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18AE733

Seventh Semester B.E. Degree Examination, July/August 2022 Hydraulics and Pneumatics

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. With a neat sketch, explain the basic hydraulic power system. (08 Marks)
b. With a neat sketch, explain the construction and working of a gear pump. (06 Marks)
c. Determine the volumetric efficiency of a gear pump of external and internal diameters 75mm and 50mm respectively. Width of the gear teeth is 50mm. If the actual discharge is $30 \times 10^{-3} \text{ m}^3/\text{min}$ at 1800 rpm. (06 Marks)

OR

- 2 a. With a neat sketch, explain the operation of a Vane motor. (06 Marks)
b. A hydraulic motor has a displacement of 150 cm^3 , operates with a pressure of 75 bar and speed of 1800 rpm. If the actual flow rate consumed by the motor is $0.005 \text{ m}^3/\text{sec}$ and the actual torque delivered by the motor is 165N-m. Find i) Volumetric efficiency
ii) Mechanical efficiency iii) The actual power delivered by the motor. (10 Marks)
c. Classify the Hydraulic pumps. (04 Marks)

Module-2

- 3 a. Explain Pressure Reducing valve with graphical symbol. (10 Marks)
b. Explain with a sketch, Non – compensated flow control needle valve. (10 Marks)

OR

- 4 a. Explain with a neat sketch, the working of Shuttle valve with symbolic representation. (10 Marks)
b. Explain with neat sketch of 3/2 poppet valve with symbolic representation. (10 Marks)

Module-3

- 5 a. Explain with a neat circuit diagram, the counter balance valve application. (10 Marks)
b. Explain how speed of a hydraulic cylinder is controlled using a Regenerative Hydraulic circuit. (10 Marks)

OR

- 6 a. With circuit diagram, explain the application of accumulator as hydraulic shock absorber. (10 Marks)
b. Explain with a neat circuit diagram, the working of double pump hydraulic system. (10 Marks)

Module-4

- 7 a. What are the desirable properties of hydraulic fluids? Explain briefly. (08 Marks)
b. How hydraulic seals are classified? Explain any one method. (06 Marks)
c. What is a Filter? What are the methods of filtering? Explain briefly. (06 Marks)

OR

- 8 a. What are the types of Pneumatic actuators? With sketch explain the construction and working principle of single acting cylinder. (08 Marks)
b. Differentiate Hydraulic and Pneumatic system. (06 Marks)
c. What is Cushioning? Sketch and explain the cushioning of cylinder. (06 Marks)

Module-5

- 9 a. With a neat sketch and symbol, explain 3/2 direction control poppet valve. (10 Marks)
b. With a neat sketch, explain how OR functions are generated in Pneumatic systems. (10 Marks)

OR

- 10 a. Explain the different methods employed for controlling the speed of pneumatic cylinders with neat sketches. (10 Marks)
b. What is the function of a time delay valve? Explain the constructional features of a typical time – delay valve with a neat sketch. (10 Marks)

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