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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.

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) Theoretical torque (iii) Theoretical 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)

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.

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- 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)
