

CMR ENGINEERING COLLEGE: : HYDERABAD

UGC AUTONOMOUS

III-B.TECH-II-Semester End Examinations (Regular) - June- 2024

INDUSTRIAL ROBOTICS

(CSM, AI&DS)

[Time: 3 Hours]

[Max. Marks: 70]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A**(20 Marks)**

1. a) List the different components of Robot. [2M]
- b) Write about accuracy. [2M]
- c) What do you mean by homogeneous transformation? [2M]
- d) Differentiate joint coordinates and world coordinates. [2M]
- e) What do you mean by manipulator jacobian? [2M]
- f) List the steps involved in trajectory planning. [2M]
- g) Write about position sensor. [2M]
- h) What are the end effectors? Give one example. [2M]
- i) Mention the features required for robot in spot welding. [2M]
- j) List out different robot programming languages. [2M]

PART-B**(50 Marks)**

2. Write a short note on application of robot in various fields in emerging technology. [10M]
- OR**
3. Write short notes on the following: [10M]
 - i. Resolution.
 - ii. Degrees of Freedom.
 - iii. Speed of response.
 4. Determine a composite rotation matrix for the following sequence of rotations i) Rotation of angle α about X-axis, ii) Rotation of angle β about Y-axis and iii) Rotation of angle γ about Z-axis. [10M]
- OR**
5. What are the different types of motion that a robot manipulator can make in travelling from point to point? Explain. [10M]
 6. Describe trajectory planning system with reference to robots. [10M]
- OR**
7. Explain newton Euler formulation for a robot arm with advantages and disadvantages. [10M]
 8. Illustrate the working of Force and Torque sensor in detail with advantages and disadvantages. [10M]
- OR**
- 9.a) Explain the working of a stepper motor. [5M]
 - b) List out the merits and demerits of hydraulic and pneumatic actuator. [5M]
 10. Describe the working and implementation of robot in spot and continuous arc welding process. [10M]
- OR**
11. Discuss various programming methods used in robotics with examples and features of each. [10M]
