

Code No: 158BG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, September - 2022

INDUSTRIAL ROBOTICS

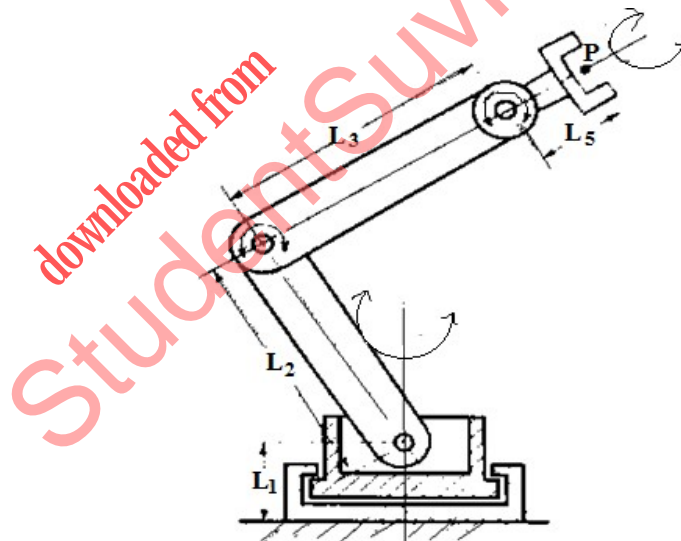
(Mechanical Engineering)

Time: 3 Hours

Max.Marks:75

Answer any five questions
All questions carry equal marks

- 1.a) Write the main characteristics of robot application in industry.
- b) Define Automation. Discuss the reasons for automating the existing mechanized units. [7+8]
2. What are the basic components of Industrial robots? Explain the functional of the components briefly. [15]
3. A vector $v = -3i + 5j - 6k$ is rotated by 60° about Z axis followed by translation of +3units in Y axis, followed by rotation of 30° about Y axis, followed by rotation of 45° about X axis of the reference frame. Find the homogeneous transformation matrix. [15]
4. A five d.o.f manipulator is shown in figure. Assign the frames and obtain joint-link parameters. Formulate forward kinematic model. [15]



- 5.a) What do you mean by manipulator Jacobean? Explain.
- b) Explain how Jacobian is computed for a rotary joint. [5+10]
6. Describe the features and calculations of cubic trajectory. [15]
- 7.a) Briefly explain the working of a stepper motor. Give its advantages.
- b) Explain the construction and working of potentiometer. [8+7]
8. Explain the use of robots in
 - a) Material handling application
 - b) Spray painting application. [8+7]

---oo0oo---