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Total No. of Pages : 02

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B.Tech. (Computer Science & Engg./Electrical Engg./Electronics & Communication Engg.) (Sem.–7)

ROBOTICS & AUTOMATION

Subject Code : BTEC-907C-18

M.Code : 90612

Date of Examination : 14-07-22

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS 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

1. Write briefly :

a) Why do we use robots in the industry?

b) What are the advantages of offline programming?

c) What do you mean by magnetic gripper?

d) What do you mean by manipulator jacobian?

e) Which are the sensors used in robots for sensing position and force?

f) What are the components of a robot?

g) What is inverse kinematics problem?

h) Describe pitch, yaw and roll motion of a robot wrist.

i) What is the necessity of dynamic modelling of robotic manipulators?

j) What are the basic characteristics of a robot-level language?

SECTION-B

2. What is a robot work cell? What are the different classifications of work cell layout?

3. What is the role of D-H notation? Explain their importance in solving Forward Kinematics.

4. What are the singularities of a manipulator? How are they classified?

5. How will you plan a straight-line trajectory in Cartesian space?

6. Describe the role of DC motors in Embedded systems with an application to Robotics.

SECTION-C

7. Explain about joint angle, joint distance, link length and link twist with the help of D-H representation.

8. What is the role of inverse Jacobian operator in velocity kinematics? Also, explain the significance of singularities in the same.

9. Obtain the dynamic model of 1 DOF robot operated by an electric motor.

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.