



B.Tech VII Semester Supplementary Examinations, December 2024

ROBOTICS
 (ME)

Maximum Marks: 70

Date:07.01.2025

Duration: 3 hours

- Note: 1.This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	What are the key features that distinguish robots from other forms of automation such as CNC machines.	1	L1
2	Explain the degree of freedom of a manipulator.	1	L1
3	Discuss the various types of grippers mechanism.	2	L1
4	Differentiate joint coordinates and world coordinates	2	L1
5	What is Lagrange – Euler formulations? What are its applications?	3	L1
6	What are the advantages of Euler-Lagrange formulation?	3	L1
7	Differentiate joint space trajectory and Cartesian trajectory planning.	4	L1
8	What is potentiometer?	4	L1
9	Explain about Hydraulic actuators.	5	L1
10	In which type of production, robots are preferred for loading and unloading function?	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Sketch and explain the four basic robot configurations classified according to the coordinate system. [10M]	1	L2
OR			
12	Discuss in detail about Magnetic gripper with neat sketch. [10M]	1	L2
13	Determine the transformation matrix T that represents a translation of 'a' units along x-axis, followed by a rotation of β about x-axis and followed by a rotation of Θ about z-axis. [10M]	2	L2
OR			
14	What is the role of D-H notation? Explain their importance in solving Forward Kinematics. [10M]	2	L2

15	Using Lagrangian method , derive the equations of motion for the two degree of freedom robot arm, shown in figure, the center of mass for each link is at the center of link. The moments of inertia are I_1 and I_2 [10M]	3	L2
OR			
16	Explain in detail about the Trajectory for cubic polynomials. [10M]	3	L2
17	What are the uses of sensor in robotics? What are the types of sensors used in robotics? [10M]	4	L2
OR			
18	Compare stepper motor and D.C. motor drives for a robot. [10M]	4	L2
19	What are the desirable features of a robot for successful machine tool load/unload applications? [10M]	5	L2
OR			
20	What are essential characteristics of a spot welding manipulator? [10M]	5	L2