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Eighth Semester B.E. Degree Examination, June 2012

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. Define Pascal law and state one application. (04 Marks)
 - b. A displacement type cylinder has a rod of 65 mm diameter and is powered by hand pump with a displacement volume of 5 ml per double stroke. The maximum operating pressure is 350 bar. Calculate :
 - i) The number of double pumping strokes needed to extend the cylinder rod by 50 mm
 - ii) The maximum load which could be raised, using the system. (08 Marks)
 - c. With a neat sketch, explain the construction and working of a external gear pump. (08 Marks)
2.
 - a. Derive an expression for volumetric displacement of inline-axial piston pump. (08 Marks)
 - b. A hydraulic motor has a displacement of 130 cm³, 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 m³/sec and the actual torque delivered by motor is 200 Nm. Find:
 - i) Volumetric efficiency
 - ii) Mechanical efficiency
 - iii) Overall efficiency
 - iv) Power delivered by motor in kW. (12 Marks)
3.
 - a. Explain the control of double acting cylinder using 4/2 DCV. (04 Marks)
 - b. Describe regenerative circuit and its application. (08 Marks)
 - c. A double acting cylinder is hooked to an regenerative circuit. The relief valve setting is 105 bars. The piston area is 130 cm² and the rod area is 45 cm². If the pump flow is 0.0016 m³/sec, determine the cylinder speed and load carrying capacity for:
 - i) Extension stroke
 - ii) Retracting stroke
 - iii) Power consumed during extension and retraction (08 Marks)
4.
 - a. Describe the meter-in circuit used for controlling the speed of cylinder. List the merits and demerits. (10 Marks)
 - b. Design a hydraulic sequencing circuit used in a drilling machine for clamping work piece and drilling a hole by using logic gates. (10 Marks)

PART – B

5.
 - a. List six desirable properties of hydraulic fluid and explain any two properties. (06 Marks)
 - b. With a neat sketch, explain full flow filter. (08 Marks)
 - c. Discuss sealing devices. (06 Marks)

- 6** a. Explain the following:
i) Magnetic type rodless cylinder
ii) Cable operated rodless cylinder **(08 Marks)**
b. Describe torque cylinder. **(08 Marks)**
c. Write the graphical symbol of normally open 3/2 pneumatic direction control valve. **(04 Marks)**
- 7** a. Write down ISO-5599-3 coding for the following pressure port, working ports and exhaust ports. **(04 Marks)**
b. With a neat sketch, explain the control of extension of a double acting cylinder using OR and AND logic functions. **(10 Marks)**
c. Describe the diaphragm type accumulator. **(06 Marks)**
- 8** a. What is signal overlap? Describe signal overlap in a memory device and its suppression. **(10 Marks)**
b. Explain gas loaded accumulator. **(05 Marks)**
c. Write a brief note on chemical dryers. **(05 Marks)**

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