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

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MMPD/MMCM - 204

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

Examination, June 2016

Robotics and Automated Material Handling

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.

1. What do you understand by robot anatomy? Describe the four common robot configurations with an example. What is the degree of freedom associated with the arm and body of the robot?

2. Write down the translation and rotational transformation matrix. What is homogenous transformation matrix, explain its significance. Lamina ABCD with co-ordinates A(4, 3), B(3, 1), C(8, 1) and D(7, 4) respectively is first rotated through 60° about the origin and then translated by 5 unit along X axis and 4 unit along Y axis. Find the final position and orientations of given lamina.

3. Explain work volume, pay load, control resolution, accuracy and repeatability in respect of robots.

4. What are the various types of sensors used in robots? What are the proximity sensors? Explain with help of a diagram.

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5. Define Automatic Storage and Retrieval System (ASRS) and explain its operation. What are the various types of Grippers used for material handling with robotic operations? What are the design considerations?

6. Explain the various functions of machine vision system with a reference to its application in robotics.

7. What are the methods used for programming a robot? Explain with their specific merits and demerits.

8. Write short notes on:
   a) Palletizing and Depalletizing
   b) Classification of robot joints
   c) Movements of end effector: roll, pitch, yaw

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