Code No: I0401/R16

M. Tech. I Semester Regular Examinations, December-2016

INDUSTRIAL ROBOTICS

Common to CAD/CAM (04), Advanced Manufacturing Systems (17), Computer Aided Design & Manufacturing (09) and Advanced Manufacturing and Mechanical System Design (13)

Time: 3 Hours   **Max. Marks: 60**

Answer any FIVE Questions
All Questions Carry Equal Marks

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1.	a	How do you differentiate point-to-point control and continuous path motion in a robot?	6M
	b	Distinguish between joint interpolated motion and controlled path motion.	6M
2.		Determine a **T** matrix that represents a rotation through an angle α about the OX axis, followed by a translation of 'b' unit of distance along the OZ axis, followed by a rotation of 'Ø' about the OY axis.	12M
3.	a	Compare and contrast served and non-served grippers. What are the actuators used for such grippers	6M
	b	Classify the robot end-effectors from control point of view.	6M
4.		Two plates of 5mm thickness are to be welded with square butt joint as shown in figure 1. The welding is a straight weld. The welding torch should start from position A, move to B, continue with continuous arc welding along BC in a straight line and then move to position D. Write a program in world-coordinate system?	
			12M
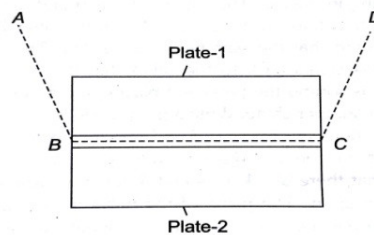
Figure 1

5.	a	Classify the robots from the viewpoints of handling.	6M
	b	Describe a flexible manufacturing cell wherein a spherical robot is transferring the parts to a CNC lathe and a CNC milling machine	6M
6.	a	Find the new location of point P $(1, 2, 3)^T$ relative to the reference frame after a rotation of 30° about the z-axis followed by a rotation of 60° about the y-axis.	6M
	b	What is robot vision? What are the types of vision sensor used to generate the contour picture of a work piece?	6M

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7.	a	What are the functions of the sensors?	6M
	b	What are the different types of sensors? Classify them.	6M
8.	a	Explain about considerations in robot cell design.	6M
	b	Explain about error detection in robot cell design.	6M

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