1079

Exam.Code:0941
Sub. Code: 7054

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

Time allowed: 3 Hours

Max. Marks: 50

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

x-x-x

I. Attempt the following:-

a) What is are LSPB-1 and LSPB-2?

b) How robots are specified?

c) What is working principle of proximity sensor?

d) What are manipulator parameters?

e) What is work volume? (5x2)

UNIT – I

II. a) A point $P_{abc} = (2, 3, 4)^T$ has to be translated through distance of +4 units along OX- axis and -2 units along OZ-axis. Determine the co-ordinates of the new point P_{xyz} by homogeneous transformation.

b) Write industrial applications of Robot. (5,5)

III. a) Define forward and inverse kinematics of robots.

b) Describe robot end effectors. Explain operation of mechanical grippers. (5,5)

IV. a) Drive Lagrangian equation of motion.

b) Why inverse kinematics solution is not unique for generic robots? (5,5)

UNIT – II

V. The path traced by a joint of a robot manipulator is described by the fifth degree polynomial. The joint has to star 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 different types of range finder sensors with sketch.

b) Explain with diagram working principle of vidicon camera. (2x5)

VII. Write program and also draw flowchart to palletize the object in VAL commands. (10)

x-x-x