Roll No. ☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

B.Tech (Automation & Robotics) (2011 & Onwards) (Sem.-6)

ADVANCED ROBOTICS
Subject Code : BTAR-601
M.Code : 71065

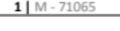Time : 3 Hrs.   Max. Marks : 60

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. What is pose of a rigid body?

   b. What is the physical significance of degree of a freedom?

   c. What is forward kinematics?

   d. Write down forward kinematics of two link planer arm.

   e. What is difference between direct and inverse dynamics?

   f. What is the goal of motion planning of a robot?

   g. What is PID control?

   h. Discuss the performance of feedback control systems.

   i. What is state space representation?

   j. What is offline programming of a robot?

SECTION-B

2. Explain the inverse kinematics of robot.

3. Write D-H notation for robots and define homogeneous transformation matrix.

4. What are the advantages and disadvantages of the Euler-lagrange and Newton-Euler formulation?

5. Discuss the several techniques used for controlling the motion of a robot.

6. What is the difference between point to point motion and continuous path motion? Also, discuss their applications.

SECTION-C

7. (a) Explain robot programming using teach pendent.

    (b) Explain walk through programming of robot.

8. Derive the dynamic equation of motion of a one link arm using Euler–Lagrange formulation.

9. (a) What are the functional requirements of a robot? Discuss in detail.

    (b) Discuss the recursive dynamics using Newton Euler formulation.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.