PVP 14

Code: ME7T4B

IV B.Tech - I Semester – Regular/Supplementary Examinations
March - 2021

ROBOTICS
(MECHANICAL ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22 M

1.

a) Define work volume.
b) Classify the robots as per the type of control and mobility.
c) What are the problems associated with magnetic gripper?
d) How will sensor evaluated?
e) Differentiate between a transducer and a sensor.
f) Write a short note on importance of kinematic study of the robot.
g) Write down the basic types of robot programming.
h) How can you define a manipulator?
i) Briefly explain the function of a piezoelectric sensor.
j) List out the few robot application areas in manufacturing.
k) List any two applications of straight-line interpolation in robotics.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Sketch robot anatomy and show the work volume. 8 M

   b) What are end effectors? Sketch various grippers and show the degrees of freedom. 8 M

3. a) What is homogenous transformation matrix? Explain four sub matrices in D-H notation. 8 M

   b) Determine the transformation matrix T that represents a translation of 'a' units along x-axis, followed by a rotation of 'β' about x-axis and followed by a rotation of 'Θ' about z-axis. 8 M

4. Explain about Newton – Euler formulations by considering an example. 16 M

5. a) What are the uses of sensors in robotics? Explain the types of sensors used in robotics. 8 M

   b) Explain about Force sensors with neat sketch. 8 M

6. a) Write short notes on "Applications of robot in manufacturing system". 8 M

   b) Explain the basic components of a "Robot Arc Welding System". 8 M