

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2026****Second Semester****Department of Mechanical Engineering****PPDE2405 – INDUSTRIAL ROBOTICS AND EXPERT SYSTEMS****Regulations –2024****Duration : 3 Hrs****Maximum : 100 Marks****PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BLT	CO	Marks
1.	Write the definition of robot as per RIA.	L1	1	2
2.	Compare energy-based and force-based approach for the formulation of robot dynamics.	L2	1	2
3.	Compare hydraulic and pneumatic drives.	L4	2	2
4.	List any four tools as end effectors of robot.	L1	2	2
5.	Differentiate between the sensors and transducers.	L4	3	2
6.	Why is training a vision system important for robotic applications?	L3	3	2
7.	What is meant by robots tracking window?	L1	4	2
8.	Name the three occasions when humans are close to the machine to be exposed to danger.	L1	4	2
9.	Differentiate manual and powered lead through programming.	L2	5	2
10.	What are the types of knowledge required for problem representation in AI?	L1	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11. a	i Use neat sketches to illustrate the functions of various parts present in the anatomy of robot.	L3	1	8
	ii Prepare a table to explain the selection of end effectors for various applications of robot in manufacturing industries.	L3	1	8
	Or			
b	i A vector $v=3i+2j+7k$ is rotated by 60° about the z-axis of the reference frame. It is then rotated by 30° about the x-axis of the reference frame. Find the rotation transformation.	L3	1	8
	ii Show the different methods of describing the position and orientation of objects to the robot with suitable sketches.	L3	1	8
12. a	i Compare the applications of linear and rotary actuators in the joints of robot manipulator used in material handling.	L2	2	8
	ii Compare the applications of position and velocity sensing devices in pick and place robot.	L2	2	8
	Or			
b	i With suitable sketches, explain the operation of motor which provides the output in the form of discrete angular motion increments.	L2	2	8
	ii List and explain the factors to be considered in the selection and design of grippers.	L2	2	8

13.	a	A robotic arm in a factory is hitting nearby objects. Develop suitable collision avoidance system using proximity sensors and explain their working with a suitable sketch.	L6	3	16
Or					
	b	A robot needs to identify and handle objects of different shapes and textures. Develop suitable system using tactile sensors to help in this task and explain its working with a suitable sketch.	L6	3	16
14.	a	With suitable example, analyze the various arrangements of robot work cells.	L4	4	16
Or					
	b	Classify the ten elements used in robot cycle time analysis into four major groups and explain their significance in detail.	L4	4	16
15.	a	Evaluate the various ways to record the robots desired motion path into the controller memory with a suitable sketch.	L2	5	16
Or					
	b	Explain the three different search techniques in Artificial intelligence. Also explain the goals of AI research.	L2	5	16
