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17ME72

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022 Fluid Power Systems

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 various functions performed by the hydraulic fluid and list its desirable properties and types of hydraulic fluid. (10 Marks)
- b. With the aid of sketches, explain the following (10 Marks)
- i) Return line filtering
 - ii) Section line filtering
 - iii) Pressure line filtering.

OR

- 2 a. State Pascal's law. Explain its applications with a neat sketch. (10 Marks)
- b. What are the problems caused by contamination in Hydraulic fluid and mention different ways to reduce effects of contamination? (10 Marks)

Module-2

- 3 a. Explain the working of unbalanced vane pump. Also obtain an expression for its theoretical discharge. (10 Marks)
- b. Define the following : (10 Marks)
- i) Volumetric Displacement
 - ii) Theoretical discharge
 - iii) Volumetric efficiency
 - iv) Mechanical efficiency
 - v) Overall efficiency.

OR

- 4 a. Name the types of Hydraulic cylinders and explain working of double acting cylinder with neat sketch. (10 Marks)
- b. A pump supplies oil at $0.0016\text{m}^3/\text{s}$ to 40mm double acting hydraulic cylinder. If the load is 5000N (extending and retracted) and rod diameter is 20mm, find the hydraulic pressure during extension and retraction stroke. Piston velocity during extension and retraction stroke. Cylinder power during extending and retraction stroke. (10 Marks)

Module-3

- 5 a. Mention the different types of Direction control valves. Explain the working of 4/3 spring centered direction control of value. (10 Marks)
- b. Sketch and explain pressure compensated flow control valve. (10 Marks)

OR

- 6 a. Explain with Hydraulic circuit diagram control of single acting and Double acting cylinders. (08 Marks)
- b. With neat sketch, explain sequence valve application in clamping and drilling operation. (12 Marks)

Module-4

- 7 a. List different types of compressor. Explain with a neat sketch production of compressed air. (10 Marks)
- b. What are the characteristics of compressed air? Explain them and mention their advantages. (10 Marks)

OR

- 8 a. What is cushioning of cylinders? Why cushioning is necessary? Explain the working of a typical cushioned cylinder. (10 Marks)
- b. Explain with a neat sketch the constructional features of a typical time delay valve with neat sketch. (10 Marks)

Module-5

- 9 a. Explain the methods employed for controlling the speed of pneumatic cylinders with neat sketches. (08 Marks)
- b. Illustrate function diagram for double acting two cylinders for sheet metal bending applications. (12 Marks)

OR

- 10 a. Explain the following used in electro pneumatic systems. (10 Marks)
- i) Solenoid
 - ii) Relay
 - iii) Contractors.
- b. Write a short note on cascading method. (10 Marks)
