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10ME73

Seventh Semester B.E. Degree Examination, June/July 2019
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. Write the displacement characteristics of Fixed and Variable displacement pump. (03 Marks)
b. Explain Pressure compensated vane pump, with a neat figure. (07 Marks)
c. Derive an expression for theoretical displacement of a axial piston pump. (04 Marks)
d. Explain the working of internal gear pump, with a neat figure. (06 Marks)
- 2 a. Explain the working of single and double acting cylinder.. (05 Marks)
b. Explain how bent axis motor differs with axial motor with schematic sketches. (08 Marks)
c. A hydrostatic transmission operating at 10 MPa has the following data :

Hydraulic pump	Hydraulic motor
$V_D = 100 \text{ cm}^3$	$V_D = ?$
$\eta_{\text{vol}} = 90\%$	$\eta_{\text{vol}} = 92\%$
$\eta_{\text{mech}} = 85\%$	$\eta_{\text{mech}} = 87\%$
$N = 1500 \text{ rpm}$	$N = 700 \text{ rpm}$

- Find the a) Displacement of the motor.
b) Output torque to motor.

(07 Marks)

- 3 a. Explain with a neat figure, the working of a Compound Relief Valve. (07 Marks)
b. Explain how a pressure compensated flow is obtained through a flow control valve, with the help of a neat sketch. (07 Marks)
c. Explain the working of the following D.C. Valves using graphic symbols :
i) 3/2 valve ii) 4/2 valve. (06 Marks)
- 4 a. Explain how speed of a hydraulic cylinder is controlled using a regenerative hydraulic circuit. (07 Marks)
b. Explain Meter in circuit design of a hydraulic system. (06 Marks)
c. Sketch the hydraulic circuit for use of accumulator as an auxiliary power source and explain its working. (07 Marks)

PART - B

- 5 a. Write notes about service properties of hydraulic fluids. (06 Marks)
b. What are the undesirable effects of solid contaminations? (06 Marks)
c. Explain with neat sketches the working of Full - flow and By - pass filter. (08 Marks)
- 6 a. Describe the structure of pneumatic control, with a block diagram. (07 Marks)
b. Explain the working of cylinder cushioning, with a neat sketch. (07 Marks)
c. Describe any two basic mounting arrangements of pneumatic actuators. (06 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.

- 7 a. Explain the working of a puppet valve, with a schematic diagram and graphic symbol. (07 Marks)
- b. Explain how a shuttle valve functions as an OR gate. (04 Marks)
- c. Explain with a circuit diagram, controlling of extension of a double acting cylinder using logic gates. (09 Marks)
- 8 a. Explain with a neat circuit diagram, the coordinated sequencing motion of two cylinders with signal overlap steps. (08 Marks)
- b. Explain Pilot assisted solenoid control of d.c. valves with a circuit diagram. (07 Marks)
- c. Explain the preparation of compressed air. (05 Marks)

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