Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

MMPD-204/MMCM-204 (Old)

M.E./M.Tech., II Semester

Examination, December 2016

Robotics and Automated Material Handling

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Draw neat diagrams wherever required.

1. a) What is Robot? Explain the anatomy of three different types of robots with neat sketches.
   b) Define the following terms with examples:
      i) Robot reach
      ii) Robot accuracy
      iii) Robot envelope

2. a) Draw and discuss Basic Robot Motions with diagram.
   b) Sketch a 6-DOF Cartesian robot. Briefly describe its features.

3. a) Determine the translated vector for the vector $v = 25i + 10j + 20k$ when translation is performed by 8 in the x direction, 5 in the y direction and 0 in the z direction.
   b) Describe the inverse kinematics problem. What are its characteristics?

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4. a) Explain End Effectors and its type.
   b) Explain the Denavit-Hartenberg method of transformation.

5. a) Explain the functions of Machine Vision System of a robot.
   b) Describe Sensors and classify them in the robotic context.

6. a) Make a comparison table for the different programming languages MCL, PAL, RAIL, RPL and VAL. Elucidate their characteristics.
   b) Describe the basic structure of a Stepper Motor used in actuators.

7. a) List types of Automated Material Handling Equipments. Discuss any two.
   b) What are the considerations that effect the planning of a joint-interpolated motion trajectory of a robot arm?

8. Write short note on following: (any two)
   a) Design of Conveyor and AVG system
   b) Object Recognition and Categorization
   c) Robot softwares

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