

1407

April 2025

Time - Three hours  
(Maximum Marks: 100)

[N.B. Answer all the questions, choosing any two subdivision from each question. Each subdivision carries 10 marks.]

1.
  - (a) If the density of liquid is  $950 \text{ kg/m}^3$ , find its specific weight, specific volume and relative density.
  - (b) Define the following: cohesion, adhesion and density.
  - (c) Discuss the following fluid properties with suitable sketches: (5+5)  
(i) Capillarity (ii) Surface tension
  - (d) One Litre of petrol weighs 7.5N. Calculate its specific weight, density and specific volume.
2.
  - (a) Write a short note on the following: atmospheric pressure, gauge pressure and vacuum pressure.
  - (b) The pressure of water in a pipe line is measured by means of simple manometer containing mercury. The mercury level in the open tube is 150 mm higher than that of the left tube. The height of water level in the left tube is 40 mm. Determine the pressure in the pipe in terms of (i) m of water (ii)  $\text{kN/m}^2$ . (5+5)
  - (c) Explain the working of pressure gauge with neat sketch.
  - (d) A differential manometer connected to two pipes reads 250 mm of mercury. Water flows through one pipe and oil through the other. Find the pressure difference between two pipes if the level of pipes are same. The pressure of water is greater than the pressure of oil. Also the height of water column from the centre of pipe to level of mercury is 450mm. (Take relative density of oil as 0.8)

[Turn over.....]

3. (a) A pipe line is carrying full of water at a point 'A' in the pipe line the diameter is 600mm and the pressure is  $70\text{kN/m}^2$  and velocity is  $2.4\text{m/sec}$ . At another point 'B' in the same pipe line the diameter is 300mm and the pressure is  $14\text{kN/m}^2$  and is 2m higher than "A". Determine the direction of flow.
- (b) Discuss the classification of fluid flows.
- (c) Explain about Venturimeter with neat sketch.
- (d) Write about the following: (3+3+4)  
(i) streamline (ii) path line (iii) stream tubes
4. (a) Describe about minor losses in a pipe flow.
- (b) Write about Darcy's and Chezy's equations.
- (c) Define water hammer. Also write a note on its cause and effect.
- (d) What is cavitation? List its cause, effect and remedies.
5. (a) Explain the working of double acting reciprocating pump.
- (b) Explain the working of single stage centrifugal pump with neat sketch.
- (c) Explain the working of impulse turbine with neat sketch.
- (d) Write about the following: (3+3+4)  
(i) draft tube (ii) surge tank (iii) air vessels