



CBCS SCHEME

--	--	--	--	--	--	--	--	--	--

18MT54

Fifth 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. What are the advantages and limitations of a hydraulic system? (06 Marks)
b. Explain with a neat sketch the structure of hydraulic control system. (08 Marks)
c. A gear pump has 75mm outside diameter, 50mm inside diameter and 25mm width. If the volumetric efficiency is 90%, what is the corresponding actual flow rate? The pump speed is 1000rpm. (06 Marks)

OR

- 2 a. Explain with neat sketch the working of a external gear pump? Mention their two advantages and disadvantages. (10 Marks)
b. Explain the working of unbalanced vane pump. Also obtain an expression for its theoretical discharge. (10 Marks)

Module-2

- 3 a. Explain with neat sketch the working of single acting cylinder. (07 Marks)
b. Explain with neat sketch :
i) Vane motor
ii) Swash plate piston motor. (07 Marks)
c. A hydraulic motor has a displacement of 130cm^3 and operates with a pressure of 105 bar and speed of 2000rpm. If the actual flow rate consumed by the motor is $0.005\text{m}^3/\text{s}$ and the actual torque delivered by the motor is 200N-m.
Find :
i) Volumetric efficiency
ii) Mechanical efficiency
iii) Overall efficiency. (06 Marks)

OR

- 4 a. Explain the working of shuttle valve with a sketch. (07 Marks)
b. Explain with a neat sketch construction and operation of simple pressure relief valve. (07 Marks)
c. Give the symbol for the following :
i) Pilot operated check valve
ii) Pressure sequence valve
iii) Pressure reducing valve
iv) Variable flow control valve
v) Four way three position with float neutral
vi) Four way three position with regenerative natural. (06 Marks)

Module-3

- 5 a. Explain the control of a single acting hydraulic cylinder with a sketch. (06 Marks)
b. Explain hydraulic cylinder sequencing circuit with a sketch. (08 Marks)
c. Explain the difference between motor-in and motor-out circuit with a sketch. (06 Marks)

OR

- 6 a. Explain any six service properties of hydraulic fluids. (06 Marks)
b. Explain the reservoir system with neat sketch. (08 Marks)
c. Explain the general types of hydraulic fluids. (06 Marks)

Module-4

- 7 a. List and briefly explain the important characteristics of compressed air. (10 Marks)
b. Explain with suitable examples
i) Cylinder mounting arrangements
ii) Dynamic seals and static seals. (10 Marks)

OR

- 8 a. Explain with neat sketch construction of a simple two-way-two position poppet type DCV and symbol. (10 Marks)
b. Explain with neat sketch :
i) Shuttle valve
ii) Check valve. (10 Marks)

Module-5

- 9 a. With a neat sketch explain how following functions are generated in pneumatic system :
i) AND function ii) OR function. (10 Marks)
b. Explain displacement step diagram for stamping operation. (05 Marks)
c. Explain control diagram for two cylinder application. (05 Marks)

OR

- 10 a. Explain the principle of cascade control system. (06 Marks)
b. Explain use of relay with neat sketch. (08 Marks)
c. What are the differences between pneumatic and electro-pneumatic circuits? (06 Marks)
