12/12/2011 BE ETRX, CMPN, IT VIII (OLD)
Robotics

38 : 2nd half.11-AM(e)

Con. 6457-11. **(OLD COURSE)** **MP-4687**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six**.

1. (a) Define Automation. Differentiate between soft and hard automation. **5**
   (b) List and define Kinematic parameters. **5**
   (c) Explain in brief various types of work envelopes. **5**
   (d) Explain fundamental rotation. Develope fundamental rotation matrices. **5**

2. (a) Define Direct Kinematics. Develope arm equation for 5-axis RHINO XR3 robot with the help of D-H Algorithm. **10**
   (b) Explain PnP operation with sketches. **10**

3. (a) Obtain Inverse Kinematic Solution for 4 axis SCARA robot. **10**
   (b) Explain various template matching algorithms and compare them. **10**

4. (a) Classify robot as per workspace and explain in brief. **10**
   (b) Explain Bounded Deviation Algorithm (BDA) to obtain straight line motion. **10**

5. (a) List various workspace fixtures and explain them in brief. **10**
   (b) State the role of shrink and swell operators in robot vision. Differentiate between these operators with suitable examples. **10**

6. (a) List various specifications of robot and explain at least 6 significant specifications with sketches wherever required. **10**
   (b) Explain configuration space and also the role of G. V. D. in task planning. **10**

7. Write short notes on the following :— **20**
   (a) NC VS CNC machines
   (b) Interpolated motion
   (c) Perspective transformations
   (d) Tool Configuration Vector (TCV).
