PVP 14

Code: AE6T6FE-A, CS6T5FE-B, EC6T6FE-F, EE6T6FE-F

III B.Tech - II Semester – Regular/Supplementary Examinations
AUGUST 2021

ROBOTICS

(Common for AE, CSE, ECE & EEE)

Duration: 3 hours Max. Marks: 70

PART – A

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

11x 2 = 22 M

1.

a) What are the benefits of industrial robot?
b) Define accuracy and repeatability of a robot.
c) Justify whether the following statement is true or false. Degree of freedom depends upon the number of actuators used in a robot.
d) Define a robot manipulator.
e) Write a rotation matrix about x and y-axes.
f) What are the joint and link parameters for kinematic modeling?
g) List various types of drives used in robots.
h) What is a proximity sensor?
i) Differentiate between manual and powered lead through programming methods.
j) Write any two general considerations in selecting a robot for material handling?
k) What is the classification of robots by control system?

PART – B

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

3 x 16 = 48 M

2. a) Explain present and future applications of robots. 8 M

   b) Sketch and explain the four basic robot configurations classified according to the coordinate system. 8 M

3. a) Sketch line diagram of a robot arm and explain the functions of main components. 8 M

   b) What are the various factors in grippers selection and design? Explain. 8 M

4. a) What is homogenous transformation matrix? Explain. 8 M

   b) What is DH Matrix? Derive Denavit Hartenberg matrix. Explain in brief. 8 M

5. a) Explain the working of a stepper motor with a neat sketch. 8 M

   b) Explain optical encoder and resolvers in detail with neat diagrams. 8 M

6. a) What is robot programming? Explain different methods of robot programming. 8 M

b) Demonstrate the application of robot's in

i) Continuous arc welding. 4 M

ii) Machine loading and unloading. 4 M