

(REVISED COURSE)

(3 Hours)

[Total Marks : 100
AE

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six**.
 (3) Assume **suitable** data wherever **required**.

1. Attempt any **four** :— 20
 - (a) Compare Hard and Soft automation.
 - (b) Explain Reach and Stroke of a robot.
 - (c) Define Kinematic Parameters.
 - (d) Compare Area descriptor and Line descriptor.
 - (e) Explain Screw Transformation.
2. (a) Explain D-H algorithm. 10
 (b) Explain the four fundamental operations to transfer (K-1) frame to K frame, hence obtain T_{k-1}^k transformation matrix. 10
3. (a) Obtain Arm matrix of Microbot Alpha-II. 10
 (b) Explain the work space analysis of a four axis SCARA robot. 10
4. (a) Develop IK analysis of Rhino XR-3 Robotic arm. 15
 (b) Explain linear interpolation with parabolic blends. 5
5. (a) What are template matching techniques of gray level Image and their application to Robot vision. 10
 (b) Explain Bounded Deviation algorithm. 10
6. (a) Explain the PNP motion trajectory in detail. 10
 (b) Explain perspective transformation. 5
 (c) Explain Tool Configuration vector. 5
7. Write a short note on :— 20
 - (a) Advantage of Robots in Biomedical
 - (b) Explain any application of Robots in Biomedical engg.
 - (c) Task planning problem
 - (d) Workspace fixtures
 - (e) Region growing.