Reg. No.															

Question Paper Code	13454

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Mechanical Engineering

20MEPC603 - MECHATRONICS

Regulations - 2020

Duration: 3 Hours Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	A Mechatronics approach emphasizes (a) Isolated system components (b) Integrating mechanical and electronic systems (c) Relying only on hardware designs (d) Traditional mechanical engineering methods	*1*	*K1*	*CO1*
2.	Eddy current sensors are primarily used for (a) Measuring light intensity (b) Detecting cracks and defects (c) Monitoring temperature changes (d) Measuring angular displacement	*1*	*K1*	*CO1*
3.	The accumulator in 8085 microprocessor is used for (a) Arithmetic operations (b) Logical operations (c) Data transfer (d) All of the above	*1*	*K1*	*CO2*
4.	What is the size of the program counter in 8085? (a) 8-bit (b) 16-bit (c) 32-bit (d) 64-bit	*1*	*K1*	*CO2*
5.	In 8255, which register is used to configure the operating mode of the ports? (a) Data Bus (b) Control Word Register (c) Status Register (d) Address Register	*1*	*K1*	*CO3*
6.	For a 7-segment LED display interfaced via 8255, how many data lines are typically required? (a)4 (b) 7 (c) 8 (d) 9	*1*	*K1*	*CO3*
7.	What programming language is most commonly associated with PLCs? (a) Python (b) Ladder Logic (c) Java (d) HTML	*1*	*K1*	*CO4*
8.	What is the function of counters in PLC programming? (a) To control the power supply (b) To count events or pulses (c) To measure temperature (d) To store data	*1*	*K1*	*CO4*
9.	Which of the following is a common feature of a servo motor? (a) open-loop control (b) high torque at low speed (c) fixed step angle (d) no feedback system	*1*	*K1*	*CO5*
10.	Which stage of the design process involves creating and testing prototypes? (a) concept development (b) detailed design (c) verification and validation (d) problem identification	*1*	*K1*	*CO6*

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	What is mechatronics approach?	*2*	*K1*	*CO1*
12.	Differentiate between open loop and closed loop control systems.	*2*	*K2*	*CO1*
13.	Define Timing diagram.	*2*	*K1*	*CO2*
14.	Differentiate Microprocessors and Microcontrollers.	*2*	*K2*	*CO2*
15.	What are the disadvantages of parallel interfacing?	*2*	*K1*	*CO3*
16.	Infer the function of Read /write control logic in 8255.	*2*	*K2*	*CO3*
17.	What is ladder programming?	*2*	*K1*	*CO4*
18.	Outline the function of adaptive control.	*2*	*K2*	*CO4*
19.	What are the elements of electrical motors?	*2*	*K1*	*CO5*

20.		Outline the properties of a stepper motor.	*2*	*K2*	*CO5*
21.		What are the movements required in pick and place robot?	*2*	*K1*	*CO6*
22.		Name five sensors used in engine management system.	*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Summarize how displacement is sensed by LVDT. With neat sketch explain LVDT.	*11*	*K2*	*CO1*
		OR			
	b)	Explain with suitable diagram about optical encoders and its types.	*11*	*K2*	*CO1*
24.	a)	Illustrate the pin diagram of 8085 microprocessor and write notes on address bus with neat sketch.	*11*	*K2*	*CO2*
		OR			
	b)	Summarize the Internal memory organization of 8051 microcontroller.	*11*	*K2*	*CO2*
25.	a)	Demonstrate the circuit for interfacing stepper motor with 8085 microprocessor using8255 PPI.	*11*	*K2*	*CO3*
		OR			
	b)	Illustrate with a neat block diagram the architecture of 8255 PPI.	*11*	*K2*	*CO3*
26.	a)	Describe with ladder diagrams Delay On, Delay Off timers and function of a Cascade timer.	*11*	*K2*	*CO4*
		OR			
	b)	Explain the architecture of PLC and its elements.	*11*	*K2*	*CO4*
27.	a)	Illustrate the construction and working principles of servomotor.	*11*	*K2*	*CO5*
		OR			
	b)	Outline feature of stepper motors. Explain the working principles of stepper motor in half step mode.	*11*	*K2*	*CO5*
28.	a)	Explain the various stages in designing a mechatronics system.	*11*	*K2*	*CO6*
		OR			
	b)	Explain the mechatronics design of an automatic car parking system with suitable diagram.	*11*	*K2*	*CO6*