



USN

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

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Define Pascal's law. Describe with a neat circuit diagram, the basic components required in hydraulic system. (08 Marks)
- b. In the hydraulic press, a force of 100N is exerted on the small piston. Determine the upward force on the large piston. The area of the small piston is $50 \times 10^2 \text{mm}^2$ and the area of the large piston is $500 \times 10^2 \text{mm}^2$. Also find the distance moved by the large piston if the small piston moves by 100mm. (08 Marks)

OR

- 2 a. With a neat sketch, explain the operation of a vane pump. (08 Marks)
- b. Explain the advantages, limitations and applications of hydraulic systems. (08 Marks)

Module-2

- 3 a. Why cushioning is needed in a hydraulic cylinder? With a neat sketch, explain end cushioning in hydraulic cylinder. (08 Marks)
- b. Explain the performance of hydraulic motors. (08 Marks)

OR

- 4 a. Explain 2/3 and 2/4 Direction Control Valve with a neat circuit diagram. (08 Marks)
- b. With a neat sketch, explain the working principle of the solenoid actuation in DCV. (08 Marks)

Module-3

- 5 a. Explain with a neat circuit diagram, the working of double pump hydraulic system. (08 Marks)
- b. What are hydraulic accumulators? Sketch and explain dead weight or gravity type accumulator. (08 Marks)

OR

- 6 a. List out and explain the desirable properties of hydraulic oil. (08 Marks)
- b. Explain static and dynamic seals with examples. (08 Marks)

Module-4

- 7 a. Briefly explain the characteristics of compressed air. (08 Marks)
- b. With a neat sketch, explain structure of pneumatic control system. (08 Marks)

OR

- 8 a. With a neat sketch, explain poppet and spool valve. (08 Marks)
- b. Explain supply air throttling and exhaust air throttling. (08 Marks)

Module-5

- 9 a. Explain cascade method of pneumatic circuit design. (08 Marks)
- b. Write a short note on logic gates used in pneumatic applications. (08 Marks)

OR

- 10 a. With a schematic drawing and component symbols, explain electrical relay. (08 Marks)
- b. Explain control circuitry for single acting cylinders with circuit diagram. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.