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Fifth Semester B.E. Degree Examination, June/July 2024

Fluid Power Engineering

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1
 - a. Define Fluid Power System. Sketch and explain the structure of a hydraulic Control System (08 Marks)
 - b. State Pascals law. Explain the concept of force multiplication. (08 Marks)
 - c. A haydraulic press has a ram of 25cm diameter and a plunger of diameter 4cm. If a load of 40 kN is to be lifted, find the magnitude of the minimum force to be applied on the plunger to keep the 40 kN in balance. (04 Marks)

OR

- 2
 - a. What are the desirable properties of hydraulic fluid? Explain briefly any 8 of them. (08 Marks)
 - b. Define Seal. Explain briefly how hydraulic seals are classified. (06 Marks)
 - c. Explain the various filtering locations used in filtering the oil in hydraulic system (06 Marks)

Module-2

- 3
 - a. Explain with a neat sketch the working principle of an external gear pump. (08 Marks)
 - b. Explain pump theory of a positive displacement pump and what are the factors to be considered for selecting a hydraulic pump. (08 Marks)
 - c. A vane pump has a rotor of diameter 50mm, a cam ring of diameter 80mm and the vane width of 40mm. Compute the volumetric displacement if the eccentricity is 10mm. (04 Marks)

OR

- 4
 - a. Explain single acting and double acting hydraulic cylinder with diagram and their graphic symbol. (08 Marks)
 - b. With is an accumulator? Explain with a neat sketch the working principle of gas loaded accumulator with graphic symbol. (06 Marks)
 - c. A hydraulic motor has a volumetric displacement of 123 cm³ operating at a pressure of 60 bar and speed 1800 rpm. If the actual flow rate consumed by the motor is 0.004 m³/sec and the actual torque delivered by the motor is 100Nm. Find i) Volumetric efficiency ii) mechanical efficiency iii) overall efficiency. (06 Marks)

Module-3

- 5
 - a. Define control valves. Explain the classification of control valves. (05 Marks)
 - b. Explain the following valves with graphical symbol.
 - i) Compound pressure relief valve
 - ii) Pressure reducing valve
 - iii) Shuttle valve
 (15 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.

OR

- 6 a. Explain the concept of meter-in and meter-out circuits. List the advantages and limitations of the circuit. (10 Marks)
 b. What is regenerative circuit? Mention its applications. (04 Marks)
 c. Explain with a neat sketch, sequencing circuits. (06 Marks)

Module-4

- 7 a. Explain with a neat sketch the working of pneumatic filter. (06 Marks)
 b. List the characteristics of compressed air in pneumatic system. (06 Marks)
 c. Explain with a neat sketch
 i) Rodless cylinder ii) Impact cylinder. (08 Marks)

OR

- 8 a. Explain with a neat sketch with graphical system
 i) Quick exhaust valve ii) Time delay valve iii) Twin pressure valve. (15 Marks)
 b. Briefly explain cylinder cushioning. (05 Marks)

Module-5

- 9 a. Explain the following with truth table X symbol
 i) OR gate ii) AND gate (10 Marks)
 b. Explain the sequencing of two cylinders A and B using cascading method circuit for cylinder sequence $A^+ B^+ B^- A^-$ (10 Marks)

OR

- 10 a. Explain the following pneumatic circuit
 i) Supply air throttling ii) Exhaust air throttling (10 Marks)
 b. Write short notes on the following :
 i) Solenoid ii) Electromagnetic Relay (10 Marks)
