

CBCS SCHEME

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18ME55

Fifth Semester B.E. Degree Examination, July/August 2021 Fluid Power Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. Define fluid power technology. Mention the advantages and applications of fluid power system. (06 Marks)
- b. What is Pascal's law? Explain the concept of force multiplication. (06 Marks)
- c. Write notes on:
 - (i) Sealing materials
 - (ii) Pressure drop in hoses/pipes (08 Marks)
- 2 a. Explain the desirable properties of hydraulic fluids in industrial hydraulic systems. (08 Marks)
- b. Explain the various filter locations used in filtering in hydraulic systems. (06 Marks)
- c. Write a note on hoses and quick acting couplings. (06 Marks)
- 3 a. With a neat sketch, explain the construction and working of variable displacement vane pump. Also mention the difference between positive and non positive displacement pumps. (10 Marks)
- b. Write a note on performance characteristics of gear pump. (05 Marks)
- c. Explain briefly the gas loaded type of accumulator with a neat sketch. (05 Marks)
- 4 a. Explain the working of cushioning and telescopic cylinders with a neat sketch with suitable applications. (10 Marks)
- b. A hydraulic motor has a volumetric displacement of $123 \times 10^{-6} \text{ m}^3$. If it receives $0.0009 \text{ m}^3/\text{s}$ of oil at 50 bars, find:
 - (i) Speed of the motor
 - (ii) Theoretical torque
 - (iii) Theoretical power of the motor (06 Marks)
- c. Mention the difference between:
 - (i) Hydraulic pump and hydraulic motor
 - (ii) Linear Actuator and Rotary Actuator (04 Marks)
- 5 a. Give the classification of control valves. Also explain the different centre positions of 3 position 4 way direction control valves with symbolic representations. (09 Marks)
- b. Discuss the working of pressure compensated flow control valve with a neat sketch. (06 Marks)
- c. Give the symbolic representation of:
 - (i) Pressure relief valve
 - (ii) Pressure reducing valve (05 Marks)
- 6 a. Explain the following with a neat hydraulic circuits:
 - (i) Force Multiplication Circuit
 - (ii) Sequencing Circuit (16 Marks)
- b. Explain the speed control of hydraulic cylinder involved with meter-in circuit. (04 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.

- 7 a. Discuss the structure of pneumatic control system with the aid of block diagram. Also mention the limitations of pneumatic system. (08 Marks)
- b. List the characteristics of compressed air in pneumatic systems. (06 Marks)
- c. Explain in brief FRL Unit with a neat diagram. (06 Marks)
- 8 a. Explain the working principles of the following pneumatic cylinders with neat sketches:
(i) Impact cylinder
(ii) Rodless cylinders (08 Marks)
- b. Explain the following with neat sketches:
(i) Quick Exhaust Valve
(ii) Time Delay Valve
(iii) Shuttle valve (12 Marks)
- 9 a. Explain the direct and indirect actuation of cylinders in pneumatic systems with simple circuits. (06 Marks)
- b. Explain the following pneumatic circuits:
(i) Supply Air Throttling
(ii) Exhaust Air Throttling (06 Marks)
- c. Explain the OR Gate logic with truth table and symbol. (08 Marks)
- 10 a. Discuss the motion control diagram for a 2-cylinder circuit. (12 Marks)
- b. Explain the use of relays in electro-pneumatic control. (08 Marks)
