CBCS SCHEME

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18ME55

Fifth Semester B.E. Degree Examination, June/July 2023
Fluid Power Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. State Pascal's law. Explain with a neat sketch the structure of fluid power system. **(08 Marks)**

b. Explain the desirable properties of hydraulic fluids. **(08 Marks)**

c. Explain the sources of contamination of hydraulic fluids. **(04 Marks)**

OR

2 a. Explain with a neat sketches the different types of seals used in fluid power system. **(08 Marks)**

b. With a neat circuit diagram explain suction line filter and pressure line filter. **(06 Marks)**

c. Explain the working of air cooled heat exchanger with the aid of sketch. **(06 Marks)**

Module-2

3 a. With a neat sketch explain the working of external gear pump. Obtain an expression for volumetric displacement, theoretical flow rate and volumetric efficiency. **(10 Marks)**

b. A pump having displacement of 140 cm^3 is driven at 1440 rpm and operates against a maximum pressure of 150 bar. The volumetric efficiency is 0.9 and overall efficiency is 0.8 find (i) Pump delivery in LPM (ii) The input power required in KW (iii) The torque at the pump shaft. **(10 Marks)**

OR

4 a. Explain with a neat sketch the operation of balanced vane motor. **(08 Marks)**

b. With a neat sketch explain Spring loaded accumulator. **(06 Marks)**

c. A hydraulic motor has a 100 cm^3 volumetric displacement. If it works at 140 bar pressure and receives fluid at a theoretical flow rate of 0.001 m^3/s. Determine

i) Speed of the motor

ii) Theoretical torque

iii) Theoretical Power developed **(06 Marks)**

Module-3

5 a. With a neat sketch explain the working of pressure Relief valve and pressure compensated flow control valve. **(10 Marks)**

b. Explain the working of meter-in and meter-out circuit for controlling the speed of hydraulic cylinder. **(10 Marks)**

OR

6 a. List the various types of control valves. With a neat sketch explain the working of 3/2 sliding spool valve. **(10 Marks)**

b. Explain with a neat circuit diagram the working of a Regenerative circuit. Obtain an expression for extending speed of the piston. **(10 Marks)**

Module-4

7 a. Explain with a neat sketch the pneumatic control system. (08 Marks)
b. Sketch and explain the mechanism end position cushioning of pneumatic cylinder. (08 Marks)
c. List the characteristics of compressed air. (04 Marks)

OR

8 a. Explain with the help of neat sketch Quick-Exhaust Valve. (08 Marks)
b. Explain the working of Air Filter with the aid of neat sketch. (06 Marks)
c. With the help of simple sketch explain pneumatic cylinder mounting methods. (06 Marks)

Module-5

9 a. Explain with a neat circuit diagram supply air throttling and exhaust air throttling. (10 Marks)
b. Explain the functions of 'OR' and 'AND' gates with Shuttle Valve and twin pressure valve respectively. (10 Marks)

OR

10 a. Explain the controlling of pneumatic cylinders in a sequence as $A^+ B^+ B^- A^-$ by cascading method. (12 Marks)
b. Explain Electro-Pneumatic Control of single acting cylinder with a suitable circuit. (08 Marks)

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