

**Master in Pharmacy 1<sup>st</sup> Year 1<sup>st</sup> Semester Examination 2024**

**Subject: Bioprocess Engineering and Technology (MPB 103T)**

Time: 3Hrs.

Full Marks: 75

Answer any FIVE questions

1. Write the different criteria for fermenter scale-up. Write the advantages and shortcomings of enzyme immobilization. Classify different enzyme immobilization processes (with chart) [4+5+6]=15
2. What are the major steps of enzyme purification from fermentation broth? What are the different types of chromatographic processes? Write short note on salting out process in enzyme purification. [5+5+5]=15
3. Write a note on benzyl penicillin.  
Define strain improvement with its significance. [5+10]=15
4. What are the different resistances that act during oxygen transfer in fermentation broth? What are the different methods for cell disruption? Purification of extra-cellular enzymes is easier than intracellular enzyme – justify. [6+6+3]=15
5. Briefly describe the importance of rheological properties in bioprocessing. Define viscosity and write its unit. Classify fluids based on their viscous properties (with the figure). [6+2+7]=15
6. (a) What are scaling criterion of fermenter?  
(b) Considered the scale-up of fermentation from 10L to 10,000L vessel. The small fermenter has a height-to-diameter ratio of 3. The impeller diameter is 30% of the tank diameter. Agitator speed is 500 rpm and three Ruston impellers are used. Determine the dimensions of the large fermenter and agitator speed for (i) constant P/V, (ii) constant impeller tip speed, (iii) constant Reynolds number. [5+10] =15
7. Answer the following:
  - (a) Therapeutic importance of Clavulanic acid.
  - (b) What is 6APA? Write its pharmaceutical importance.
  - (c) Why cancer therapy is called chemotherapy? Explain. [5+5+5] =15