



R20 Regulation

Subject code:3P4CB

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Autonomous, Accredited by NAAC with 'A' Grade)

**B.Tech IV Semester Regular Examinations, July 2022**

**FLUID MECHANICS AND HYDRAULIC MACHINES**

(Mechanical Engineering)

Maximum Marks: 70

Date:22.07.2022 Duration: 3 hours

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 What is the variation of viscosity with temperature for fluids?
- 2 List the types of manometers.
- 3 Compare steady and unsteady flow.
- 4 Give the applications of Bernoulli's equation.
- 5 State the Darcy-Weisbach equation and specify the terms.
- 6 List the causes of minor energy losses in flow through pipes.
- 7 Define hydraulic efficiency of a turbine.
- 8 Give the expression for specific speed of a turbine.
- 9 What are positive displacement pumps?
- 10 Define Net Positive Suction Head.

Part-B

Answer All the following questions.

(10MX 5=50Marks)

- 11 List and explain the various physical properties of fluids. [10]  
OR
- 12 Discuss the working of a differential manometer with a neat sketch. [10]
- 13 Derive the three dimensional continuity equations in Cartesian coordinate system. Also add a note on the types of fluid flow. [10]  
OR
- 14 State Bernoulli theorem for steady flow of an incompressible fluid and derive the Bernoulli's expression. [10]
- 15 Three pipes of diameters 300 mm, 200 mm and 400 mm and lengths 450 m, 255 m and 315 m respectively are connected in series. The difference in water surface levels in two tanks is 18 m. Determine the rate of flow of water, if coefficients of friction are 0.0075, 0.0078 and 0.0072 respectively considering, (a) Minor losses also and (b) Neglecting minor losses. Sketch HGL and TEL. [10]  
OR
- 16 Explain the boundary layer separation phenomena in detail. Discuss the methods of controlling boundary layer separation with sketches. [10]
- 17 A Pelton wheel has a mean bucket speed of 10 m/s with a jet of water, flowing at the rate of 700 lit/s under a head of 30 m. The buckets deflect the jet through an angle of  $160^\circ$ . Calculate the power given by water to the runner and hydraulic efficiency of turbine. Assume coefficient of velocity as 0.98. [10]  
OR
- 18 Discuss the construction and working of Francis turbine with a sketch. [10]

- 19 Sketch and explain the working of a reciprocating pump with and without an air vessel. [10]
- OR
- 20 Sketch and explain the different types of casing in centrifugal pumps. Draw the pump performance curves. [10]