

SE (Biotech) - III (CBGS)  
Unit operation - I

09/7/14

24

Code : NP-18773

(3 Hours)

Total Marks : 80

- N.B. :** (1) Question No.1 is compulsory.  
(2) Attempt **any three** questions from remaining **five** questions.  
(3) Assume suitable data wherever necessary.

1. Answer the following (any four) 20
  - (a) Explain capacity and effectiveness of screen.
  - (b) Apply the principle of conservation of mass to the flow of incompressible fluid to derive the relevant form of continuity equation.
  - (c) Give various temperature measuring devices.
  - (d) State Bond's law for size reduction and give its equation.
  - (e) Give the important factors on which rate of filtration depend.
  
2. (a) Water is flowing through a pipe having diameter 30cm and 15cm at the bottom and upper portion respectively. The intensity of pressure at the bottom end is 29.43 N/cm<sup>2</sup> and the pressure at upper end is 14.715 N/cm<sup>2</sup>. Determine the difference in datum head if the rate of flow through pipe is 50 lit/sec. 10  
(b) Describe the principle, construction, working and applications of venturimeter. 10
  
3. (a) Differentiate between crushing and grinding. 6  
(b) Calculate the operating speed of the ball mill from following data 8
  - (i) Diameter of ball mill = 500 mm
  - (ii) Diameter of ball = 50 mm

Operating speed of ball mill is 35% of critical speed.
- (c) Compare ideal screen and actual screen. 6
  
4. (a) Give the classification of pump? Explain construction and working of centrifugal pump. 10  
(b) Explain pneumatic conveyor with neat diagram. 5  
(c) Explain Helical blade mixers. 5
  
5. (a) Explain constant rate and constant pressure filtration. 10  
(b) State Newton's law of viscosity? What is kinematic viscosity? Find the kinematic viscosity of an oil having density 960kg/m<sup>3</sup>. The shear stress at a point in oil is 0.25 N/m<sup>2</sup> and velocity gradient at that point is 0.25s<sup>-1</sup>. 10
  
6. Write short notes on (any four) 20
  - (a) Piezometer
  - (b) Blowers
  - (c) Knife Cutter
  - (d) Pitot Tube
  - (e) Orifice Meter.

**Con. 13523-14.**