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23242

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.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Solve any FIVE of the following :

5 × 2 = 10

- (a) List any four desirable properties of hydraulic oil.
- (b) Draw I.S. Symbol of (i) bidirectional fixed displacement hydraulic motor
(ii) bidirectional variable displacement hydraulic pump.
- (c) State different types of pumps used in hydraulic system.
- (d) State two types of linear actuators.
- (e) State difference between pressure relief valve and pressure reducing valve.
- (f) State the use of twin pressure valve and shuttle valve.
- (g) State the two common faults and its remedies that can be observed in pneumatic circuit.



2. Solve any FOUR of the following :**4 × 3 = 12**

- (a) Explain general layout of pneumatic system with sketch.
- (b) Explain the working of vane gear motor with sketch.
- (c) Explain working of check valve with sketch.
- (d) Explain working of lobe compressor with sketch.
- (e) List any four components used in hydraulic system with its function.

3. Solve any FOUR of the following :**4 × 3 = 12**

- (a) Explain working of external gear pump with sketch.
- (b) Explain the working of flow control valve with sketch.
- (c) Select the suitable speed control circuit for negative type of load and explain it with circuit diagram.
- (d) Draw and explain a hydraulic circuit to actuate a shaping machine with slow cutting forward stroke and rapid tool retraction/return.
- (e) Explain the working of double acting cylinder with sketch.

4. Solve any THREE of the following :**3 × 4 = 12**

- (a) State any two types of control valves and state their functions used in hydraulics.
- (b) Explain working of pressure relief valve with sketch.
- (c) State any four types of accessories used in hydraulic or pneumatic system along with their functions.
- (d) Draw and explain hydraulic circuit to operate two double acting cylinders with following conditions (i) Cylinder 'X' moves first in forward direction and after reaching set pressure cylinder 'Y' moves in forward direction. (ii) Both cylinder returns simultaneously.
- (e) Explain pneumatic circuit for direct control of double acting cylinder.

5. Solve any THREE of the following :**3 × 4 = 12**

- (a) Explain working of single acting cylinder for longer stroke length and to fit in compact space in retracted position.
- (b) Discuss the situation in following types of center positions of DCV :
 - (i) All ports closed and (ii) All ports open
- (c) One polymer processing machine is to be operated with two valves, select suitable valve to operate machine either by valve V_1 OR V_2 . Explain working of selected valve with sketch.
- (d) Select suitable flow control valve for pneumatic circuit allowing free flow in one direction and controlled variable flow in reverse direction. Justify your answer with sketch.
- (e) Explain with sketch construction of oil filter.

6. Solve any TWO of the following :**2 × 6 = 12**

- (a) Explain the meter-in speed control circuit for hydraulic cylinder.
 - (b) A pneumatic machine to be operated from both sides. Draw pneumatic circuit which ensures both hands safety of the worker while operating the machine. Explain its working.
 - (c) Select suitable pneumatic circuit for sequencing of two air cylinders based on their positions. Explain circuit with sketch.
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