Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Automation & Robotics) (2018 Batch) (Sem.–3)

FLUID MECHANICS AND FLUID MACHINES

Subject Code : BTAR-304-18

M.Code : 76503

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 specific volume.
2. Differentiate between dynamic and kinematic viscosity.
3. State Pascal Law.
4. What is specific speed of turbine?
5. What is priming?
6. Define overall efficiency of turbine.
7. What is the difference between model and prototype?
8. What are the various losses occurred in pipes?
9. Name the various problems commonly experienced during operation of centrifugal pumps.
10. What is Thomas Cavitation number?

SECTION-B

11. A pipeline carrying oil of specific gravity 0.87, changes in diameter from 200 mm at a position A to 500 mm diameter at a position B which is 4 metre at a high level. If the pressure at A and B are 9.81 N/cm^2 and 5.886 N/cm^2 respectively and the discharge is 200 litres/s, determine the loss of head.

12. The resisting force F of a plane during flight can be considered as dependent upon the length of aircraft, velocity, air viscosity, air density and bulk modulus of air. Express the functionality relationship between these variables and the resisting force using dimensional analysis.

13. Discuss the working of Single acting Reciprocating Pump with diagram.

14. The internal and external diameter of the impeller of a centrifugal are 200 mm and 400 mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20° and 30°. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water.

15. Derive equation to calculate specific speed in turbines.

SECTION-C

16. Derive Darcy Weisbach Equation.

17. The penstock supplies water from a reservoir to the Pelton Wheel with a gross head of 500 m. One third of the gross head is lost in friction in the penstock. The rate of flow of water through the nozzle fitted at the end of the penstock is 2 m/s. The angle of deflection of the jet is 165°. Determine the power given by the water to the runner and also hydraulic efficiency of the Pelton wheel by assuming speed ratio 0.45 and $C_v = 1$.

18. Discuss constant efficiency curves of turbines.

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.