

Code No: RT41107

**R13****Set No. 1**

IV B.Tech I Semester Supplementary Examinations, February/March - 2018

**ROBOTICS AND AUTOMATION**

(Electronics and Instrumentation Engineering)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any THREE questions from Part-B*

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**PART-A (22 Marks)**

1. a) Discuss the applications and working principle of the Range sensors. [4]
- b) How to design an end effector for picking of papers from a surface. [4]
- c) What are the various methods for determining a desired trajectory of joint? [4]
- d) What is Jacobian work envelope? Explain in brief. [3]
- e) Discuss the software elements of robot and different teaching methods of robot. [4]
- f) Explain the four step process of Robotic assembly. [3]

**PART-B (3x16 = 48 Marks)**

2. a) What are position sensors? What are the different types of position sensors? What are the conditions that determine the choice of a particular type of position sensor? [8]
- b) Sketch and explain two views to indicate the work envelope of a
  - i. Cylindrical robot. [8]
  - ii. Anthropomorphic robot. [8]
3. a) What are the advantages and disadvantages of using pneumatic drives in robot manipulators? [8]
- b) What is meant by dynamic stabilization of robot? Discuss briefly. [8]
4. Find the manipulated Jacobian matrix (J) of cylindrical robot. [16]
5. Discuss with an illustrative example for any one type of Robot, solution for inverse kinematics problem of Robot. Discuss algorithm to be deployed for solving multiple solutions. [16]
6. a) Enumerate the capabilities and limitations of lead through programming methods? [8]
- b) Explain the features and capabilities of the second-generation languages. [8]
7. Explain the applications of robots in loading and unloading. [16]