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 Gravity.
2. Define Surface Tension and write its units.
3. State Bernoulli's equation.
4. What is the difference between laminar and turbulent flow?
5. What are the advantages of model testing?
6. What is cavitation in pumps?
7. Define Mechanical Efficiency in turbine.
8. State various losses in pipes.
9. State the function of draft tube in turbines.
10. What is negative slip in reciprocating pump?

SECTION-B

11. The water is flowing through a tapering pipe having diameter 300mm and 150 mm at sections 1 and 2 respectively. The discharge through the pipe is 40 litre/sec. The section 1 is 10m above datum and section 2 is 6m above datum. If pressure at section 1 is 400kN/m^2, find pressure at section 2.

12. Differentiate between Francis turbine and Kaplan turbine.

13. Discuss Buckingham's pi theorem for solving dimensional analysis problem.

14. A Pelton wheel is receiving water from a penstock with a gross head of 510 m. One-third of gross head is lost in friction in the penstock. The rate of flow through the nozzle fitted at the end of the penstock is 2.2 m^3/s. The angle of deflection of the jet is 165 degree. Determine the power given by water to runner by assuming speed ratio 0.45 and coefficient of velocity 1.

15. Derive an expression for specific speed of turbine.

SECTION-C

16. A liquid of viscosity 0.9 poise is filled between two horizontal plates 10 mm apart. If the upper plate is moving at 1m/s with respect to the lower plate which is stationary and the pressure difference between two sections 60 m apart is 60 kN/m^2, determine :

    a) The velocity distribution

    b) The discharge per unit width

    c) The shear stress on the upper plate.

17. Discuss in detail main characteristic and operating characteristic curves of centrifugal pump.

18. Discuss in detail with diagram the working of single acting reciprocating pump.

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.