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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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