Roll No. | | | | | | | | | | | | 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.