CBCS SCHEME

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21AU643

Sixth Semester B.E. Degree Examination, June/July 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. Sketch and explain the working of an external gear pump write appropriate equations to determine the theoretical discharge and volumetric efficiency of the same. **(10 Marks)**

b. Determine the flow rate from a gear pump running at 1800rpm with OD = 75mm, ID = 50mm and L = 25mm, assuming a volumetric efficiency of 90%. **(06 Marks)**

c. State Pascal law and explain. **(04 Marks)**

OR

2 a. With appropriate sketch analyze a first class (Class I) lever system and arrive at the cylinder load using a Free Body Diagram (FBD). **(10 Marks)**

b. A pump supplies oil at $0.0016 m^3/s$ to a 40mm diameter double acting hydraulic cylinder. If the extending and retracting load is 5000N and the rod diameter is 20mm, find :

i) Hydraulic pressure
ii) Piston velocity
iii) Cylinder kW power, during extending and retraction stokes. **(10 Marks)**

Module-2

3 a. Explain construction and working of a check valve. Write its symbolic representation. **(10 Marks)**

b. Explain with a neat sketch, construction and working of a pressure control (relief) value. Symbolically represent the same. **(10 Marks)**

OR

4 a. List out discuss any ten desirable properties of a hydraulic fluid (oil). **(10 Marks)**

b. How do you classify scaling devices? With a schematic explain O-ring operation. **(10 Marks)**

Module-3

5 a. With appropriate circuit (line) diagram, explain the working of control of a single acting hydraulic cylinder. **(10 Marks)**

b. Analyze a circuit of locked cylinder using pilot check valves. **(10 Marks)**

OR

6 a. What is a hydraulic accumulator? With a neat sketch explain the construction and working of a spring loaded accumulator. **(10 Marks)**

b. With a hydraulic circuit diagram demonstrate accumulator as hydraulic shock absorber. **(10 Marks)**

Module-4

7 a. Sketch and explain the preparation of compressed air for a pneumatic system. **(10 Marks)**

b. Mention three methods of reducing moisture content in air. Sketch and explain the working of an absorption dryer. **(10 Marks)**

OR

8 a. Sketch and explain the working of a simple 2/2 poppet value. Represent symbolically. **(10 Marks)**

b. Explain the concept of direct actuation of pneumatic cylinder with appropriate circuit diagrams. **(10 Marks)**

Module-5

9 a. What are motion diagrams? With a neat sketch explain a displacement step diagram. Also mention the rules for drawing the diagram. **(10 Marks)**

b. Sketch and explain control a single acting cylinder. **(10 Marks)**

OR

10 a. Discuss briefly on signal elimination :
i) By short impulse transmitters
ii) By idle return roller. **(10 Marks)**

b. Explain cascading method principle. **(10 Marks)**

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