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Roll No .....

**MMCM/MMPD - 204****M.E./M.Tech. II Semester**

Examination, December 2015

**Robotics and Automated Material Handling****Time : Three Hours****Maximum Marks : 70****Note:** Attempt any five questions. All questions carry equal marks.

1. a) Write in brief about robot anatomy.  
b) Classify robot drive systems and discuss any two in details.
2. a) What do you mean by manipulator path control? Discuss motion types and joint space schemes in details.  
b) Define robot arm dynamics with minimum and maximum inertia. Write down the configuration of a robot controller.
3. a) Write in brief about end effectors also classifies end effectors.  
b) How grippers are design for a robot?
4. a) What are the different methods of robot programming? Also discuss powered leadthrough and manual leadthrough methods in details.  
b) Write a short note on computer control and robot software.

5. a) Compare non optical and optical position sensors.  
b) Define machine vision systems. Also discuss proximity and range sensors in details.
6. a) What are the material transfer applications? Also discuss pick and place operation in details.  
b) Discuss machine loading and unloading concept in robotics.
7. a) How storage system performance measured?  
b) Classify different types of material handling equipment.
8. a) Write in brief about robot configurations.  
b) Compare translational transformation and rotational transformation.

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