CBCS SCHEME

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21MT43

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Hydraulics and Pneumatics

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain the structure of hydraulic control system with neat sketch. List the applications of hydraulic system. **(10 Marks)**

b. Discuss the factors to be considered for selecting hydraulic pump. Explain the working of gear pump with schematic diagram. **(10 Marks)**

OR

2 a. Explain with neat sketch the working of vane pump (balanced vane pump). **(10 Marks)**

b. A pump has a displacement volume of $0.0000984 m^3$/rev. It delivers $0.00152 m^3$/s of oil at 1000rpm and pressure is 70 bar. If the prime moves input torque is 124.3N-m. Determine : i) Overall efficiency of the pump ii) The theoretical torque required to operate the pump. **(10 Marks)**

Module-2

3 a. Explain the working of telescopic cylinder with neat diagram. **(06 Marks)**

b. In a hydraulic operation, the cylinder is required to extend against a load of 60kN and retract against a load of 6kN. If the cylinder bore diameter and rod diameter are 60mm and 20mm respectively. Calculate the pressure for each stroke. **(08 Marks)**

c. Explain cylinder force, speed and power of hydraulic actuators. **(06 Marks)**

OR

4 a. Sketch and explain the two position four way directional control valve. **(06 Marks)**

b. Explain the working of rotary valve with neat sketch. **(08 Marks)**

c. Explain the working needle valve with schematic diagram. **(06 Marks)**

Module-3

5 a. Explain the working of regenerative circuit. **(10 Marks)**

b. Discuss the classification of hydraulic accumulators. Explain gas loaded accumulator with neat sketch. **(10 Marks)**

OR

6 a. Discuss the three basic types of filtering elements used in hydraulic system. **(06 Marks)**

b. Explain the types of seals used in hydraulic system with neat sketches. **(08 Marks)**

c. Explain the working of Air cooled heat exchanger with schematic diagram. **(06 Marks)**

Module-4

7 a. Explain the structure of pneumatic control system with neat sketch. State the applications of pneumatic systems. **(10 Marks)**

b. Explain end position cushion arrangement in pneumatic cylinder with neat sketch. **(10 Marks)**

OR

8	a.	Explain the working of pilot operated poppet valve with the help of schematic diagram.	(06 Marks)
	b.	With the help of neat diagram, explain the working of 4/2 – way spool valve.	(06 Marks)
	c.	Sketch and explain the working of memory valve.	(08 Marks)

Module-5

9	a.	With neat sketch, explain how the following functions are generated in pneumatic system: i) AND ii) OR.	(10 Marks)
	b.	With the help of neat circuit diagram, explain pressure dependent control unit.	(10 Marks)

OR

10	a.	Explain the working of cascading with neat sketch.	(10 Marks)
	b.	Sketch and explain the relays and contractors.	(10 Marks)

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