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## Eighth Semester B.E. Degree Examination, June/July 2013

### 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. State Pascal's law. Explain with a neat sketch, the basic hydraulic power system. (06 Marks)
  - b. What are the important considerations taken while selecting a pump for a particular application? Explain procedure. (08 Marks)
  - c. A vane pump has a rotor diameter of 60 mm a cam ring diameter of 90 mm and vane width of 50 mm. If the eccentricity is 10 mm, determine the volumetric displacement. (06 Marks)
- 2
  - a. Explain with a neat sketch working of linear actuator for single acting cylinder. (05 Marks)
  - b. With a neat sketch, explain second class lever system used with hydraulic cylinders to drive load. (07 Marks)
  - c. A hydraulic motor has a displacement of 165 cm<sup>3</sup>/rev and operates with a pressure of 70 bar and a speed of 2000 rpm. If the actual flow rate consumed by the motor is 6 LPS and the actual torque delivered by the motor is 170 N-m. Find:
    - i) Volumetric efficiency
    - ii) Mechanical efficiency
    - iii) Overall efficiency (08 Marks)
- 3
  - a. Explain with a neat sketch how three way and four way direction control valves operate. Give graphical symbols. (10 Marks)
  - b. Explain pressure relief valve with graphical symbol also. (10 Marks)
- 4
  - a. Explain briefly the principle involved in a regenerative circuit and obtain an expression for the speed of actuator. (10 Marks)
  - b. Explain with suitable circuits how single acting and double acting cylinders are controlled. (10 Marks)

#### PART – B

- 5
  - a. What are desirable properties of hydraulic fluids? Explain briefly any five of them. (10 Marks)
  - b. Discuss the problems caused by the gases in hydraulic fluids. (05 Marks)
  - c. Derive an expression for beta efficiency. (05 Marks)
- 6
  - a. Explain briefly with a neat sketch 3/2 way spool type direction control valve to control flow of air in pneumatic system. (10 Marks)
  - b. Differentiate hydraulic and pneumatic systems. Sketch simple hydraulic and pneumatic systems. (10 Marks)
- 7
  - a. With a neat sketch, explain how following functions are generated in pneumatic systems:
    - i) AND function
    - ii) OR function (10 Marks)
  - b. Sketch and explain circuit for air-pilot control double acting cylinder. (10 Marks)
- 8
 

Write short notes on any FOUR of the following:

  - a. Accumulator as an emergency power source
  - b. Electro-pneumatic control
  - c. Sealing devices
  - d. Memory valve (function)
  - e. Meter in and meter out circuit. (20 Marks)