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18ME55

Fifth Semester B.E. Degree Examination, July/August 2022
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. What are the main components of hydraulic system? Write with neat sketch explain hydraulic system. (08 Marks)
- b. What do you mean by static and dynamic seal? Mention sealing materials used. (06 Marks)
- c. What are the desirable properties of a fluid explain any five? (06 Marks)

OR

- 2 a. Define Pascal's Law? With neat sketch, explain for any one application. (06 Marks)
- b. Mention some advantages and disadvantages of fluid power system. (08 Marks)
- c. For a simple hydraulic Jack the following data is given, force on pump piston is 100N, area of pump piston is 50cm², displacement of pump piston is 10cms, find force and area of load cylinder that carries also find energy input and energy output. Take area of load cylinder 500cm². (06 Marks)

Module-2

- 3 a. Give the classification of pumps. With neat sketch explain balanced vane pump. (08 Marks)
- b. With neat sketch explain construction of external gear motor. (06 Marks)
- c. A vane pump have volumetric displacement 115cm³. It has a rotor diameter of 63.5mm, a cam ring diameter of 88.9mm and a vane width of 50.8mm, find the eccentricity. (06 Marks)

OR

- 4 a. With neat sketch explain bent axis types axial piston pump. Derive the equation for theoretical flow rate. (10 Marks)
- b. Find the flow rate in ltr/sec that an axial piston pump delivers at 1000 RPM. The pump has 9 numbers 15mm diameter piston arranged on a 125mm diameter piston circle. The offset angle is set at 10° and the volumetric efficiency is 94%. (10 Marks)

Module-3

- 5 a. With neat sketch explain solenoid actuated 4/3 direction control valve. (06 Marks)
- b. With neat sketch explain Shuttle valve. (06 Marks)
- c. With neat sketch explain circuit used for punching operation. (08 Marks)

OR

- 6 a. With neat sketch explain non compensated flow control valve, with symbol. (08 Marks)
- b. Explain the regenerative circuit with diagram. Derive the equations for velocity. (12 Marks)

Module-4

- 7 a. With a neat diagram, explain the structure of pneumatic system. (08 Marks)
- b. Explain different types of cylinder cushioning. (06 Marks)
- c. What are the characteristics of compressed air? (06 Marks)

OR

- 8 a. Differentiate between hydraulic system and pneumatic systems. (06 Marks)
b. With neat sketch explain FRL unit with symbol (08 Marks)
c. With a circuit diagram explain
i) Quick exhaust valve (06 Marks)
ii) Time delay valve.

Module-5

- 9 a. Explain OR and AND gates in pneumatic systems with circuits. (10 Marks)
b. With neat sketch and symbol explain 2/2 poppet valve. (06 Marks)
c. What are the two types of air Throttling? Differentiate between them. (04 Marks)

OR

- 10 a. What are the rules to be followed to draw a motion diagram? (06 Marks)
b. With a neat diagram, explain signal flow pneumatic structure. (08 Marks)
c. Briefly explain about relay and contactors. (06 Marks)
