. Explain any three chromatographic techniques that help in the product recovery process.

**IV. Answer the following:**

**1x10 = 10**

- 18. a.** A polymer of a phenolic compound finds wide array of applications in the cosmetic industry. It has an amino acid as a precursor, name this polymer. List its Types and the process involved in its industrial production. **6m**
- b.** Schematically illustrate the design for inoculation of inoculum from seed tank to fermenter indicating sterilization and control points. **4m**