Question Paper Code : Q 2317

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Sixth Semester

(Regulation 2004)

Mechatronics Engineering

ME 1305 — APPLIED HYDRAULICS AND PNEUMATICS

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Pascal's law.

2. What are the functions of hydraulic fluids?

3. What are the advantages of vane pumps?

4. List the basic components of a double acting cylinder circuit.

5. Mention the applications of meter-in-circuit.

6. List various types of accumulators.

7. What are the drawbacks of poorly prepared compressed air?

8. Write notes on one way flow control valves.

9. What are the important components of a power pack?

10. What are the advantages of fluidics?

11. (a) (i) Describe the applications of fluid power system. (8)

    (ii) Discuss the various advantages of fluid power systems. (8)

Or

    (b) (i) Discuss in detail the importance of Laminar and Turbulent flow in various applications. (8)

    (ii) Write detailed notes on :

    (1) Reynold's number

    (2) Losses in pipes. (8)

12. (a) (i) Explain with a neat sketch the construction and working of axial piston pump, showing how the discharge can be varied. (8)

    (ii) Derive an expression for the theoretical discharge of the axial piston pump. (8)

Or

    (b) (i) Explain with a neat sketch the principle of operation of a vane pump. Derive an expression for the output of the vane pump. (12)

    (ii) A vane pump is to have a volumetric displacement of 120 cm³. It has a rotor diameter of 64 mm, a can ring diameter of 88.9 mm and a vane width of 52 mm. What must be the eccentricity? (4)

13. (a) (i) Sketch any eight different neutral position for 3-position 4-way valves. (8)

    (ii) Distinguish between unloading valve and sequence valve. (8)

Or

    (b) Explain how an accumulator can be used as :

    (i) an emergency power source. (8)

    (ii) a leakage compensator. (8)

14. (a) (i) Write detailed notes on air lubricators. (8)

    (ii) With a neat sketch explain the construction and working of a quick exhaust valve. (8)

Or

2

Q 2317

(ii) Draw a two handed safety circuit and explain. (4)

15. (a) Explain the function of an air-over-oil intensifier circuit with a neat sketch. (16)

Or

(b) Explain with sketches the operation of 'Electro-hydraulic' and 'Electro-pneumatic' circuits. (16)