B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2011

Common to MECHANICAL ENGG. & MANUFACTURING ENGG. BRANCH

FIFTH SEMESTER - (REGULATION 2008)

ME 9303 – HYDRAULICS AND PNEUMATICS

Time: 3 hr Max. Mark: 100

PART- A (10X2 = 20 Mark)

1. What two factors are responsible for the high responsiveness of hydraulic devices?
2. Name two undesirable results when using oil with viscosity that is too low.
3. What is a pressure compensated flow control valve?
4. Draw the symbol of counter balance valve and sequence valve.
5. Oil at 0.001 m^3/s and 70 bars enters the low-pressure inlet of a 3:1 Racine pressure intensifier. Find the discharge flow-rate and pressure
6. Under what condition is a hydraulic motor braking system desirable?
7. What is the difference between after cooler and a chiller air dryer?
8. What is the difference between moving part logic and fluidic devices?
9. What is the advantage of PLC over microprocessor controlled circuits?
10. What is the difference between filter and stainer?

PART- B (5 X16 = 80 Mark)

11. (i) Gas at 80 bars gage and 50 °C is contained in the 1920 cm^3 cylinder. A piston compresses the volume to 1000 cm^3 while the gas is heated to 120 °C. What is the final pressure in the cylinder? (3)

    (ii) A cylinder with an 8 cm diameter piston and 3 cm diameter rod receives fluid at 30 Lpm. If the cylinder has a stroke of 35 cm, what is the maximum cycle rate that can be accomplished? (3)

    (iii) Brief on the desired properties of hydraulic fluid. (10)

12. (a) (i) Describe the working principle of pressure compensated variable displacement vane pump. (8)

    (ii) Brief on cylinder cushion arrangements. (4)

    (iii) A hydraulic motor has a displacement of 130 cm^3 and operates at a pressure of 105 bars and a speed of 2000 rpm. If the actual flow rate consumed by the motor is 0.005 m^3/s and the actual torque delivered by the motor is 200 N.m, find the overall efficiency and kW power delivered by the motor. (4)

(OR)

(b)(i) Compare the advantages and disadvantages of different types of accumulators. (8)

(ii) What is the difference between servo control and proportional control valve? (4)

(iii) A hydraulic transmission operating at 105 bars pressure has the following characteristics:

PUMP: V_D= 100 cm^3, η_v = 85%, η_m = 90% and N = 1000rpm.

MOTOR: η_v = 94%, η_m = 92% and N = 600rpm.

Find the displacement of the motor and its output torque. (4)