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10ME73

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Hydraulics & Pneumatics

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

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.

PART – A

1 a. State Pascal's law. Mention its significance. **(04 Marks)**

b. List the advantages and limitations of hydraulic system. **(05 Marks)**

c. What is meant by positive displacement pump? With a neat sketch explain the construction and working of gear within gear pump. **(11 Marks)**

2 a. Explain in brief the telescopic cylinder with a neat sketch. **(04 Marks)**

b. Discuss various types of mountings on cylinders with appropriate sketches. **(10 Marks)**

c. A hydraulic motor has a volumetric displacement of $125 \times 10^{-6} m^3$ and a pressure rating of 150 bar. It receives a theoretical flow rate of oil 0.0015 m^3/s from a pump. Find (i) The motor speed (ii) Theoritical torque (iii) Theoritical power. **(06 Marks)**

3 a. Explain briefly the rotary type directional control valve with a neat sketch. **(06 Marks)**

b. Explain the following with neat sketches:
(i) Pressure reducing valve.
(ii) Pressure compensated flow control valve.
Also mention their symbolic representations. **(14 Marks)**

4 a. With a neat circuit, explain as to how force multiplication is achieved in hydraulic industrial. **(06 Marks)**

b. Briefly explain the factors affecting synchronization of actuators in hydraulic circuits. **(02 Marks)**

c. Explain the following with neat circuits:
(i) Synchronization of actuators using flow control valves.
(ii) Sequencing circuit. **(12 Marks)**

PART – B

5 a. Explain the following properties with reference to hydraulic oils:
(i) Viscosity and Viscosity index.
(ii) Oxidation stability.
(iii) Demulsibility.
(iv) Lubricity. **(08 Marks)**

b. Differentiate between:
(i) Internal leakage and external leakage.
(ii) 'O' rings and 'U' ring seals. **(04 Marks)**

c. Explain the following :
(i) Pressure line and Return line filter.
(ii) Proportional filter. **(08 Marks)**

6 a. Explain briefly the pneumatic system with the help of a block diagram. **(06 Marks)**
b. Explain the various characteristics of compressed air. **(06 Marks)**
c. Write a note on:
(i) FRL unit.
(ii) Rodless cylinders. **(08 Marks)**

7 Explain the following:
a. Quick Exhaust valves.
b. Twin Pressure valves.
c. Time dependent valves.
d. OR and AND gates in pneumatic applications. **(20 Marks)**

8 a. Explain briefly the motion diagram and control diagram. **(08 Marks)**
b. Write a note on relay switches. **(05 Marks)**
c. Explain the working of a lubricator with a neat sketch in a pneumatic system. **(07 Marks)**

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