

Code: R7102306

R07

B. Tech I Year (R07) Supplementary Examinations, December 2012

**PROCESS ENGINEERING PRINCIPLES**

(Biotechnology)

Time: 3 hours

Max. Marks: 80

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Differentiate between unit operations and unit processes. Give examples from biotechnology.  
(b) Discuss the applications of momentum transfer in bioprocessing.
- 2 Discuss about various equations of states available to evaluate PVT data.
- 3 (a) Define the terms:  
(i) Fluid  
(ii) Fluid statics  
(iii) Fluid dynamics  
(b) Derive "Bernoulli's equation".
- 4 What is Newton's law of viscosity? Explain about Newtonian and non-Newtonian fluids with examples.
- 5 (a) Define:  
(i) Reynolds number (ii) Friction factor  
(iii) Skin friction (iv) Form friction  
(b) A fluid with viscosity 18.3 CP density 1.32 g/cm<sup>3</sup> is flowing in a horizontal tube of radius 0.21 inches. For what pressure gradient will the flow become turbulent?
- 6 (a) Define the terms 'drag' and 'drag coefficient'.  
(b) Discuss about 'packed beds'.
- 7 Describe 'venturimeter' with a neat diagram.
- 8 Discuss about different types of pumps and give their application.

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