



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

II B.Tech II Sem Supply End Examination, July 2022 Fluid Mechanics and Hydraulic Machines (MECH)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part - A, answer all questions which carries 20 marks.

3. In Part - B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A**(10*2 Marks = 20 Marks)**

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|-------|--|----|-----|-----|
| 1. a) | Define Kinematic Viscosity of liquid? | 2M | C01 | BL1 |
| b) | Differentiate between Atmospheric pressure and gauge pressure? | 2M | C01 | BL2 |
| c) | What is meant by fluid dynamics? | 2M | C02 | BL1 |
| d) | Differentiate between unsteady flow and non-uniform flow? | 2M | C02 | BL2 |
| e) | Write the function of Pitot tube? | 2M | C03 | BL1 |
| f) | Mention the various types of thicknesses of Boundary layer. | 2M | C03 | BL1 |
| g) | What are the examples of Impulse and Reaction Turbines? | 2M | C04 | BL1 |
| h) | Define unit speed and unit discharge of a turbine | 2M | C04 | BL1 |
| i) | What is meant by Pump? | 2M | C05 | BL1 |
| j) | What is specific speed in Pump? | 2M | C05 | BL1 |

PART- B**(10*5 Marks = 50 Marks)**

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|------|---|----|-----|-----|
| 2 a) | Derive the expression for viscosity of a fluid. | 5M | C01 | BL6 |
| b) | Explain fluid properties Surface tension and Capillarity. | 5M | C01 | BL4 |

OR

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|---|---|-----|-----|-----|
| 3 | The right limb of a simple U-Tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of specific gravity 0.9 is flowing. The centre of the pipe is 12 cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe if the difference of mercury level in two limbs is 20 cm. | 10M | C01 | BL3 |
|---|---|-----|-----|-----|

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|------|---|----|-----|-----|
| 4 a) | Derive the equation of Continuity for one dimensional flow. | 5M | C02 | BL6 |
| b) | Describe stream Line and Path line using neat sketches. | 5M | C02 | BL2 |

OR

- 5 State the momentum equation. How will you apply momentum equation for determining the force exerted by a floating liquid on a pipe bend? 10M C02 BL1
- 6 a) Explain the effect of pressure gradient on boundary layer separation. 5M C03 BL4
b) Explain with neat sketch Reynolds experiment to classify flow. 5M C03 BL4
- OR**
- 7 Derive an expression of Co-efficient of Discharge of Venturi meter. 10M C03 BL6
- 8 a) Derive an expression for the force exerted by the jet of water on stationary inclined plate. 5M C04 BL6
b) What is draft-tube? Why is it used in a reaction turbine? 5M C04 BL1
- OR**
- 9 A Pelton wheel generates 8000 KW under a net head of 130 m at a speed of 200 rpm. Assume the coefficient of velocity for the nozzle 0.98, hydraulic efficiency 87%, speed ratio 0.46 and jet diameter to wheel diameter ratio is 1/9. Determine i) Discharge required ii) Diameter of the wheel iii) Diameter and number of jets required iv) specific speed; Mechanical efficiency is 75%. 10M C04 BL3
- 10 a) Compare Centrifugal and reciprocating pumps. 5M C05 BL2
b) Draw and discuss the performance characteristic curves of centrifugal pump. 5M C05 BL2
- OR**
- 11 A single acting reciprocating pump running at 50 rpm, delivers 0.01 m³/s of water. The diameter of the piston is 200 mm and stroke length 400 mm. determine the theoretical discharge of the pump and co-efficient of discharge, slip and percentage slip of the pump. 10M C05 BL3

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