1335

Code : 15ME41T

Register Number

HYDRAULICS & PNEUMATICS

Time : 3 Hours] **[Max. Marks : 100**

Note : (i) Answer any **six** questions from Part – **A** and answer any **seven** questions from Part – **B**.

(ii) Solve the problems in SI units only.

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PART – A

1. Define the following properties :
   (i) Density
   (ii) Specific weight
   (iii) Specific gravity
   (iv) Capillarity
   (v) Surface tension

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2. State Bernoulli's theorem. Mention the assumptions made. **5**

3. Describe different types of losses in fluid flow through pipes. **5**

4. Differentiate between impulse and reaction turbines. **5**

5. Explain with a neat sketch working of a submersible pump. **5**

6. List the advantages of hydraulic system. **5**

7. Explain the working principle of gear pump with a neat sketch. **5**

8. State and explain Pascal's law. **5**

9. Explain the general layout of a Pneumatic system. **5**

PART – B

10. (a) List the advantages and disadvantages of Manometers. **4**

    (b) Explain with a neat sketch differential Manometer. **6**

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11. (a) Distinguish between Ideal fluid and Real fluid.   4

    (b) Explain with a neat sketch Bourdon's tube pressure gauge.   6

12. (a) Distinguish between   4
        (i) Compressible and incompressible flow
        (ii) Linear and turbulent flow

    (b) A horizontal venturimeter with inlet and throat diameters 300 mm and 150 mm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and throat is 200 mm of mercury. Determine the rate of flow. Take $C_d = 0.98$.   6

13. (a) Explain continuity equation.   4

    (b) A pipe through which water is flowing is having diameters 200 mm and 100 mm at section 1 and 2 respectively. The velocity of water at section 1 is 4 m/s. Find the velocity head at section 1 and 2 and also rate of discharge.   6

14. (a) Explain Hydraulic Gradient Line and Total Energy Lines.   4

    (b) A pipe having a diameter of 300 mm and length 3500 m is used for transmission of power by water. The total head available at pipe inlet is 500 m. Find the maximum power available at the outlet of the pipe if f = 0.006.   6

15. (a) Explain draft tube. Mention its types.   4

    (b) A Pelton wheel develops 2000 kW under a head of 100 m and with an overall efficiency of 85%. Find the diameter of the nozzle, if the co-efficient of velocity for the nozzle is 0.98.   6

16. (a) Explain slip and negative slip of Reciprocating pump.   4

    (b) A centrifugal pump having an overall efficiency of 75% is discharging 30 litres/sec. of water through a pipe of 150 mm diameter and 125 m long. Calculate the power required to drive the pump if the water is lifted into a height of 25 m. Take co-efficient of friction as 0.01.   6

17. (a) State classification of control valves with their functions.   4

    (b) Sketch and explain the pressure reducing valve.   6

18. (a) Explain the non-return valve.   4

    (b) Sketch and explain the spring loaded Accumulator.   6

19. (a) Explain the Pneumatic actuators.   4

    (b) Explain the working principle of vane motor with neat sketch.   6

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