

Seventh Semester B.E. Degree Examination, July/August 2022
Hydraulics & Pneumatics

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Sketch and explain the working of a Internal gear pump. (08 Marks)
b. List six basic components required in a hydraulic fluid power system and state their essential functions. (06 Marks)
c. A hydraulic pump has a displacement volume of 120 cm^3 . Its actual flow rate is $0.0015 \text{ m}^3/\text{s}$ at 900 rpm and has 75 bars. If the actual torque input by the prime mover to the pump is 150 N.m. Determine the overall efficiency of the pump. Also find the theoretical torque input to the pump for its operation. (06 Marks)
- 2 a. Explain with a neat sketch, the operation of a Swash plate type axial piston pump. (08 Marks)
b. With a neat sketch, explain second class lever system used in hydraulic cylinder to drive load. (06 Marks)
c. A hydraulic motor has a 100 cm^3 volumetric displacement. If it works at 140 bar pressure and receives fluid at a theoretical flow rate of $0.001 \text{ m}^3/\text{s}$. Determine speed of the motor, theoretical torque and the theoretical power developed. (06 Marks)
- 3 a. Sketch and explain pressure compensated flow control valve. (08 Marks)
b. With a neat sketch, explain the spool type DC valve (4 way, 3 position DCV). (06 Marks)
c. Explain briefly with a neat sketch, the construction and operation of pilot operated pressure relief valve. (06 Marks)
- 4 a. Explain with a neat circuit diagram, the working of meter-in and meter-out circuit for controlling the speed of a cylinder. (08 Marks)
b. With a neat circuit diagram, explain the cylinder synchronizing circuit (cylinders are connected in parallel). (06 Marks)
c. With a neat circuit, explain the working of accumulator as a shock absorber. (06 Marks)

PART – B

- 5 a. List and explain the desirable properties of a hydraulic fluid. (06 Marks)
b. Sketch and explain any two types of filtering methods adopted in hydraulic system. (08 Marks)
c. Sketch and explain the components of reservoir system. (06 Marks)
- 6 a. With a neat sketch, explain a FRL (Filter Regulator Lubricator) unit. (08 Marks)
b. What are the characteristics of a compressed air? (06 Marks)
c. Sketch and explain the working of cushioning in pneumatic cylinder. (06 Marks)
- 7 a. With a neat sketch, explain quick exhaust valve. (10 Marks)
b. Explain with circuit diagram, the functions of direct and indirect actuations of pneumatic cylinders. (10 Marks)

- 8 a. Describe the control circuit for simple single acting pneumatic cylinder with figure. (06 Marks)
- b. Describe the production of compressed air with schematic diagram. (06 Marks)
- c. Write short notes on any two:
- (i) Air filters.
 - (ii) Air driers.
 - (iii) Air lubricating unit
 - (iv) Air pressure regulator. (08 Marks)
