

Code No: R22A0351

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B.Tech I Semester Regular Examinations, November 2024**Robotics & Automation**

(CSE, IT, CSIT, CSE-CS, CSE-AIML, CSE-DS, CSE-IOT & B.Tech-AIML)

Roll No									

Time: 3 hours**Max. Marks: 60****Note:** This question paper contains two parts A and B

Part A is compulsory which carries 10 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing **ONE** Question from each SECTION and each Question carries 10 marks.

		<u>PART-A (10 Marks)</u>	BCLL	CO(s)	Marks
		<u>(Write all answers of this part at one place)</u>			
1	A	What is an Embedded System?	L1	CO-I	[1M]
	B	List the main categories of Embedded Systems.	L1	CO-I	[1M]
	C	What are the main classifications of robots?	L1	CO-II	[1M]
	D	Define links and joints in the context of robotics.	L1	CO-II	[1M]
	E	What is the AVR RISC microcontroller architecture?	L1	CO-III	[1M]
	F	Name the main families of the AVR microcontroller.	L1	CO-III	[1M]
	G	What are the fundamental characteristics of ARM processors?	L1	CO-IV	[1M]
	H	List the types of registers available in ARM architecture.	L1	CO-IV	[1M]
	I	What is robotic perception, and why is it important in robotics?	L1	CO-V	[1M]
	J	Define localization in the context of robotic systems.	L1	CO-V	[1M]
		<u>PART-B (50 Marks)</u>			
		<u>SECTION-I</u>			
2	A	Explain the concept of embedded systems, detailing their characteristics and applications in modern technology.	L2	CO-I	[5M]
	B	Discuss the different categories of embedded systems, providing examples and describing their unique features.	L2	CO-I	[5M]
OR					
3	A	Compare and contrast microprocessors and microcontrollers in terms of architecture, applications, and programming.	L2	CO-I	[5M]
	B	Detailed overview of embedded system architecture, including its components and their functions.	L4	CO-I	[5M]
		<u>SECTION-II</u>			
4	A	Discuss the classification of robots, including differences between industrial, service, and mobile robots.	L2	CO-II	[5M]
	B	Explain the concepts of links and joints in robotic arms, and how they contribute to a robot's movement and functionality.	L2	CO-II	[5M]
OR					
5	A	Explain working of DC motor.	L4	CO-II	[5M]

	B	Describe the significance of degrees of freedom in robots, and explain how it affects their flexibility and range of motion.	L2	CO-II	[5M]
	<u>SECTION-III</u>				
6	A	Describe the memory organization in AVR microcontrollers, including program memory, data memory, and EEPROM, and explain how they interact.	L2	CO-III	[5M]
	B	Discuss the functionality of I/O ports in AVR microcontrollers, including how to configure and use them for input and output operations.	L2	CO-III	[5M]
	<u>OR</u>				
7	A	Discuss the Universal Synchronous and Asynchronous serial Receiver and Transmitter (USART) in AVR microcontrollers, including its operation and applications.	L2	CO-III	[5M]
	B	Explain the PIN diagram of AVR microcontroller.	L2	CO-III	[5M]
	<u>SECTION-IV</u>				
8	A	Describe the fundamental features and architecture of ARM processors.,	L2	CO-IV	[5M]
	B	Detailed explanation of the types of registers in ARM architecture, including their roles and differences between them.	L2	CO-IV	[5M]
	<u>OR</u>				
9	A	Explain the pipelining concept in ARM processors, including stages of the pipeline.	L2	CO-IV	[5M]
	B	Analyze the Current Program Status Register (CPSR) in ARM processors.	L4	CO-IV	[5M]
	<u>SECTION-V</u>				
10		Explain Robotic perception, localization and mapping.	L2	CO-V	[10M]
	<u>OR</u>				
11	A	Identify some risks associated with deploying AI in robotic applications. How can AI enhance robotic perception capabilities?	L2	CO-V	[2M+3M]
	B	What control methods are commonly used in robotics for movement? What ethical considerations arise from the use of AI in robotics?	L2	CO-V	[2M+3M]
