

Code No: 158DG

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

FUNDAMENTALS OF ROBOTICS

(Common to CE, ME, ECE, CSE, IT)

Time: 3 Hours

Max.Marks:75

Answer any five questions

All questions carry equal marks

- 1.a) Explain the basic components of a robot system with the help of a line diagram.
- b) Explain with principles of operation use of wrist force sensor with force sensing.[7+8]
- 2.a) Write a short note on internal and external sensors in Robotics.
- b) Discuss the role of Robotics in Engineering. [8+7]
- 3.a) Write a short note on homogenous transformation in Robotics.
- b) Differentiate magnetized gripper and pneumatic gripper. [7+8]
- 4.a) Explain the mechanical grippers and their linkage mechanisms with neat sketches.
- b) Explain the concept of differential kinematics in Robotics. [8+7]
- 5.a) Differentiate between path planning and trajectory planning.
- b) Determine the manipulator Jacobian matrix and singularities for the 3-DOF articulated arm. [7+8]
- 6.a) Write a short note on manipulator Jacobian in Robotics.
- b) Solve the fifth order polynomial trajectory-planning problem with a suitable example.[7+8]
- 7.a) What are the different Robot programming languages?
- b) Write the capabilities and limitations of Lead through programming. [7+8]
- 8.a) Sketch and explain different robot layout cells used in industrial applications. Discuss advantages, limitations and applications of each one.
- b) What features are required for Robot in spray painting? [8+7]

---0000---