ME/SemII/CBCGS/MechCAD/CAM/Robotics/M-J-17

11051A

Q.P. Code :16430

[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B: i) Question No. 1 is compulsory
ii) Solve any three question from remaining
iii) Figure to the right indicate marks
iv) Assume suitable data wherever necessary with justification

Q.1 Write Short notes on the following: 20
a) Degrees of Freedom
b) Work space
c) Applications of Robotic manipulators in the Industry
d) Robot cell design and control.

Q.2 a) Differentiate between Direct kinematics and inverse kinematics. 10

b) Sketch a 3D.O.F cylindrical configuration (RPP) robotic manipulator and formulate direct kinematics problem. 10

Q.3 Derive the dynamic formulation of a two link manipulator using Lagrange -Euler formulation. 20

Q.4 a) Explain the PID control of the Joint actuator. 10

b) Explain the segmentation technique used in image processing with an illustration 10

Q.5 a) Explain the Trapezoidal velocity profile for trajectory planning of an actuator 10

b) Explain position, Velocity and accelerator sensors used in robotics. 10

Q.6 Write short notes on 20
a) Types of Mechanical grippers.
b) Artificial intelligence and task planning.
c) Rohot programming
d) Social issues and economies of robots.

****