		GUJARAT TECHNOLOGICAL UNIVERSITY M. E SEMESTER – IV• EXAMINATION – SUMMER • 2014	
	Sul Sul Tin Ins	bject code: 742801 bject Name: Robotics and Control ne: 02:30 pm - 05:00 pm tructions: 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks.	
Q.1	(a) (b)	Briefly describe the different modes by which robots can be programmed. Define in context of robots: Payload, repeatability, reach, precision	07 07
Q.2	(a) (b)	Write the advantages and disadvantages of robots. What do you mean by transfer function? Define with neat sketch open-loop and close-loop transfer functions.	07 07
	(b)	OR It is desired to position the origin of the hand frame of Cartesian robot at point [3, 4, 7] ^T . Calculate the necessary Cartesian coordinate motion that needs to be made.	07
Q.3	(a) (b)	Classify the absolute control actions and explain any one of them in brief. Show through neat sketch the degrees of freedom associated with a robot wrist.	07 07
Q.3	(a) (b)	Write the function of end effectors and give the specific industrial applications of vacuum grippers and tools as end effectors. Write the short notes on proximity and range sensors	07 07
Q.4	(a)	Enlist the selection and design criteria to select particular type of end effecter for the robot.	07
	(b)	Describe the desire features in the sensors use for robots. OR	07
Q.4	(a)	Enlist the functions of machine vision system and explain the techniques used for object recognition in industry	07
	(b)	What do you mean by quantization? The maximum voltage range for a 8 bit capacity A/D converter is 20V. Calculate the quantization level, quantization level spacing and the quantization error.	07
Q.5	(a) (b)	Write the short note on charge-coupled devices (CCD). For an image digitized at 128 points per line and 125 lines, determine (a) the total number of bits to represent the gray level values required if an 8-bit A/D converter is used to indicate various shades of gray and (b) the reduction in data volume if only black and white values are digitized.	07 07
Q.5	(a) (b)	Explain the object recognition and template matching in brief. Enlist the different illumination techniques used and describe any two of them.	07 07
