

Code :9A23303

R9

II B.Tech I Semester(R09) Supplementary Examinations, May 2011
FLUID FLOW IN BIOPROCESSES
(Biotechnology)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

1. (a) Differentiate unit operations and processes.
(b) Give applications of momentum transfer in bio processing.
2. (a) What is an ideal gas ? State ideal gas law explaining the nomenclature. Give the conditions of applicability of ideal gas law.
(b) Calculate the volume of 15kg of chlorine at a pressure of 0.9 Bar and 293K.
3. Derive Bernoulli's equation, stating the assumptions clearly.
4. (a) Give classification of non-newtonian fluids with examples in bioprocessing.
(b) Discuss the construction and working of any two types of viscometers.
5. (a) Write about boundary layer concept with the help of schematic diagrams.
(b) Differentiate skin friction and form frictions. How is pressure drop calculated in both the cases?
6. (a) Derive drag and drag coefficient. Write the relevant equations to find drag and drag coefficient with symbols neatly explained.
(b) Discuss flow of fluids through packed beds.
7. (a) What is a valve ? Discuss the different kinds of valves available for bio processing industries.
(b) What is a venturimeter ? Explain its working principle and construction with the help of a schematic diagram.
8. (a) Write about positive displacement pumps.
(b) How do you calculate pump horse power?
