

21MT43

Fourth Semester B.E. Degree Examination, June/July 2023 Hydraulics and Pneumatics

Time: 3 hrs.

Max. Marks: 100

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

Module-1

a. What are the advantages and limitations of hydraulic system?

(06 Marks)

b. With neat sketch and explain structure of hydraulic system.

(06 Marks)

c. An external gear pump has 12.5 cm outside diameter 8.5 cm inside diameter and 4 cm 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.

(08 Marks)

OF

2 a. Explain with neat sketch swash plate type of axial piston pump.

(10 Marks)

b. A Vane pump is to have a volumetric displacement of 82000 mm³. It has a rotor diameter of 50 mm, a cam ring diameter of 75 mm and a vane width of 40 mm. What must be the eccentricity? What is the maximum volumetric displacement possible? (10 Marks)

Module-2

3 a. With neat sketch and explain linear actuators.

(10 Marks)

b. A hydraulic motor operating at 75 bar pressure, has a volumetric displacement of 175 cm³/rev. The motor runs at 2000 rpm to deliver a torque of 175 N.m., while using a flow rate of 375/pm. Determine the volumetric, mechanical and overall efficiencies. Also determine the actual power delivered by the motor. (10 Marks)

OR

- a. Classify hydraulic control valve and explain with neat sketch pilot operated check valve, give its graphical representation. (10 Marks)
 - b. Explain briefly with neat sketch working of pressure compensated flow control valve.

(10 Marks)

Module-3

- a. A double acting cylinder is hooked up in a regerative circuit. The relief valve setting is 105 bar. The piston area is 130 cm² and the rod area is 45 cm². If the pump flow is 0.0016 m³/s, find the cylinder speed and load carrying capacity for,
 - (i) Extension stroke.
 - (ii) Refracting stroke.
 - iii) Power consumed during extension and retraction.

(10 Marks)

b. What are hydraulic accumulators? Classify the different accumulator and explain with neat sketch bladder type accumulator with symbolic representation. (10 Marks)

OR

6 a. Explain any five desirable properties of fluid.

(10 Marks)

b. What are the function of reservoir system and explain with neat sketch the working of reservoir system. (10 Marks)

		Module-4
7	a. b.	Define pneumatic system. Explain the characteristics of compressed air. (06 Marks) With neat sketch and explain end position cushion arrangement in pneumatic cylinder. (08 Marks)
	c.	What are the difference between hydraulics and pneumatic system? (06 Marks)
		What are the classification of pneumatic valves and explain with symbolic representation of
8	a.	different types of flow control valve. (10 Marks)
	b.	Explain with neat sketch supply air throttling and exhaust air throttling (10 Marks)
		Module-5
9	a.	With neat sketch and explain how the following function are generated in pneumatic system: (i) AND gate
		(ii) OR gate. (10 Marks)
	b.	Explain with neat sketch working of time dependent control circuit. (10 Marks)
		OR (IOM II)
10	a.	Explain with neat sketch cascading method. (10 Marks) Explain with neat sketch cascading method. (20 Marks)
	b.	Explain with neat sketch solenoid controlled pilot operated Directional Control Valve (10 Marks)
		(DCV).

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