

Name :

Roll No. :

Invigilator's Signature :

CS/M.Tech(ME)/SEM-2/PTM-204A/2011

2011

ROBOT APPLICATION & DESIGN

Time Allotted : 3 Hours

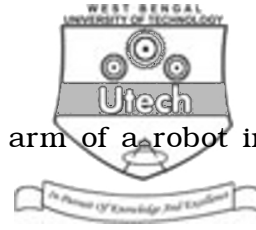
Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer any *five* of the following. $5 \times 14 = 70$

1. What is automation ? Describe fixed, programmable and flexible automations. 2 + 12
2. Define a robot. Name four basic robot configurations. Explain the four categories of robots. 2 + 2 + 10
3. What is the function of a controller ? Describe different types of controllers. 2 + 12



4. How would you represent the end of the arm of a robot in joint space and world space ? What do you mean by forward and reverse transformations of a robotic arm ? Derive the relation for forward and reverse transformations of a 2 degree of freedom robotic arm. 4 + 2 + 8
5. What is an end-effector ? Describe briefly four types of grippers other than mechanical grippers. 2 + 12
6. What are transducers and sensors ? Name different types of sensors. What is the function of a proximity sensor ? Describe any one of the proximity sensors. 4 + 2 + 2 + 6
7. Discuss different robot applications in manufacturing.



8. Write short notes on any *four* of the following :

$4 \times 3\frac{1}{2}$

- a) Robot drives
- b) Speed of motion of robots
- c) Tools as end-effectors
- d) Accuracy and repeatability of robots
- e) Speed of response and stability
- f) Basic components of a robotic system.

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