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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Automation & Robotics) (Sem.-5)

ROBOTICS ENGINEERING AND APPLICATIONS

Subject Code : BTAR503-18

M.Code : 78217

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**Answer briefly :**

- 1) How do you classify robots by coordinate system?
- 2) Enumerate Isaac Asimov's three laws of robotics.
- 3) What are the three degrees of freedom associated with the arm and body motion?
- 4) What are the singularities of a manipulator? How are they classified?
- 5) What are the different parts of robotic arm? Explain.
- 6) What do you mean by magnetic gripper?
- 7) What do you mean by Jacobian matrix?
- 8) What do you mean by homogeneous transformation?
- 9) What are the methods of teaching a robot?
- 10) What do you understand by work envelop of a robot?



SECTION-B

- 11) Sketch and explain the four basic robot configurations classified according to the coordinate system.
- 12) Explain different types of sensors used in robots?
- 13) What are the design considerations in the robot end effector for holding the object?
- 14) For the point [3 7 5] perform the following operations :
 - a) Rotate 30° about X-axis
 - b) Translate 8 units along y-axis
 - c) Rotate 30° about x then translate 6 units along Y-axis.
 - d) Rotate 90° about z-axis.
- 15) Describe the industrial applications of robots for machine loading and unloading and assembly operations.

SECTION-C

- 16)
 - a) Discuss about Vacuum Grippers along with their advantages and disadvantages.
 - b) What are the common types of motion that a robot manipulator can make in travelling from point to point?
- 17)
 - a) What is a robot program? Also, discuss various types of methods for entering the command into the robot?
 - b) Explain the implementation of DH notation for a links coordinate system and joint parameters.
- 18)
 - a) Discuss in detail the architecture of the robot system.
 - b) Explain the steps involved in Trajectory planning.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.