

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024***Second Semester**Product Design and Development***CD4092- Industrial Robotics And Expert Systems***Regulations - 2021**Duration : 3 Hrs**Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)***

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	What is a manipulator?	RE	1	2
2.	Distinguish between accuracy and repeatability.	UN	1	2
3.	What are the different types of actuators?	UN	2	2
4.	What are the factors to be considered while selecting an end effector?	RE	2	2
5.	Name any two applications of the sensor.	UN	3	2
6.	How do you sense the position accuracy of a robot?	RE	3	2
7.	List any four industrial applications of robots.	RE	4	2
8.	What are the benefits of cycle time analysis?	RE	4	2
9.	State the methods for defining position in space irrespective of robot configuration.	UN	5	2
10.	What are the goals of KBES?	RE	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i Sketch and explain the cartesian robots indicating the joints and degree of freedom.	UN	1	6
	ii Explain briefly the main Robot's anatomy with a neat sketch.	RE	1	7
	Or			
	b Explain the robot manipulator's forward and reverse transformations with 3 degrees of freedom.	UN	1	13
12.	a Sketch the pneumatic circuits to control cylindrical and Cartesian coordinate robot motions.	UN	2	13
	Or			
	b Name different types of end effectors. Compare and contrast the end effectors from the viewpoint of their functions.	AN	2	13
13.	a i Distinguish between tactile and non-tactile sensors.	UN	3	6
	ii Explain, with a suitable sketch, how proximity and range sensors work.	RE	3	7

Or

	b	Explain the various techniques in Image processing and analysis with suitable examples for each of them.	UN	3	13
14.	a	Explain the workplace design considerations for the safety of robots in detail.	UN	4	13
		Or			
	b	Explain the robot application in assembly and inspection line with suitable examples.	UN	4	13
15.	a i	Briefly explain the robot programming languages in detail.	RE	5	6
	ii	Explain the teach pendant for the robot system.	UN	5	7
		Or			
	b	Explain the various types of motion interpolations.	UN	5	13

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	Discuss the applications and working principles of the sensors: i) the Position sensor and ii) the velocity sensor.	UN	2	15
		Or			
	b	The robot is programmed to pick up a part from point A and move it to point B, followed by a move to a neutral position. Points A and B are to be defined by the programmer within the robot's work volume. Then, the robot should pick up the part at point b and move it back to point A, followed by a move to the previous neutral position. The robot can be operated continually in the “run” mode to repeat the motion pattern repeatedly. Give the design of the robot.	CR	5	15