Enrolment Number:

P P SAVANI UNIVERSITY
4th Semester School of Engineering (1st Internal Exam)

Subject: Computer Graphics (SECE2051)
Branch: Computer/IT

[Date: 25/03/2019] [Time: 10:15 AM to 11:15 AM] [Total Marks: 30]

Instructions:

- Figures to the right indicate full marks.
- Use of scientific calculator is allowed.
- Draw neat and clean drawings & Assume suitable data if necessary.

Q1. A Select the most appropriate option for the given questions: **(5 marks)**

1) Shear transformation can be expressed in terms of _____ and _____.
a) Rotation only
b) Scaling only
c) Reflection only
d) Product of scaling and rotation

2) _____ transformation do not change the shape of an object.
a) Shear
b) Translation
c) Scaling
d) Reflection

3) If the logical _____ of end codes of the line segment in Cohen-Sutherland line clipping is not zero, the line is totally outside the clipping window.
a) OR
b) AND
c) XOR
d) NOT

4) The translation distances dx and dy are called as the _____.
a) Shift vector
b) Translation vector
c) Both a and b
d) Neither a and b

5) The basic geometric transformations are.
a) Translation
b) Rotation
c) Scaling
d) All of the above mentioned

Q1 B What is Rotation in 2D? Derive the column vector matrix for rotation about origin

(5 marks)

Q2. A What is homogeneous co-ordinates? Give homogeneous co-ordinates for translation, rotation and scaling. (5 marks)

Q2.B Explain Reflection in 2D transformation. Give Examples of some common Reflections.

(5 marks)

OR

Q2. B What is Shearing? Apply the Shearing transformation to the square with A (0,0), B(1,0), C(1,1) and D(0,1) as given: 1) shear parameter value of 0.5 relative to line Yref= -1 2) shear parameter value of 0.5 relative to line Xref= -1

Q3. A What is translation in 2D? Translate a polygon with co-ordinates A(2,5), B(7,10) and C(10,2) by 3 units in x-direction and 4 units in y-direction. (5 marks)

OR

Q3. A What is Composite transformation? Explain the concept of multiple scaling when scale factors are (2,1) and (3,4) for the given line pq [p(2,2), q(8,8)] (5 marks)

Q3. B What is Line Clipping? Write down the steps of Cohen-Sutherland Line Clipping Algorithm

(5 marks)

OR

Q3. B What is Line Clipping? Write down the steps of Liang-Barsky Line Clipping Algorithm.

(5 marks)

$y=0$ $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$y=yref$ $\begin{bmatrix} 1 & 0.5 & -0.5(-1) \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

* All the Best *

$\begin{bmatrix} 1 & 0.5 & +1.5 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 0 & 0 \\ Shy & 1 & -Shy\ Xref \\ 0 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 0 & 0 \\ 0.5 & 1 & -0.5(-1) \\ 0 & 0 & 1 \end{bmatrix}$

$\begin{bmatrix} 1 & 0 & 0 \\ 0.5 & 1 & 1.5 \\ 0 & 0 & 1 \end{bmatrix}$

36000
$+10000$
$+10000$
$\overline{56000}$