10ME73

Seventh Semester B.E. Degree Examination, Aug./Sept. 2020
Hydraulics and Pneumatics

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. With neat block diagram, explain the structure of hydraulic power system. **(06 Marks)**
    b. Explain the construction and working of balanced vane pump. **(08 Marks)**
    c. A Hydraulic pump has a displacement volume of 120cm^3. Its actual flow rate is 0.0015 m^3/s at 900 rpm and 75 bar. If the actual torque input by the Prime mover to the pump is 150N-m, determine the overall efficiency of the pump. Also find the theoretical torque input to the pump for its operation. **(06 Marks)**

2   a. With a neat sketch, explain the second class lever system used with hydraulic cylinders to drive load. **(06 Marks)**
    b. Explain with neat sketch the operation of swash plate Piston motor in hydraulic system. **(06 Marks)**
    c. A hydraulic motor has a displacement of 165cm^3/rev, and operates with a pressure of 70 bar and a speed of 2000rpm. If the actual flow rate consumed by the rotor is 6 liters/s and the actual torque delivered by the motor is 170 N-m, find
        i)   Volumetric efficiency of the motor
        ii)   Mechanical efficiency of the motor
        iii) Overall efficiency of the motor
        iv)   Actual Power (kw) delivered by the motor. **(08 Marks)**

3   a. Classify Hydrulic control valves, explain with a neat sketch pressure compensated flow control valve. **(10 Marks)**
    b. Draw symbolic representation of the following hydraulic control valves.
        i) Simple pressure relief valves
        ii) Pressure reducing valve
        iii) Sequence valve
        iv) Counter balance valve
        v) Manually operated, spring centered three position four way valves. **(10 Marks)**

4   a. Explain with a neat circuit diagram the working of a regenerative circuit. **(08 Marks)**
    b. Explain with a neat Meter – in circuit diagram the working of a speed control of hydraulic cylinder. **(08 Marks)**
    c. What are hydraulic accumulators? Classify the accumulators used in hydraulic system. **(04 Marks)**

PART – B

5   a. Explain any five desirable properties of hydraulic fluid. **(10 Marks)**
    b. Explain three types of filtering methods adopted in hydraulic system. **(06 Marks)**
    c. What are the effects of solid contamination? **(04 Marks)**

6 a. Explain the characteristics of compressed air. **(06 Marks)**

b. Define Pneumatic system. Give the difference between hydraulic and pneumatic system.

(06 Marks)

c. Explain end position cushioning in pneumatic cylinder with diagram. **(08 Marks)**

7 a. Explain with a neat sketch sequence control of two double acting cylinder using logic gates.

(10 Marks)

b. Explain the following logic gates used pneumatic logic operations.

i) AND ii) OR iii) NOT iv) NOR v) NAND. **(10 Marks)**

8 a. Explain with a neat diagram coordinated sequence motion of two cylinders. **(10 Marks)**

b. Write a short notes on :

i) Airfilters ii) Air Dryers iii) Air lubricator. **(10 Marks)**

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