Code: 5G542

II B.Tech. II Semester Supplementary Examinations April 2023
Fluid Mechanics and Hydraulic Machinery
(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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		Marks	CO	BL

UNIT–I

| 1. | A U-tube differential manometer has been arranged to measure the pressure difference between two points A and B in a sloping pipeline conveying water. The point B lies 20 cm higher than point A. If the difference in the level of mercury in limbs of U-tube is 60 cm,   calculate the pressure difference ($P_A \sim P_B$). | 14M | CO1 | L2 |

OR

| 2. | Derive the equation of continuity for one dimensional flow of an incompressible fluid | 14M | CO1 | L2 |

UNIT–II

| 3. | Water flows through a horizontal conical pipe, with diameter at the larger end as 1.3 m and that at the smaller end as 0.70 m. the pressure head at the smaller head is 5 m of water, and the discharge is 3.5 m^3 /sec. Calculate the velocities at the two ends and the pressure head at the larger end. Neglect losses. | 14M | CO2 | L3 |

OR

| 4. | State the momentum equation. How will you apply momentum equation for determining the force exerted by a flowing fluid on a pipe bend? | 14M | CO2 | L2 |

UNIT–III

| 5. | What do you understand by pumped storage type of power station? What are its merits and demerits when compared with other types? Use sketches if necessary. | 14M | CO3 | L2 |

OR

| 6. | A jet of water of diameter 50mm, having a velocity of 20 m/s strikes a curved vane which is moving with a velocity of 10 m/s in the direction of jet. The jet leaves the vane at an angle of 600 to the direction of motion of vane at outlet. Determine i) Force exerted by the jet on the vane in the direction of motion ii) Work done per second by the jet. | 14M | CO3 | L3 |

UNIT–IV

| 7. | Define a turbine and bring out the differences between reaction turbine and impulse turbine. | 14M | CO4 | L2 |

OR

| 8. | Explain what you understand by governing of a hydraulic turbine with neat sketches. | 14M | CO4 | L2 |

UNIT–V

| 9. | Define and explain how manometric head of a centrifugal pump is measured. Compare this with total head, suction head and delivery head of a centrifugal pump. | 14M | CO5 | L2 |

OR

| 10. | The impeller of a centrifugal pump has 1.2 m outside diameter. It is used to lift 1800 litres of water per second against a head of 6 m. Its vanes make an angle of 1500 with the direction of motion at outlet and runs at 200 rpm. If the radial velocity of flow at outlet is 2.5 m/s, find the manometric efficiency. Also find the lowest speed to start the pump, if the diameter of the impeller at inlet is equal to half the diameter at exit. | 14M | CO5 | L3 |

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