Code :R7102306

R7

B.Tech I Year (R07) Supplementary Examinations, December 2010
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) Explain the following terms:
   i. Steady state process
   ii. Solute
   iii. Rate of a process
   (b) Distinguish between the unit processes: isomerisation and reduction.

2. (a) What is gravitational force constant (gc) explain its significance with the FPS units and dimensions.
   (b) Define dyne and gram wt. How are they related? What are the dimensions and units of this conversion factor.

3. (a) What is incompressible fluid?
   (b) With the help of a line sketch describe a simple inclined manometer.
   (c) Show that in a simple straight tube manometer : Δ P = R_m (ρ_A - ρ_B) Where Δ P is the pressure difference; R_m is the vertical level diffence of liquid in the manometer; ρ_A and ρ_B are the densities of the manometric fluid and fluid flowing respectively.

4. (a) Distniguish between Newtonian and non Newtonian fluids by their shear stress shear rate behaviour. Illustrate with sketches.
   (b) State any two 2 parameter models for describing a non Newtonian fluid. Briefly write on Bingham fluid.

5. A standard 1 inch-sch-40 horizontal steel pipe is used to conduct chlorine gas. The gas enters the pipe through a rounded entrance at a pressure of 6 atm abs, a temperature of 120^{0}C and a velocity of 35m/s.
   (a) What is the maximum possible length of the pipe.
   (b) What are the pressure and stagnation temperature of the gas at the end of the pipe at maximum length? For Cl_2 Υ = 1.36 and M= 70.19.

6. Derive Ergun equation and give its significance.

7. What are the different types of valves? Explain them in brief.

8. (a) Write a short notes on NPSH.
   (b) Write a short notes on pump priming.
   (c) Write the affinity laws for pumps.

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