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 1) Y= (X1+X2).(X3+X4), 2) Y= (X1.X2) +(X3.X4)	(4)

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)

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