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10ME73

Seventh Semester B.E. Degree Examination, June/July 2024
Hydraulics and Pneumatics

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. State Pascal's law. Explain with neat sketch the basic elements of Hydraulic system. **(06 Marks)**

b. An input cylinder with a diameter of 30mm is connected to an input cylinder with a diameter of 80mm. A force of 1000N is applied to the input cylinder. What is the output force? How far would we need to move the input cylinder to move the output cylinder 100mm. The output cylinder is required to move at 0.5mt/sec. At what speed the input cylinder moves. **(06 Marks)**

c. Explain with neat sketch, the operation of variable displacement pump. **(08 Marks)**

2 a. Explain with a neat sketch, the working of Bent axis piston motor. **(07 Marks)**

b. Explain with a neat sketch, the working of a Vane motor. **(07 Marks)**

c. A hydraulic motor has a displacement of $150cm^3$ and operates with a pressure of 120 bar and a speed of 2500 rpm. The actual flow rate consumed by the motor is 0.00781 mt^3/sec and the actual torque delivered by the motor is 250 NMt. Find i) Volumetric efficiency ii) Mechanical efficiency iii) Overall efficiency. **(06 Marks)**

3 a. With a neat sketch, explain the working of a Rotary valve. **(07 Marks)**

b. With a neat sketch, explain the working of a pressure reducing valve. **(07 Marks)**

c. Draw ISO symbols of : i) Pressure sequence valve ii) Pressure reducing valve iii) Counter balance valve. **(06 Marks)**

4 a. With a neat circuit diagram, explain Counter balance valve application. **(10 Marks)**

b. Explain with a neat sketch of Double pump unloading circuit. **(10 Marks)**

PART - B

5 a. Sketch and explain Static and Dynamic seals. **(10 Marks)**

b. What are the desirable properties of hydraulic fluids? Explain any five of them. **(10 Marks)**

6 a. Sketch and explain end position cushioning of a pneumatic cylinder. **(10 Marks)**

b. Sketch and explain any 5 types of mounting arrangements of cylinders. **(10 Marks)**

7 a. With a circuit diagram, explain Memory valve. **(07 Marks)**

b. With a neat sketch, explain Twin Pressure valve. **(05 Marks)**

c. With a circuit diagram, explain the control of extension of a double acting cylinder using OR logic gate. **(08 Marks)**

8 a. With a neat sketch, explain Relay. **(07 Marks)**

b. With a neat diagram, explain Absorption air drier. **(07 Marks)**

c. With a neat sketch, explain Air filter. **(06 Marks)**

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