

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Seventh Semester

Mechanical Engineering**20MUOE906 - INTRODUCTION TO INDUSTRIAL AUTOMATION**

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. What is the main advantage of oil hydraulics over pneumatics? (a) Higher speed (b) Cleaner operation (c) Higher power-to-weight ratio (d) Lower cost	1	K1	CO1
2. A gear pump operates using: (a) Rotating pistons (b) Intermeshing gears (c) Oscillating blades (d) Reciprocating cylinders	1	K1	CO1
3. Which valve is responsible for determining the path taken by fluid in a circuit? (a) Pressure relief valve (b) Flow control valve (c) Directional control valve (d) Check valve	1	K1	CO2
4. A pressure reducing valve is primarily used to: (a) Relieve pressure at the pump (b) Increase downstream pressure (c) Reduce and maintain constant downstream pressure (d) Maintain fluid temperature	1	K1	CO2
5. The function of an FRL unit in pneumatics is to: (a) Control speed (b) Filter, regulate and lubricate air (c) Generate electricity (d) Reduce viscosity	1	K1	CO3
6. Which type of compressor is commonly used for low-pressure pneumatic systems? (a) Centrifugal (b) Reciprocating (c) Rotary Vane (d) Turbocharger	1	K1	CO3
7. The accumulator in a hydraulic circuit is used to: (a) Reduce pressure (b) Store hydraulic energy (c) Filter oil (d) Supply air	1	K1	CO4
8. The bleed-off circuit controls speed by regulating: (a) Input flow (b) Output flow (c) Flow to tank (d) Load pressure	1	K1	CO4
9. PLC stands for: (a) Programmable Logic Control (b) Programmable Logic Controller (c) Process Logic Controller (d) Programmable Load Controller	1	K1	CO5
10. Ladder logic resembles: (a) Flow chart (b) Circuit diagram (c) Relay logic diagram (d) Block diagram	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11. Mention any two differences between hydraulic and electric drives.	2	K1	CO1
12. Mention any two advantages of hydraulic systems.	2	K1	CO1
13. Write any two the functions of a valve in a fluid power system.	2	K1	CO2
14. Define the function of an actuator in a fluid power system.	2	K1	CO2
15. Define pneumatic system and list its main components.	2	K1	CO3
16. Write two functions of an air reservoir.	2	K1	CO3
17. Define Pressure Intensifier.	2	K1	CO4
18. State the function of a counterbalance valve.	2	K1	CO4
19. Define scan cycle.	2	K1	CO5
20. Define industrial automation.	2	K1	CO5
21. List the various components of an FRL unit.	2	K1	CO3

22. List two advantages of using pneumatic drives in automation. 2 K1 CO3

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23. a) Explain in detail about Hydraulic Power System and list its essential components with a neat sketch. 11 K2 CO1

OR

b) Explain the classification of drives and list the main differences between hydraulic, pneumatic, and electric drives in terms of performance, cost, and applications. 11 K2 CO1

24. a) Explain pressure reducing valve with neat Sketch and how does it differ from relief valve? 11 K2 CO2

OR

b) Explain the working of Tandem and Telescopic cylinder with neat sketch. 11 K2 CO2

25. a) Describe the functions and working of air reservoirs, filters, regulators, and lubricators in a pneumatic system. 11 K2 CO3

OR

b) Explain the construction and working principle of any two types of air motors used in pneumatic systems. 11 K2 CO3

26. a) Describe with a suitable circuit, how an accumulator can be used as an leakage compensator and as an emergency power source. 11 K2 CO4

OR

b) Explain the operation of a fail-safe circuit in a hydraulic system. 11 K2 CO4

27. a) Explain the PLC programming standards and types with suitable examples. 11 K2 CO5

OR

b) Explain the basics of ladder logic programming with a suitable diagram. 11 K2 CO5

28. a) Explain about meter-in circuit and meter-out circuit with circuit diagrams. 11 K2 CO4

OR

b) Discuss the speed control circuit for a double acting cylinder with diagram. 11 K2 CO4