

Code: AE6T6FE-A, CS6T5FE-B

III B.Tech - II Semester – Regular Examinations – May 2017

ROBOTICS
(Common for AE & CSE)

Duration: 3 hours

Max. Marks: 70

PART – A

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

11x 2 = 22 M

1.

- a) Which is the first robot and when it is introduced to the world?
- b) What are three laws of robotics?
- c) Discuss the advantages and disadvantages of using robots in industry?
- d) What are common types of arms?
- e) What are the types of End effectors?
- f) What are D-H parameters?
- g) Define forward transformation and inverse transformation?
- h) Write the principle of resolver.
- i) What is the use of proximity sensors?
- j) List out the software packages used for Robot programming.
- k) What features are required for robot in spray painting?

PART – B

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

3 x 16 = 48 M

2. a) What are the future applications of Robot? 4 M
- b) Sketch and explain the four basic robot configurations classified according to the coordinate system. 12 M
3. a) With the help of line diagram show basic components of a robot connected to a system. 8 M
- b) What do you understand by degree of freedom (DOF)? How many DOFs are required to position an end effector at any point in 3-D space? 8 M
4. a) Explain the process of calculation of final DH matrix with the DH parameter table. 10 M
- b) Consider a vector P. We wish to rotate it about Z by 15 degrees and translate it 4 units in X_A , and 9 units in Y_A , Find new position vector P^1 . where $P = [3 \ 2 \ 0]^T$ 6 M
5. a) Define actuator? Describe the working of Electric actuating system with a neat diagram. 8 M

b) Discuss briefly about the encoders and velocity sensors.

8 M

6. a) List the different Robot programming language and describe them briefly.

8 M

b) Explain the role of robot applications in the following operations

8 M

i) Material Transfer ii) Material Handling

iii) Loading and unloading