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10ME73

Seventh Semester B.E. Degree Examination, Dec.2013/Jan.2014

Hydraulics and Pneumatics

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1
 - a. What are the factors to be considered for selecting a hydraulic pump? Explain in brief. (07 Marks)
 - b. Explain the construction and working of a external gear pump. (07 Marks)
 - c. A vane pump is to have a volumetric displacement of 82cm^3 . It has a rotor diameter of 5cm, a cam ring diameter of 7.5cm and a vane width of 4cm. What must be the eccentricity? (06 Marks)
- 2
 - a. Explain with neat sketch balanced vane motor. (06 Marks)
 - b. Explain with sketch linear actuators. (04 Marks)
 - c. A hydraulic motor has a displacement of 130cm^3 , operates with a pressure of 105 bar and has a speed of 2000 rpm. If the actual flow rate consumed by the motor is $0.005\text{m}^3/\text{s}$, and the actual torque delivered by the motor is 200N-m find:
 - i) Volumetric efficiency.
 - ii) Mechanical efficiency.
 - iii) Overall efficiency.
 - iv) Power developed by motor in kW. (10 Marks)
- 3
 - a. Classify hydraulic control valves. Explain with neat sketch working of check valve, and give its graphical representation. (10 Marks)
 - b. Draw symbolic representation of the following hydraulic control valves.
 - i) Simple pressure relief valve.
 - ii) Pressure reducing valve.
 - iii) Sequence valve.
 - iv) Counter balance valve.
 - v) Manually operated, spring centred, three position four way valves. (10 Marks)
- 4
 - a. Explain with neat sketches meter-in and meter-out circuits. (10 Marks)
 - b. What are hydraulic accumulators? Classify the different accumulators used in hydraulic system and explain spring loaded hydraulic accumulator. (10 Marks)

PART – B

- 5
 - a. Explain briefly filters and strainers in hydraulic system. (08 Marks)
 - b. Derive expression for beta efficiency. (05 Marks)
 - c. Discuss about sealing devices. (07 Marks)
- 6
 - a. What are the advantages using pneumatic system? (10 Marks)
 - b. Explain with neat sketch and cushion arrangements in double acting cylinder. (10 Marks)

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- 7 a. With a neat sketch, explain how the following functions are generated in pneumatic systems:
i) AND; ii) NOT; iii) OR. (15 Marks)
b. Explain quick exhaust valve with its graphical symbol only. (05 Marks)
- 8 Explain the following:
a. Electropneumatic control.
b. Application of memory valve.
c. Needle flow control valve.
d. Air dryers. (20 Marks)
