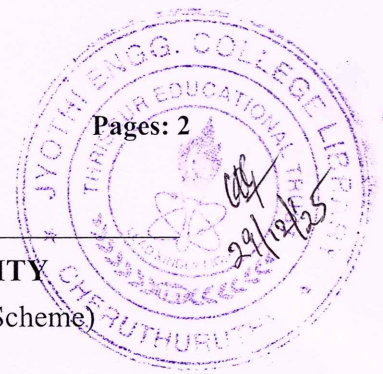


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
 B.Tech Degree S6 (S,FE) Examination December 2025 (2019 Scheme)



Course Code: MRT306

Course Name: INDUSTRIAL HYDRAULICS & PNEUMATICS

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|---|-----|
| 1 | Differentiate between pressure relief valve and pressure reducing valve | (3) |
| 2 | Describe the types of servo valves | (3) |
| 3 | What are the advantages of using hydraulics over pneumatics? | (3) |
| 4 | Describe the working of metering in hydraulic circuit with a suitable sketch. | (3) |
| 5 | Describe the internal and external feed back system | (3) |
| 6 | Explain any two example of PID application. | (3) |
| 7 | Explain how the fluid power is controlled using a PLC | (3) |
| 8 | What is the use of relays in PLC? | (3) |
| 9 | List the electric devices used in the control of fluid power system. | (3) |
| 10 | Explain the working of a pilot operated sequence valve. | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

- | | | |
|----|---|------|
| 11 | a) Illustrate and explain the internal architecture of a 4-way DCV with its symbol. | (10) |
| | b) Explain how an electro-hydraulic servo valve works | (4) |

OR

- | | | |
|----|---|------|
| 12 | a) With the help of neat, labelled diagrams, explain the working principles of three different types of hydraulic gear pumps commonly used in the industry. | (14) |
|----|---|------|

Module II

- | | | |
|----|--|-----|
| 13 | a) Discuss the importance and necessity of automation in modern industries | (7) |
| | b) What is a Directional Control Valve (DCV)? Explain its function with a neat sketch. | (7) |

OR

- 14 a) Illustrate and explain the functioning of an electro-hydraulic servo valve with the help of a block diagram (9)
- b) Differentiate between hydraulic and pneumatic systems (5)

Module III

- 15 a) Explain the concepts of open-loop and closed-loop control systems with examples and suitable diagrams. Also, discuss their respective advantages and disadvantages (14)

OR

- 16 a) Draw and describe the block diagram and components of a closed loop electro-hydraulic servo system. (8)
- b) Explain Bode diagrams and their use in Control system operation (6)

Module IV

- 17 a) Explain how relays, timers, and counters are used in PLC-based control circuits (8)
- b) Explain how combinational circuits differ from sequential circuits (6)

OR

- 18 a) Explain the use of truth tables and Karnaugh maps in designing control logic for fluid power systems. How do they help optimize circuit complexity? (10)
- b) Construct the ladder logic for the following Boolean Equations (4)
- 1) $Y = (X1 + X2).(X3 + X4)$, 2) $Y = (X1.X2) + (X3.X4)$

Module V

- 19 a) Describe the construction and operation of electro-hydraulic servo systems. Compare them with hydro-mechanical servo systems (14)

OR

- 20 a) Illustrate and explain the limit switch-based control of a hydraulic cylinder. (7)
- b) Describe the methods of controlling actuator speed using meter-in, meter-out, and bleed-off circuits, with appropriate diagrams. (7)
