

Duration: 20 minutes [No Extra page]

Full Marks: 20

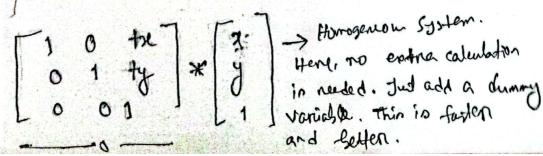
ſ	Name	ID.	Section: 12
ı	Name		

CO1	1.	What is the benefit of a homogeneous coordinate system over a cartesian coordinate System? Give an example.	05
CO1	2.	Rotate point (5,6) at an angle 60 degree clockwise with respect to point (4,3) and then scale it 4 times in x axis and 5 times in y axis with respect to origin. Find out the output point. You have to show each step properly.	15
CO1	3.		

Answer to the Question No: 01

Solution: In a cardesian eventirate system, we have to add an entre matrix to get the final nexult. This is costly. That is only, to eliminate that endna costly step, we should use Homogeneon Coordinate system. Here, we don't need to do any extra stup.

Example: for transation, y'= y+ ty 0 1 0 * [10] * [7] +



Answer to the Quedtin No:02

subutton: given point (5,3) (5,6)

respecting point (4,3)

angle 60° (clockwine)

Scale: 4timen in X & 5 timen in Y.

Cutad (before scaling) =
$$T(4.3) * R(60) * T(-4.-3) * input$$

$$= \begin{bmatrix} 1 & 0 & 4 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix} * \begin{bmatrix} \cos(-60) & -\sin(60) & 0 \\ \sin(-60) & \cos(-60) & 0 \\ 0 & 0 & 1 \end{bmatrix} * \begin{bmatrix} 5 \\ 6 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 7.098 \\ 3.6339 \\ * 1 \end{bmatrix} *$$

Output (after scoling) = Scale (4.5)
$$\#$$
 input

= $\begin{bmatrix} 4 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

= $\begin{bmatrix} 28.392 \\ 18.169 \\ 1 \end{bmatrix}$
 $\approx \begin{bmatrix} 28.392 \\ 18.169 \\ 1 \end{bmatrix}$
 $\approx \begin{bmatrix} 28.392 \\ 18.169 \\ 1 \end{bmatrix}$