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Rol	No. Total No. of Pages : 02
Tota	al 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
Tim	e: 3 Hrs. Max. Marks: 60
 INSTRUCTIONS TO CANDIDATES : SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions. SECTION-A SECTION-A SECTION-A 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/m², 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 $2.2 \text{ m}^3/\text{s}$. 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/m², 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.