



R18 Regulation

Subject code: 2E7CE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, April 2024

Robotics

(Mechanical Engineering)

Maximum Marks: 70

Date: 30.04.2023 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)

- 1 What is meant by pitch, yaw and roll?
- 2 Define automation in robotics.
- 3 Discuss the various types of grippers mechanism.
- 4 Differentiate joint coordinates and world coordinates
- 5 Differentiate forward and inverse kinematics.
- 6 What do you mean by Jacobian matrix?
- 7 What is Newton – Euler formulations? What are its applications?
- 8 What is potentiometer?
- 9 Explain about electric & stepper motors.
- 10 Explain in brief about spray painting application in robots.

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 Describe about SCARA (PRRRP) Robot. [10]

OR

- 12 Discuss in detail about Magnetic gripper with neat sketch. [10]
- 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. [10]

OR

- 14 What is the role of D-H notation? Explain their importance in solving Forward Kinematics. [10]
- 15 Determine the manipulator Jacobian matrix and singularities for the 3-DOF articulated arm. [10]

OR

- 16 What is the function of a manipulator? Discuss the working of a robotic manipulator arm with a sketch. [10]
- 17 Briefly explain the working principle of any two types of position sensors with neat sketch. [10]

OR

- 18 What are the types of actuators explain with neat sketch? [10]
- 19 With neat sketches, explain velocity sensors used in Robots. [10]

OR

- 20 Explain the applications of Robot in spot and continuous arc welding. [10]