Sem VIII | CBSGS / IT / Robotics / N-D-2016

EXTRA

Q.P. Code : 724203

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question **No.1** is **compulsory**.
(2) Answer **any three** from the **remaining** questions.

1. (a) Explain the various generations of robot with example. **10**
   (b) Explain End Effecters and its types? **10**

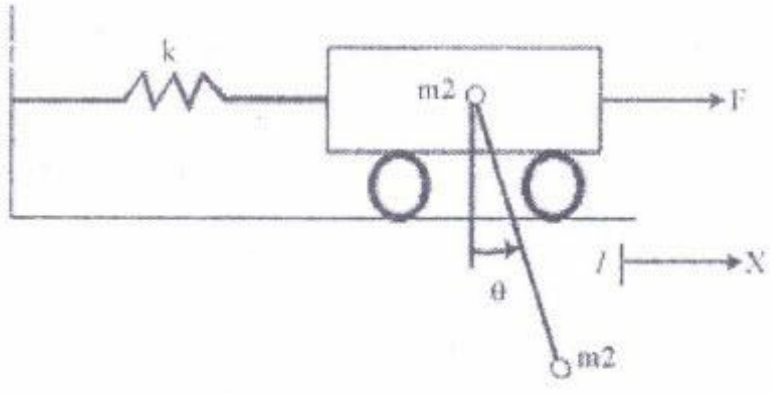
2. Given two points $a_{uvw} = (4, 3, 2)^T$ and $b_{uvw} = (6, 2, 4)^T$ with respect to the rotated OUVW coordinate system, determine the corresponding points a_{xyz} and b_{xyz} with respect to the reference coordinate system if it has been rotated 60 degree about the OZ axis. **20**

3. The desired final position and orientation of the hand of a Cartesian RPY robot is given below. **20**
   Find the necessary RPY angles and displacements :

$$ {}^{R}T_{P} = \begin{bmatrix} 0.354 & -0.674 & 0.649 & 4.33 \\ 0.505 & 0.722 & 0.475 & 2.5 \\ -0.788 & 0.160 & 0.595 & 8 \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

4. Explain DH algorithm. Carry out the inverse Kinematics analysis of 4 axis SCARA robot. **20**

5. Derive the equation of motion for the 2-DOF for the given figure. **20**



TURN OVER

6. Write short note on **any two** : **20**

(a) Direct Kinematics

(b) Bug Algorithms

(c) Silhouette methods