

II B.Tech I Semester (R09) Supplementary May 2012 Examinations
FLUID FLOW IN BIOPROCESSES
(Biotechnology)

Time: 3 hours**Max. Marks: 70**

Answer any FIVE questions
All questions carry equal marks

1. (a) Define unit operations and processes. Give examples for each.
(b) Give applications of transport phenomena principles in bioprocessing.
2. (a) List various equations of state to evaluate P, V, T data.
(b) Calculate the volume in cubic meters occupied by 40 kg of CO₂ at standard conditions.
3. Derive Bernoulli's equation stating the assumptions clearly. Give its applications.
4. State Newton's law of viscosity explaining the nomenclature. How are fluids classified based in Newton's law of viscosity?
5. (a) Define Reynolds number. How fluid flow is classified using Reynolds number.
(b) Draw the schematic of friction chart and explain the salient features.
6. Derive friction factor equation and pressure drop expression for fluid flow through bed of solids. State the assumptions made.
7. What is a manometer? Discuss any three types of manometers with the help of schematic diagrams.
8. (a) Discuss classifications of pumps.
(b) Write about the criteria for selection of pumps for a particular service.
