

USN

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|



10ME73

Seventh Semester B.E. Degree Examination, June/July 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. State Pascal's law? With a neat sketch explain the basic hydraulic power system? (08 Marks)
- b. With a neat sketch explain the construction and working of a gear pump. (06 Marks)
- c. Determine the volumetric efficiency of a gear pump of external and internal diameters 75mm and 50mm respectively. Width of the gear teeth is 50mm. If the actual discharge is $30 \times 10^{-3} \text{ m}^3/\text{min}$ at 1800 rpm. (06 Marks)
- 2 a. With a neat sketch explain the operation of a vane motor. (08 Marks)
- b. A hydraulic motor has a displacement of 150 cm^3 , operates with a pressure of 75 bar and speed of 1800 rpm. If the actual flow rate consumed by the motor is $0.005 \text{ m}^3/\text{sec}$ and the actual torque delivered by the motor is 165 N-m. Find
 - (i) Volumetric efficiency
 - (ii) Mechanical efficiency
 - (iii) The actual power delivered by the motor. (08 Marks)
- c. With a neat sketch explain the working of linear actuator for single acting cylinder. (04 Marks)
- 3 a. Explain pressure reducing valve with graphical symbol. (10 Marks)
- b. Explain with a sketch non-compensated flow control needle valve. (10 Marks)
- 4 a. With circuit diagram explain meter in circuit for controlling the speed of hydraulic cylinders. (08 Marks)
- b. Describe with a circuit diagram the construction and working of a counter balance valve in hydraulic circuit. (07 Marks)
- c. With circuit diagram explain the application of accumulator as hydraulic shock absorber. (05 Marks)

PART – B

- 5 a. What are the desirable properties of hydraulic fluids? Explain briefly. (08 Marks)
- b. How hydraulic seals are classified? Explain any one method. (06 Marks)
- c. What is a filter? What are the methods of filtering? Explain briefly. (06 Marks)
- 6 a. What are the types of pneumatic actuators? With sketch explain the construction and working principle of single acting cylinder. (08 Marks)
- b. Differentiate hydraulic and pneumatic system. (06 Marks)
- c. What is cushioning? Sketch and explain the cushioning of cylinder. (06 Marks)
- 7 a. With a neat sketch and symbol explain 3/2 direction control poppet valve. (08 Marks)
- b. With a neat sketch explain how OR functions are generated in pneumatic systems. (06 Marks)
- c. Explain quick exhaust valve with circuit diagram. (06 Marks)
- 8 a. Explain the three stages of preparation of compressed air. (06 Marks)
- b. Explain control circuitry for single acting cylinders with circuit diagram. (06 Marks)
- c. Explain signal elimination using reversing valves. (08 Marks)

* * * * *

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.