



CBCS SCHEME

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15AU554

Fifth Semester B.E. Degree Examination, June/July 2019 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. With a neat block diagram, explain the structure of hydraulic power system. (06 Marks)
b. With a neat sketch, explain external gear pump. (06 Marks)
c. An external gear pump has 125 mm outside diameter, 85 mm inside diameter and 40 mm width. For a pump speed of 1500 rpm, determine the theoretical volumetric displacement and theoretical flow rate. If the volumetric efficiency is 90%, what is the actual flow rate? (04 Marks)

OR

- 2 a. With a neat sketch explain working principle of unbalanced vanemotor. (06 Marks)
b. A hydraulic motor operating at 75 bar pressure has a volumetric displacement of $175 \text{ cm}^3/\text{rev}$. the motor runs at 2000 rpm to deliver a torque of 175 N-mt, while using a flow rate of 375 lpm. Determine the volumetric, mechanical and overall efficiencies. Also determine the actual power delivered by the motor. (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 $0.001 \text{ m}^3/\text{s}$, determine speed of the motor, theoretical torque and the theoretical power developed. (04 Marks)

Module-2

- 3 a. Explain with a neat sketch Ball type check valve with symbolic representation. (06 Marks)
b. Explain with a neat sketch of 3/2 spool valve with symbolic representation. (06 Marks)
c. Explain with a neat sketch of needle valve with symbolic representation. (04 Marks)

OR

- 4 a. What are the desirable properties of hydraulic fluid? (06 Marks)
b. Explain with a neat sketch, constructional features of hydraulic reservoir. (06 Marks)
c. Define Beta ratio and beta efficiency with respect to filters. (04 Marks)

Module-3

- 5 a. Explain with a neat sketch or circuit diagram, the working of double pump hydraulic system. (08 Marks)
b. Explain with a neat circuit diagram, the counter balance valve application. (08 Marks)

OR

- 6 a. Define hydraulic accumulators. What are the types of hydraulic accumulators? Explain with a neat sketch of bladder type of accumulator with symbolic representation. (10 Marks)
b. With a neat circuit diagram, explain accumulator as a emergency power source. (06 Marks)

Module-4

- 7 a. What are the characteristics of compressed air? (04 Marks)
b. State five disadvantages of using compressed air instead of hydraulic oil. (04 Marks)
c. Explain with a neat sketch End Position Cushioning. (08 Marks)

OR

- 8 a. With a neat sketch explain:
i) Rodless cylinder (08 Marks)
ii) Rack and pinion type of actuator (08 Marks)
b. Explain with a neat sketch working principle of supply air throttling and exhaust air throttling. (08 Marks)

Module-5

- 9 a. Explain with a neat sketch motion control diagram for a two-cylinder circuit. (08 Marks)
b. Sketch and explain:
i) Push-button switch (08 Marks)
ii) Electrical relay (08 Marks)

OR

- 10 a. With the help of a neat diagram, explain production of compressed air. (08 Marks)
b. Sketch and explain:
i) Refrigerated dryer (08 Marks)
ii) Absorption (chemical) dryer (08 Marks)
