Code: R7102306

R07

B. Tech I Year (R07) Supplementary Examinations, June 2013
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 development of boundary layer on a flat plate.
   (b) Distinguish between laminar and turbulent flow.

2 (a) What is the difference between the two types of forces using kgwt and Newton?
   (b) What is the difference between C_P and C_V of gases? How they are related?

3 (a) Enumerate Newton's law of viscosity giving a neat sketch.
   (b) With the help of a neat sketch describe a simple inclined manometer.

4 (a) State the differences between Newton and non-Newton fluids with relevant examples in bioprocessing.
   (b) Explain about coaxial cylinder viscometer.

5 (a) Draw a neat sketch of peristaltic pump and explain its construction.
   (b) Explain about working principle of peristaltic pump.

6   A gas tight room has a volume 1000 m^3. The room contains air considered to be 21% O_2 and 79% N_2 (by mole) at 20^0C and a total pressure of 1 atm.
   (a) What is the partial volume of O_2 in the room?
   (b) What is the partial volume of N_2 in the room?
   (c) What is the partial pressure of O_2 and N_2 in the room?

7 (a) With a neat diagram explain about rotameter.
   (b) Differentiate between orifice meter and venturimeter.

8 (a) Derive the equation for the terminal setting velocity for a spherical particle in the Stoke's law region under free setting conditions range.
   (b) Explain the stuffing box and mechanical seal.

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