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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Food Technology) (2018 Batch) (Sem.-3)

FLUID FLOW OPERATIONS AND RHEOLOGY

Subject Code : BTFT-304

M.Code : 76992

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**Write briefly :**

1. Define Dynamic Viscosity. Convert 1 kg/s-m dynamic viscosity in poise.
2. Differentiate between specific weight and specific volume of a fluid.
3. Differentiate between absolute pressure and gauge pressure.
4. State the assumptions made in the derivation of Bernoulli's equation.
5. What is Viscous Flow?
6. What are major energy losses in pipes? Mention one formula to calculate these losses.
7. Enlist various methods of determination of the coefficient of viscosity of a liquid.
8. What are Herchel-Bulkley fluids? Give examples.
9. Differentiate between adhesiveness and springiness.
10. Define Stokes law.

SECTION-B

11. What is Manometer? Give classification of manometers. Distinguish between U tube manometer and single column manometer. Explain the working of anyone.
12. Explain briefly the various heads and forces acting on a flowing fluid. Also give a brief discussion on equations of motion.

13. What is a Pump? Explain the construction and working of a single stage centrifugal pump with line diagrams.
14. To determine the flow of water a horizontal venturimeter having inlet and throat diameters 20 cm and 10 cm respectively is used. The differential manometer connected to the inlet and throat shows a reading of 20 cm of mercury. Assuming $C_d = 0.98$, what will be the flow rate of water?
15. Oil of absolute viscosity 0.15 Ns/m^2 and specific gravity 0.85 flows through a pipe of diameter 0.3 m. If the head loss in 3000 m length of pipe is 20 m and the flow is laminar, then find :
 - a) The velocity of flow through the pipe
 - b) Reynolds number
 - c) Fanning friction factor
 - d) Darcy friction factor.

SECTION-C

16. Explains the generalized equation for the visco-elastic material. What is significance of plasticity of visco-elastic material? Differentiate between shear thinning and shear thickening fluids. Explain with suitable examples.
17.
 - a) Explain Capillary Tube Viscometer with a neat sketch. Also derive an expression for the coefficient of viscosity measured by it.
 - b) A capillary tube viscometer of diameter 40 mm is used to measure the viscosity of an oil of specific gravity 0.9. The difference of pressure head between two points 1.4 m apart is 0.4 m of water. If the mass of oil collected in a measuring tank is 50 kg in 100 seconds, then determine the viscosity of the oil.
18.
 - a) Describe the factors affecting the rheological parameters.
 - b) A pipe 1 m in diameter carrying water at a velocity of 4 m/s is branched into two pipes. The first branch is 0.6 m in diameter and it carries one-third of the water flow. If water flows in the second branch with a velocity of 3 m/s, then determine the flow velocity in the first branch pipe and the diameter of the second branch.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.