22383

23124

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

a) State the law of robotic.

b) Define Kinematics and Dynamics.

c) State the significance and use of jacobian Matrix (Any two)

d) Write the importance of Robotic language.

e) Differentiate between point to point vs continuous path planning (Any Two)

f) Define Linear velocity and Linear acceleration.

g) Define repeatability and Precision in robotics.

Marks

2. Attempt any THREE of the following : **12**

a) Compare between Pneumatic and Hydraulic Actuator.

b) State the relationship between linear velocity and angular velocity.

c) Explain structure of a robot language with block diagram.

d) Compare lead through and walk through programming.

3. Attempt any THREE of the following : **12**

a) Compare between kinematic model and Dynamic Model.

b) Explain Pneumatic actuator with diagram of single and double acting cylinder.

c) Mention the type of joints with diagram.

d) Explain single slider crank mechanism with diagram.

4. Attempt any THREE of the following : **12**

a) Explain the principle of vacuum gripper and adhesive gripper.

b) State DH parameter and define them.

c) Describe Lagrange - Euler method and state its equation of motion in dynamics.

d) State the function of keys on teach pendent. (Any Four)

e) Derive DH parameter for SCARA Robot.

5. Attempt any TWO of the following : **12**

a) Mention any six safety measure while working with robot.

b) Derive homogenous transformation matrix of 2R Planar robot.

c) Define jacobian matrix equation in robotics with the description of each parameters.

Marks

6. Attempt any TWO of the following : **12**

a) Derive the homogenous transformation matrix.

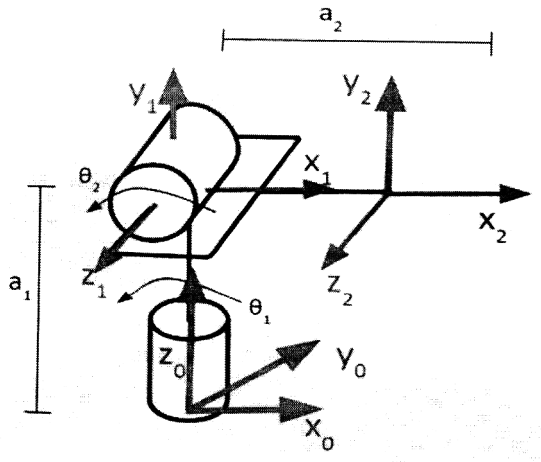

Fig. No. 1

b) Describe online and offline programming of robot.

c) Derive the rotational operator matrix for ROT (Z, θ)