

1129
B. E. (Mechanical Engineering)
Fifth Semester
MEC-503: Robotics

Max. Marks: 50

Time allowed: 3 Hours

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) What is LSPB-1 and LSPB-2?
- b) What is SCARA?
- c) What is working principle of torque sensor?
- d) What are manipulator parameters?
- e) What is inverse kinematics of Robot? (5x2)

UNIT - I

- II. a) Explain four configuration of robot arm with the help of neat sketches. (2x5)
b) Write industrial applications of Robot.
- III. a) Describe robot end effectors. Explain operation of mechanical grippers.
b) What do you understand by robot workspace? Draw the workspace for cylindrical and spherical robot arms. (2x5)
- IV. a) Explain Ultrasonic proximity sensor working principal and its application. (2x5)
b) How range sensor works? Explain its application in defence.

UNIT - II

- V. The path traced by a joint of a robot manipulator is described by the fifth degree 10 polynomial. The joint has to start from an initial angle of 10° to 20° . The starting acceleration and the ending deceleration 2 deg. /sec^2 . The velocities being zero, find the equation of motion for joint. The range is covered in 2 seconds. (10)
- VI. a) Explain robotic vision with block diagram.
b) Explain analogue to digital conversion techniques step by step. (2x5)
- VII. Write program and also draw flowchart to palletize the object in VAL commands. (10)

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