R20

Code No: R20A0453

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B.Tech II Semester Supplementary Examinations, April 2025

Robotics & Automation

(CSE, IT, CSE-CS, CSE-AI&ML, CSE-DS & CSE-IOT, B.Tech-AIDS & B.Tech-AIML)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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			BCLL	CO(s)	Marks
		SECTION-I			
1	***A***	Explain the key characteristics of an Embedded System (ES) and classify different categories of embedded systems with suitable examples	**L2**	**CO-I**	**[7M]**
	B	Explain the hardware architecture of an embedded system with a block diagram.	**L2**	**CO-I**	**[7M]**
		OR			
2	***A***	Differentiate between real-time embedded systems and general embedded systems.	**L3**	**CO-I**	**[7M]**
	B	Compare microprocessors and microcontrollers based on architecture, functionality, and applications.	**L3**	**CO-I**	**[7M]**
		SECTION-II			
3	***A***	What are links and joints in robotics? Explain their role in robot movement with diagrams.	**L2**	**CO-II**	**[7M]**
	B	Define the degree of freedom (DOF) in robotics and explain its significance in robotic design.	**L2**	**CO-II**	**[7M]**
		OR			
4	***A***	Explain the different types of gears used for power transmission in robots. How do they affect robot performance?	**L2**	**CO-II**	**[7M]**
	B	What are the essential features of software used for robot programming? Discuss any commonly used robotics software.	**L2**	**CO-II**	**[7M]**
		SECTION-III			
5	***A***	Describe the AVR RISC microcontroller architecture and explain its key features.	**L4**	**CO-III**	**[7M]**
	B	Draw and explain the pin diagram of an AVR microcontroller.	**L2**	**CO-III**	**[7M]**
		OR			
6	***A***	Explain the working of I/O ports in an AVR microcontroller and how they are used for interfacing.	**L2**	**CO-III**	**[7M]**
	B	Explain the interrupt structure of an AVR microcontroller and discuss different types of interrupts.	**L2**	**CO-III**	**[7M]**
		SECTION-IV			
7	***A***	Explain the fundamental features of the ARM processor and its advantages over other microcontrollers.	**L2**	**CO-IV**	**[7M]**

	B	What is the Current Program Status Register (CPSR) in an ARM processor? Explain its significance and structure.	**L2**	**CO-IV**	**[7M]**
		OR			
8	***A***	Explain the different pipeline stages in an ARM processor and their functions.	**L2**	**CO-IV**	**[7M]**
	B	What is the vector table in an ARM processor? Explain its role in handling interrupts.	**L2**	**CO-IV**	**[7M]**
		SECTION-V			
9	***A***	Explain the concept of robotic perception and how AI enhances a robot's ability to interpret its environment.	**L2**	**CO-V**	**[7M]**
	B	Describe the process of mapping in robotics and explain the role of AI in configuring space.	**L3**	**CO-V**	**[7M]**
		OR			
10	***A***	Explain the role of dynamics in robotic movement and how AI improves motion control.	**L2**	**CO-V**	**[7M]**
	B	Explain the potential risks of artificial intelligence in robotics and suggest measures to mitigate these risks.	**L2**	**CO-V**	**[7M]**

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