**Reg. No. :** | | | | | | | | | | |

## Question Paper Code: 33074

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

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. Differentiate between steady and unsteady flow.
2. What is moment of momentum equation?
3. Define boundary layer and give its significance.
4. Differentiate Orifice meter and venturi meter.
5. Define Reynolds number.
6. Define: (i) Euler number (ii) Mach number.
7. Define specific speed of a turbine.
8. What is Cavitation?
9. Why is priming necessary in centrifugal pumps?
10. What is an indicator diagram?

PART - B (5 x 16 = 80 Marks)

11. (a) Discuss the properties of fluids and Types of flow? (16)

Or

(b) The velocity distribution over a plate is given by $u = 2y - y^2$, where $u$ is the velocity in m/sec at a distance of $y$ metre above the plate. Determine the velocity gradient and shear stress at the boundary and 1.5 m from it. Dynamic viscosity of the fluid is 0.9 $Ns/m^2$. (16)

12. (a) Derive Euler's equation and Bernoulli's energy equation. (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) Discuss the various Dimensional Parameters with its application. (16)

Or

(b) Explain the step by step procedure for solving dimensional homogeneity using Buckingham $\pi$ Theorem. (16)

14. (a) A Pelton turbine running at 720 *rpm* uses 300 *kg* of water per second. If the head available is 425 *m*, determine the hydraulic efficiency. The bucket deflects the jet by 165°. Also find the diameter of the runner and jet. Assume $C = 0.97$ and $f = 0.46$, Blade velocity coefficient is 0.9. (16)

Or

(b) Discuss the various performance curves for pumps and turbines. (16)

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

Or

(b) With a neat sketch explain the working of a torque converter. (16)