

2105117

BEI VIII / IT / CBSGS

Sem VIII / IT / CBSGS / Robotics.

Sub: - Robotics.

6

Q.P. Code :11619

[Time: 3 Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. Question No.1 is Compulsory.
 2. Answer any three from the remaining questions.

- (a) Define Robotics and explain its classification. 10

(b) Explain Forward kinematics in detail. 10
- (a) Explain the term work envelop & work volume for the following types of robot 10

(i) Cartesian robot (ii) Cylindrical robot (iii) Spherical robot

(b) A frame F has been moved 15 units along the Y axis and 15 units along the z axis of the reference frame. 10

Find the new location of the frame.

$$\begin{bmatrix} 0.527 & -0.574 & 0.628 & 5 \\ 0.369 & 0.819 & 0.439 & 3 \\ -0.766 & 0 & 0.643 & 8 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$
- A point P (7, 3, 1)^T is attached to a frame and is subjected to the following transformations. Find the coordinates of the point relative to the reference frame at the conclusion of transformations. 20

 1. Rotation of 90 degree about the Z axis.
 2. Followed by a translation of [4, -3, 7].
 3. Followed by a rotation of 90 degree about the Y axis.
- Explain DH algorithm. Carry out the inverse Kinetics analysis of 4 axis SCARA robot. 20
- A frame B has translated a differential amount of Trans (0.01, 0.05, 0.03) units. Find its new location and 20

orientation

$$\begin{bmatrix} 0.707 & 0 & -0.707 & 5 \\ 0 & 1 & 0 & 4 \\ 0.707 & 0 & 0.707 & 9 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$
- Write short notes on any two: 20

 - A) Silhouette Method.
 - B) Bug Algorithm.
 - C) End Effecters.
