

# CRASH COURSE

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10ME73

## Seventh Semester B.E. Degree Examination, May 2017 Hydraulics and Pneumatics

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.**

### PART – A

- 1 a. What is the pressure compensated vane pump? How does it work? Explain with a neat sketch. (10 Marks)
- b. A hydraulic cylinder is to compress a car body down to a bale size in 10S. The operation requires a 3 m stroke and a 40,000 N force. If a 10 MPa pump as been selected and assuming the cylinder is 100% efficient, find
  - (i) The required piston area
  - (ii) The necessary pump flow rate is lpm.
  - (iii) The hydraulic power delivered to the cylinder
  - (iv) The output power delivered by the cylinder to the load. (10 Marks)
- 2 a. Explain with a neat sketch swash plate motor. (08 Marks)
- b. Explain with a neat sketch Hydraulic ram. (04 Marks)
- c. A pump supplies oil at  $0.0016 \text{ m}^3/\text{s}$  to a 40 mm diameter double acting hydraulic cylinder. If the load is 5000 N (Extending and retracted) and the rod diameter is 20 mm, find the Hydraulic pressure during the extending stroke, Piston velocity during the extending stroke, Cylinder kW power during the extending stroke, Hydraulic pressure during the retracting stroke, piston velocity during the retracting stroke and cylinder kW power during the retracting stroke. (05 Marks)
- 3 a. With the aid of an appropriate hydraulic circuit explain the principle of unloading valve. (10 Marks)
- b. With the aid of neat sketch explain briefly the following:
  - (i) Pressure reducing valve
  - (ii) Pressure compensated flow console valve.Give the graphic symbol for each. (10 Marks)
- 4 a. Describe with a neat hydraulic circuit that is generally used to prevent damage to the operator or damage to the circuit. (10 Marks)
- b. Describe with the aid of an appropriate hydraulic circuit hydraulic cylinder sequencing. (10 Marks)

### PART – B

- 5 a. Explain with a neat sketch construction features of a hydraulic reservoir. State the functions of reservoir. (10 Marks)
- b. With the aid of neat sketch/circuit explain the configuration in which filters may be mounted. (10 Marks)

- 6 a. Give complete classification of pneumatic cylinder. (06 Marks)  
b. What is an FRL unit? Give the graphic symbol of it. (02 Marks)  
c. Define the terms running torque, starting torque and stall torque of air motor. (06 Marks)  
d. Explain with a neat sketch double acting cylinder, which is for pneumatics. (06 Marks)
- 7 a. Explain with a neat pneumatic circuit for cylinder sequencing. (10 Marks)  
b. Sketch and explain briefly the following :  
Pneumatic pressure regulator, Air filter for pneumatic systems. (10 Marks)
- 8 a. Explain with a neat sketch solenoid controlled pilot operated direction control valve. (08 Marks)  
b. Explain clearly the steps required to size of an air compressor. (04 Marks)  
c. Classify compressors of pneumatic system. Explain briefly the diaphragm compressor. (08 Marks)

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