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3 Hours / 70 Marks

Seat No.

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15 minutes extra for each hour

- 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following. **10****
- a) State two advantages and two disadvantages of oil hydraulic systems.
- b) Define term viscosity index
- c) Draw ISO symbols of pressure compensated flow control valve with reverse free flow.
- d) State two designs of fixed displacement pumps and two designs of variable displacement pumps. (names only)
- e) Sketch a typical graph of performance characteristic of variable displacement vane pump.
- f) Draw ISO symbols to show two different centre positions of DC valves.
- g) Sketch a cross sectional diagram of a shuttle valve.

P.T.O.

- 2. Attempt any THREE of the following. 12**
- a) Sketch and explain working of unbalanced vane pump.
 - b) In mobile hydraulics application a single acting cylinder of very long stroke length is required. Due to space limitation it should occupy less space after retraction. Sketch and explain suitable actuator required for given condition.
 - c) State any two methods of actuation of DC valve with their symbols.
 - d) Draw a neat sketch and explain working of pressure and temperature compensated flow control valve.
- 3. Attempt any THREE of the following. 12**
- a) Draw a cross sectional diagram of a time delay valve and explain its working.
 - b) Sketch and explain construction of pressure reducing valve.
 - c) Explain the construction of spring loaded accumulator with neat sketch.
 - d) Draw neat sketch of a lubricator used in Pneumatic systems.
 - e) Classify air compressors. Write any one application of each compressor.
- 4. Attempt any TWO of the following. 12**
- a) Compare Relief and sequence pressure control valves on following points
 - i) Symbol
 - ii) Outlet port
 - iii) Pilot connection
 - iv) Drain
 - v) Application
 - b) Explain with neat sketch of Hydraulic circuit used in shaping machine.
 - c) In an application two hydraulic cylinders are required to move forward simultaneously with the same speed and same stroke length. Sketch a suitable circuit diagram and explain its working.

5. Attempt any TWO of the following.**12**

- a) In a pneumatic application Piston has to move back and forth continuously. Draw pneumatic circuits using
 - i) Roller operated and pilot operated DC valves.
 - ii) Solenoid operated DC valve and limit switches.
- b) Explain with neat sketch of pneumatic circuit used for speed control of air motor.
- c) Explain constructional details of Internal Gear type hydraulic motor with neat sketch.

6. Attempt any THREE of the following.**12**

- a)
 - i) List two components used in pneumatic systems but not used in Hydraulic system with their symbols.
 - ii) Draw a cross section of Hose pipe used in Hydraulics and name the layers.
 - b) List common faults observed in Hydraulic and pneumatic systems and state their remedies.
 - c) With a suitable circuit diagram explain the use of shuttle valve (Logic 'OR' gate) in Pneumatic low cost automation. State its application.
 - d) Sketch a counter balance hydraulic circuit, name its parts.
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