BE| 6TRX) VIII | CBGS |28|11|18   Q. P. Code : 40466

[Time: 3 hours]   [Max Marks 80]

1) Question no. 1 is compulsory
2) Solve any three from the remaining five questions.
3) Assume suitable additional data if necessary.

Q1) Answer the following questions:
   a) Define the following terms: Tool Path, Tool Trajectory, Degree of Freedom, Precision and Accuracy. (05)
   b) Define robot kinematic parameters. (05)
   c) Define total work space envelope and dexterous work space envelope. (05)
   d) Explain 'Histogram ' and its significance in robot vision. (05)

Q2) a) Explain significance and use of DH algorithm. Develop DH representation of a four axis SCARA robot and obtain its arm matrix. (15)
    b) Explain the significance of major and minor axes. (05)

Q3) a) Explain four fundamental operations for merging of frame k-1 with frame k. Obtain the general link coordinate transformation matrix T for mapping the (k-1)th frame into the kth frame. (10)
    b) Explain robot motion planning using Bug 1, Bug 2 and tangent algorithm. (10)

Q4) a) Develop the Inverse Kinematic solution for a three-axis planar robot having joint combination as – RRR, base –shoulder – tool roll. (10)
    b) Explain role of line and area descriptors for analyzing shape of an object. (10)

Q5) a) What are Generalised Voronoi Diagrams (GVDs) and role played by them in robot motion planning. (10)
    b) Explain template matching algorithm and its use in robot vision. (10)

Q6) Write short notes on. (ANY TWO)
   a) Inverse Perspective transformation (10)
   b) Visibility Graphs (10)
   c) Lagrangian Mechanics (10)
   d) Cartesian space trajectory (10)

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