

Reg. No. :

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 33704

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Third Semester

Mechanical Engineering

01UME304 – FLUID MECHANICS AND MACHINERY

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What do you mean by absolute pressure and gauge pressure?
2. Differentiate between steady and unsteady flow.
3. List the causes of minor energy losses in flow through pipes.
4. Differentiate Orifice meter and venturi meter.
5. Define Reynolds number.
6. List any two dimensionless parameters and their field of application.
7. State the momentum equation. When can it be applied?
8. Define specific speed of a turbine.
9. Why is priming necessary in centrifugal pumps?
10. Write the expression of mean velocity for a single acting reciprocating pump.

PART - B (5 x 16 = 80 Marks)

11. (a) The velocity profile of a viscous fluid over a plate is parabolic with vertex 20 cm from the plate, where the velocity is 120 cm/s. Calculate the velocity gradient and shear stress at a distance of 0, 5 and 15 cm from the plate, given the viscosity of the fluid is 6 poise. (16)

Or

- (b) In a two dimensional incompressible flow the fluid velocities are given by $u = x - 4y$ and $v = -y - 4x$. Show that velocity potential exists and determine its form. Find also the stream function. (16)

12. (a) Derive Bernoulli's equation by considering the motion of fluid elements along the streamline and state the assumptions made in the derivation. (16)

Or

- (b) List out the assumptions involved in Euler's equation of motion. Derive the Bernoulli equation from Euler's equation in the case of incompressible flow. (16)

13. (a) What is similitude? Explain about the types of similarities exist between the model and prototype. (16)

Or

- (b) Explain the step by step procedure for solving dimensional homogeneity using Buckingham π Theorem. (16)

14. (a) Explain in detail about Impulse turbine and Reaction turbine with a sketch. (16)

Or

- (b) (i) What is axial flow turbine? Name the types of axial flow turbine. (4)
(ii) Explain about the axial flow reaction turbine with neat sketch. (8)
(iii) Give the importance points to be remembered for an axial flow turbine. (4)

15. (a) Explain in detail about the Radial flow, axial flow and mixed flow pumps along with the performance calculation. (16)

Or

- (b) (i) The plunger diameter and stroke length of a single-acting reciprocating pump are 300 mm and 500 mm respectively. The speed of the pump is 60 rpm. The diameter and length of delivery pipe are 150 mm and 60 m respectively. If the pump is equipped with an air vessel on the delivery side at the centre line of the pump, find the power saved in overcoming friction in the delivery pipe. Assume Darcy's friction factor as 0.04 and the plunger undergoes a simple harmonic motion. (8)
- (ii) Compare the characteristics of Centrifugal Pump and Reciprocating Pump. (8)

