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17ME72

Seventh Semester B.E. Degree Examination, July/August 2022 Fluid Power Systems

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a neat block diagram, explain the structure of hydraulic power system. (10 Marks)
b. What are various advantages, disadvantages and applications of fluid power system? (10 Marks)

OR

- 2 a. What are the desirable properties of hydraulic fluids? Explain. (10 Marks)
b. Explain the working of return line and suction line filtering with the aid of sketches. (10 Marks)

Module-2

- 3 a. List the types of gear pump. Explain the construction and working of external gear pump with a neat sketch. (10 Marks)
b. Explain with the neat sketch the construction and working bladder type accumulator. (05 Marks)
c. An external gear pump has 125 mm outside diameter, 85 mm inside diameter and 40 mm width. For a pump speed of 1500 rpm determine the theoretical volumetric displacement and theoretical flow rate. If the volumetric efficiency is 90%, what is the actual flow rate in ℓpm (litres per minute)? (05 Marks)

OR

- 4 a. Explain the construction and operation of single acting cylinder. (05 Marks)
b. Explain with a neat sketch rack and pinion rotary actuator. (05 Marks)
c. A hydraulic motor operating at 75 bar pressure, has a volumetric displacement of $175 \text{ cm}^3/\text{rev}$. The motor runs at 2000 rpm to deliver a torque of 175 N-m, while using a flow rate of 375 ℓpm . Determine the volumetric mechanical and overall efficiencies. Also determine the actual power delivered by the motor. (10 Marks)

Module-3

- 5 a. Explain the hydraulic regenerative circuit with a neat sketch. (10 Marks)
b. List various types of DCV. With a neat sketch, explain the working of 4-way valve. (10 Marks)

OR

- 6 a. With a neat sketch, explain the working of pressure compensated flow control valve. (10 Marks)
b. Explain the hydraulic cylinder sequencing circuits with a neat sketch. (10 Marks)

Module-4

- 7 a. Describe the various components used in pneumatic power system and its symbol. (10 Marks)
b. Explain the working of a double acting type pneumatic cylinder with a neat sketch. (10 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.

OR

- 8 a. Explain the working of simple and pilot operated poppet valve used in pneumatic system with a neat sketch. (10 Marks)
- b. Explain the working of check valve and shuttle valve used in pneumatic system with a neat sketch. (10 Marks)

Module-5

- 9 a. Explain direct and indirect actuation of pneumatic cylinders. (10 Marks)
- b. Explain with neat sketches different methods commonly employed for controlling the speed of pneumatic cylinder. (10 Marks)

OR

- 10 a. Explain the principle of cascade control system. (10 Marks)
- b. Draw and explain the electrical control circuitry for controlling a single acting cylinder. (10 Marks)

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