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

Second Semester

M.E. - CAD/CAM

24PCDEL205 - MECHATRONICS APPLICATIONS IN MANUFACTURING

Regulations - 2024

Duration: 3 Hours　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K-Level	CO
1.	Which of the following is not a sensor?	1	K1	CO1
	(a) Strain gauge　(b) Switches　(c) Servomotor　(d) Potentiometer			
2.	How many primary types of control systems exist in mechatronics?	1	K1	CO1
	(a) 5　(b) 4　(c) 3　(d) 2			
3.	Which type of sensor detects the presence of nearby objects without any physical contact?	1	K1	CO2
	(a) Touch sensor　(b) Proximity sensor　(c) Pressure sensor　(d) Force sensor			
4.	A Bourdon tube is a common device used to measure_____	1	K2	CO2
	(a) Flow rate　(b) Temperature　(c) Force　(d) Pressure			
5.	How many pins are there in an 8085 microprocessor?	1	K1	CO3
	(a) 30　(b) 39　(c) 40　(d) 41			
6.	Which instruction is used to transfer data from register B to register A?	1	K1	CO3
	(a) MOV BA　(b) MOV A, B　(c) MVI B, A　(d) MVI A, B			
7.	_____Component executes the control program in a PLC.	1	K2	CO4
	(a) Input Module　(b) Memory Unit　(c) Processor　(d) Power Supply			
8.	What is the main purpose of a Timer in PLC programming?	1	K1	CO4
	(a) To count events　(b) To provide time delays or generate pulses			
	(c) To handle analog values　(d) To manage communication			
9.	In a mechatronic solution for a washing machine, the water level control is typically a____	1	K2	CO5
	(a) Open-loop system　(b) Closed-loop system			
	(c) Manual control system　(d) Pneumatic system			
10.	Computer Numeric Control (CNC) machines are a prime example of advanced mechatronics systems applied in_____	1	K2	CO5
	(a) Domestic appliances　(b) Automotive suspension			
	(c) Manufacturing and automation　(d) Aerospace navigation			

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K-Level	CO
11.	What is mechatronics approach?	2	K1	CO1
12.	What are the key elements of mechatronics system?	2	K1	CO1
13.	What are the types of temperature sensors? Explain any two with neat sketch.	2	K1	CO2
14.	Explain with suitable diagram about optical encoders and its types.	2	K2	CO2
15.	Define microprocessor.	2	K1	CO3
16.	Classify the addressing modes of 8085.	2	K2	CO3
17.	What are counters?	2	K1	CO4
18.	What is ladder programming?	2	K1	CO4
19.	List the two important operations categories of sensors in engine management.	2	K1	CO5
20.	List out the various sensors used in engine management system.	2	K1	CO5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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21.	Show the use of JUMP control in PLC.	2	K2	CO4
22.	Outline the function of adaptive control.	2	K2	CO4

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Extend the various elements present in the temperature control system used in a refrigeration system with a simple circuit.	11	K2	CO1
		OR			
	b) (i)	Illustrate the emerging areas of Mechatronics.	5	K2	CO1
	(ii)	Show the difference between open loop and closed loop control system.	6	K2	CO1
24.	a)	Explain the static and dynamic characteristics of transducers.	11	K2	CO2
		OR			
	b)	Sketch and explain the working principle of Potentiometer and Eddy current sensor.	11	K2	CO2
25.	a)	Show the different types of addressing modes of 8085 microprocessor.	11	K2	CO3
		OR			
	b)	DemonstrateTraffic light control interface using microprocessor.	11	K2	CO3
26.	a)	Explain the factors to be considered while selecting a PLC for mechatronics system design.	11	K2	CO4
		OR			
	b)	Explain ladder logic programming technique with symbols of PLC.	11	K2	CO4
27.	a)	Develop a Case Study of a mechatronics system for an Engine Management Systems with a neat sketch.	11	K3	CO5
		OR			
	b)	Build a mechatronics system for an automatic camera.	11	K3	CO5
28.	a)	Explain in detail about construction and working of closed loop servo system with suitable example of servomotor control system.	11	K2	CO2
		OR			
	b)	Explain in detail various types of temperature sensors.	11	K2	CO2