R18 Regulation *Subject code:2E7CE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, May 2026

ROBOTICS

(ME)

Maximum Marks: 70 Date: 15.05.2026 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	What are the key features of robots.	2M	1	L1
2	Write 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	Differentiate forward and inverse kinematics.	2M	3	L1
6	What do you mean by Jacobian matrix?	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 electric & stepper motors.	2M	5	L1
10	Explain in brief about spray painting application in robots.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Describe about SCARA (PRRRP) Robot.	10M	1	L2
	OR			
12	Discuss in detail about Magnetic gripper with neat sketch.	10M	1	L2
13	Determine the revolution matrix for a rotation of 45^0 about y-axis followed by a rotation of 120^0 about z-axis, and a final rotation of 90^0 about x-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	Explain Newton –Euler formulation. Write its applications.	10M	3	L2
	OR			
16	What is the function of a manipulator? Discuss the working of a robotic manipulator arm with a sketch.	10M	3	L2
17	A single cubic trajectory given by q(t)= 30+t2-6t3 is used for a period of 3 seconds. Determine starting and final position, velocity and acceleration of end effector.	10M	4	L2

	OR			
18	What are the types of actuators explain with neat sketch?	10M	4	L2
19	Explain about simple pick and operation with neat sketch.	10M	5	L2
	OR			
20	What are essential characteristics of a spot welding manipulator?	10M	5	L2