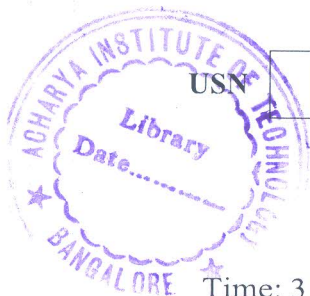


CBCS SCHEME

USN

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 (06 Marks)
(ii) Exhaust Air Throttling (08 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)
