



22345

11819

3 Hours /70 Marks

Seat No.

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- Instructions :**
- (1) *All questions are **compulsory**.*
 - (2) *Answer **each** next main question on a **new** page.*
 - (3) *Illustrate your answers with neat sketches **wherever** necessary.*
 - (4) *Figures to the **right** indicate **full** marks.*
 - (5) *Assume suitable data, **if necessary**.*

Marks

1. Attempt **any five** : **10**
 - a) State the types of fluids.
 - b) Define atmospheric pressure and gauge pressure.
 - c) State Darcy's equation and also state meaning of each term in it.
 - d) State any four applications of pneumatic systems.
 - e) State different valves used in hydraulic system.
 - f) State classification of hydraulic pumps.
 - g) State the constituents of FRL unit in a pneumatic system.

2. Attempt **any three** : **12**
 - a) State and prove Bernoulli's theorem for flow of liquids.
 - b) Distinguish between pneumatic system and hydraulic system.
 - c) With a neat sketch describe meter-in circuit used in hydraulic system.
 - d) Describe Bourdon's pressure gauge with a neat sketch.

3. Attempt **any three** : **12**
 - a) Describe gear pump with a neat sketch used in hydraulic system.
 - b) A triangular plate equilateral in form having sides 1.2 m is submerged in water at an inclined position such that the base which is horizontal is 1m below and the apex 2m below the surface of water. Find a) the total pressure on the upper surface of plate, b) the position of centre of pressure.
 - c) Describe surface tension and capillarity in brief.
 - d) Enlist any four types of fluid flow and describe in brief.

P.T.O.

**4. Attempt any three :**

- a) Describe essential physical characteristics and functions of hydraulic oils.
- b) Describe construction and working principle of any one rotary actuator used in pneumatic system.
- c) Water flows through a pipe 1500 m long and 1m diameter with a velocity of 1m/sec. Find the head lost due to friction by using
 - i) Darcy's equation with $f = 0.005$
 - ii) Chezy's equation with $c = 64$.
- d) Describe accumulators in brief.
- e) If a mercury barometer reads 720 mm and a Bourdon pressure gauge records flow pressure 500 KPa, find the absolute pressure of the system.

5. Attempt any two :**12**

- a) Derive an expression for the discharge through a venturimeter with a neat sketch.
- b) Describe the need of hydraulic filters and applications of hydraulic and pneumatic systems.
- c) State the type of pneumatic circuit used when two or more operations are to be performed in a sequence. Draw its neat sketch and describe its working in brief.

6. Attempt any two :**12**

- a) State a type of pump used to lift water from a well. Draw a neat sketch of it and describe its working in brief.
 - b) State the applications of vane pump, gear pump, rotor pump, screw pump, piston pump and centrifugal pump in industry.
 - c) State the types, material and functions of pipes used in pneumatic systems.
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