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C 3382

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Sixth Semester

Mechanical Engineering

ME 1305 — APPLIED HYDRAULICS AND PNEUMATICS

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare hydraulic drive with pneumatic drive.
2. What are the losses incurred in pipes of hydraulic drive?
3. State pumping theory in few words.
4. Draw the symbol for double acting cylinder and motor oscillating.
5. Draw the symbol for 3/2 way valve – 4/2 way valve with spring and solenoid operation.
6. What is intensifier? State its applications.
7. Identify important elements of pneumatic system.
8. List out air control valves used in pneumatics.
9. What is meant by servo system?
10. What is meant by fluidics?

PART B — (5 × 16 = 80 marks)

11. (a) List out the common types of fluids used in hydraulic drives, and state the desirable properties of fluids used in hydraulics system.

Or

- (b) For the hydraulic system, the following data are given. The pump is adding 2984 W to the fluid, the pump flow is 0.00158 m³/s, the pipe has an 0.01905 m inside diameter, the specific gravity of oil is 0.9, the kinematic viscosity of oil is 75 cs, elevation between station 1 and 2 is 6.096 m, pipe lengths are as follows 0.305 m, 1.22 m and 4.88 m. Find the pressure available at the inlet to the hydraulic motor.

12. (a) What criteria are used in the selection of hydraulic pumps? Explain with neat sketches (i) sliding vane pump and (ii) axial piston pumps.

Or

- (b) What are the characteristics of rotary fluid motor and briefly explain the construction of a double acting cylinder.

13. (a) Discuss the types, operation and use of hydraulic accumulators. Also explain the leakage compensator circuit.

Or

- (b) Explain the following with neat sketches :

- (i) Compound pressure relief valve
- (ii) Pressure compensated flow control valves

14. (a) Write elaborate notes on filter, lubricator and muffler with neat diagram and symbol.

Or

- (b) In an automation process three pneumatic cylinders are used in the following sequence $A^+B^-C^+B^+C^-A^-$. Design a suitable circuit for the above operation using cascade method.

15. (a) Explain the application of PLC in fluid power with suitable example.

Or

- (b) Explain electro hydraulic servo system and give comments on the transient response of the above system.