

B.E/B.Tech(Full Time) Degree End Semester(Arrear) Examinations April/ May 2012**Industrial Engineering Branch****VII Semester****MF9031 Robotics****(Regulations 2008)****Time : 3 hours****Max Marks: 100**

Use of Industrial Engineering Tables May Be Permitted

25**Answer All Questions****Part – A (10 x 2= 20 Marks)**

1. Define Robot.
2. Give the advantages of parallelogram jointed robotic configuration.
3. Give the disadvantages of Magnetic gripping devices.
4. If the robot has to handle varying load conditions what type of motors to be used? Give reasons.
5. Give the complete classification of sensors.
6. Give any two applications of tactile sensors.
7. What do you mean by homogeneous transformation?
8. Compare forward and inverse kinematics.
9. What are the disadvantages of pay back method?
10. Give few application of Bio Robotics.

Part – B (5 x 16= 80 Marks)

11. (a). Explain in detail the various specifications and their variations of robotic parts that one may look forward before implementation of robot for an application.
12. (a). Compare the various characteristics of Servo motors and Stepper motor
(Or)
12. (b). Give complete classification of grippers and explain any four of them.
13. (a). Explain in detail construction and working of Synchro and Resolvers
(Or)
13. (b). Explain in detail Construction and Working of two types of Optical encoders.
14. (a). (i). Give the general matrix for rotating the X axis, Y axis and Z axis to θ degrees (6)
(ii). For a vector $V = 25i + 10j + 20k$, perform a translation by a distance of 8, 5 and 0 in x, y and z respectively. The resulted transformation is rotated through 90° in z direction followed by 45° in x direction. (10)
(Or)
14. (b). A pick and place robot is employed for a stacking of parts in the carton. Parts arrive on a conveyor at every 5 seconds. The carton can contain $4 \times 4 \times 4$ parts. Carton is placed at 1.5m from the conveyor. The part is of 75mm cubic size. It takes 6 seconds for robot to place the part in the carton at the maximum distance position and return back to pickup point. Write the flow chart and VAL program to complete one cycle of filling the carton.
15. (a). Explain various applications of robotics in the near future
(Or)
15. (b). Explain the safety considerations that one should exercise while operating the robots