

CMR ENGINEERING COLLEGE: : HYDERABAD**UGC AUTONOMOUS****III-B.TECH-II-Semester End Examinations (Supply) - December- 2025****INDUSTRIAL ROBOTICS****(Common for 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) Define automation. [2M]
- b) Specify the basic components in a robot. [2M]
- c) Differentiate between Forward kinematics and reverse kinematics. [2M]
- d) Write about homogeneous transformation. [2M]
- e) List any two applications of straight line interpolation robotics. [2M]
- f) What do you mean by Jacobian matrix? [2M]
- g) List the advantages and disadvantages of pneumatic actuators. [2M]
- h) Mention the limitations of potentiometer. [2M]
- i) List the features required for robot in spray painting. [2M]
- j) State the applications of robots in different fields. [2M]

PART-B**(50 Marks)**

2. Discuss in detail the factors to be considered while selection and design of grippers. [10M]
- OR**
3. Write short notes on the following: [10M]
 - i) Repeatability.
 - ii) Degrees of Freedom.
 - iii) Speed of response.
4. Explain about homogeneous transformations in robot kinematics. [10M]
- OR**
5. Derive forward & inverse kinematics equations of manipulator for a particular position. [10M]
6. Differentiate between Lagrange Euler and Newton Euler Formulation. [10M]
- OR**
7. Explain briefly about the following: [10M]
 - i) Slew motion ii) joint interpolated motion iii) straight line motion.
8. Describe the various types of sensors used in industrial robots with necessary examples. [10M]
- OR**
9. With the neat sketch explain the construction and working principle of Pneumatic actuators. [10M]
10. Give the different applications of robot in manufacturing industries. [10M]
- OR**
11. Explain about Robot Programming Languages in detail. [10M]
