

Q.N	Questions	CO	Bloom Taxonomy	Marks
Section I				
1	Short Answer type questions.			4 x 5 = 20
a	Outline the ethical considerations in the development and deployment of robots in society. or	CO1	Understand	
	Describe the function of position and velocity feedback devices in robotic systems, analyzing their importance in ensuring precise motion control and operational accuracy.	CO1	Understand	
b	Critically assess the advantages of using high-level robot programming languages like VAL or RAPID over traditional low-level programming. or	CO2	Evaluate	
	Analyze the integration of scaling, rotation, and translation within homogeneous transformations, exploring their combined effects on coordinate transformations in spatial systems.	CO2	Analyze	
c	Discuss about cameras and their calibration. or	CO3	Understand	
	Differentiate between proportionate, derivative and integral controller in a robotic system.	CO3	Apply	
d	Discuss the P, PD and PID control in close loop control system. or	CO5	Understand	
	Define a transfer function. What is steady state response in a control system?	CO5	Understand	
Section II				
Long Answer type questions.				
2	Differentiate between rotary and linear joints in robotic manipulators with examples. or	CO1	Apply	3 x 10 = 30
	Differentiate between contact and proximity sensors with examples of their applications in robotics.	CO1	Analyze	
3	Examine how changes in joint parameters influence the trajectory of a robotic arm, assessing their impact on motion control and accuracy in robotic systems. or	CO2	Analyze	
	Provide a detailed explanation of robotic drive systems, outlining their various types and their functional significance in automation.	CO2	Remember	
4	Design and implement a basic line-following algorithm that utilizes sensors and motor control on a differential-drive robot, ensuring accurate path tracking and maneuverability. or	CO5	Apply	
	Design an advanced drive system for an autonomous robot tailored for rough terrain, ensuring optimal stability, traction, and maneuverability.	CO3	Analyze	
Section III				
Application based questions				
5	Investigate how the number and type of joints influence a robot's degrees of freedom and workspace, evaluating their impact on movement versatility and operational range. or	CO4	Analyze	1 x 20 = 20
	a. Implement camera calibration techniques in a robotic vision system, demonstrating how they improve accuracy in object detection, measurement, and spatial alignment.	CO4	Apply	
	b. Assess the impact of sensor noise on the performance and accuracy of machine vision algorithms, analyzing its effects on image processing and decision-making reliability.	CO4	Analyze	

Course Outcomes

- CO1 Gain knowledge of basic mechanical designing, electrical wiring, robotic sensors and actuators, PCB design and communication protocols
- CO2 Gain an understanding of the theoretical background necessary to understand advanced robotic technologies and their specific applications
- CO3 Demonstrate proficiency in design, construction, and operation of robotic systems
- CO4 Develop problem-solving skills by applying principles of robotics engineering to real-world problems
- CO5 Communicate effectively about robotics engineering technologies, their workings and potential applications