R18 Regulation *Subject code:2E7CE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VII Semester Supplementary Examinations, November 2025

ROBOTICS

(ME)

Maximum Marks: 70 Date: 03.12.2025 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.
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)		Marks	CO	BTL
1	Explain the following (a) Accuracy (b)Repeatability	2M	1	L1
2	Explain the degree of freedom of a manipulator.	2M	1	L1
3	Discuss the various types of grippers mechanism.	2M	2	L1
4	Differentiate joint coordinates and world coordinates	2M	2	L1
5	What is Lagrange – Euler formulations? What are its applications?	2M	3	L1
6	What are the advantages of Euler-Lagrange formulation?	2M	3	L1
7	Differentiate joint space trajectory and Cartesian trajectory planning.	2M	4	L1
8	What is potentiometer?	2M	4	L1
9	Explain about Hydraulic actuators.	2M	5	L1
10	Discuss robot application for assembly and inspection.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
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 homogenous transformation matrix? Explain four sub matrices?	10M	2	L2
15	Explain Newton –Euler formulation. Write its applications.	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