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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
$V_D = 100\ cm^3$	$V_D = ?$
$\eta_{vol} = 90\%$	$\eta_{vol} = 92\%$
$\eta_{mech} = 85\%$	$\eta_{mech} = 87\%$
N = 1500 rpm	N = 700 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)**

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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