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RN-6763

B. E. III (Sem. V) (Computer) Examination

May / June – 2010

Computer Graphics

Time : Hours] [Total Marks :

Instruction :

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 3 (Sem. 5) (Computer)**

Name of the Subject :

☛ **Computer Graphics**

☛Subject Code No. : **6 7 6 3** ☛Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

SECTION - I

Q. 1 A		Do as directed.	10
	1	DDA stands for _____.	
	2	Define clipping.	
	3	Bresenham's line drawing algorithm uses integer arithmetic.(True/False)	
	4	Define Scan Conversion. (It is a process of representing geometric primitives such as lines, circles, ellipse etc., defined by mathematical functions, in the form of pixel positions displayed on raster scan display devices.)	
	5	In seed fill algorithms, at least two interior pixels must be known. (True/False)	
	6	If region codes for line endpoints are 0010 and 1010. The line is _____. a. Completely inside b. partially inside c. Completely outside d. none of these.	
	7	Liang-Barsky line clipping algorithm is faster than Cohen-Sutherland algorithm.(True/False)	
	8	4 and 8 connection	
	9	Midpoint subdivision line clipping algorithm is based on bisection method. (True/False)	
	10	Define Decision parameter.	
B			
	1	Write a note on frame buffer.	2
	2	Give Bresenham's line drawing algorithm for lines with slope less than 1.	5
	3	Why Bresenham's line drawing algorithm is better than DDA algorithm?	3
Q. 2	A	Derive Midpoint Circle Algorithm.	10
		OR	
	A	Derive Midpoint Ellipse Algorithm.	10
	B	Define region code with respect to Cohen-Sutherland Line Clipping Algorithm. Calculate the region codes for the lines with endpoints (300, 425) and (510, 280) for line2 (80,320) and (150, 200); the clipping window coordinates are (100, 100) and (400, 400).	5

Q. 3	A	Explain Liang-Barsky Line Clipping Algorithm.	8
	B	Explain Scan-line Polygon Filling algorithms.	7
		OR	
	B	Explain the main concept of Sutherland –Hodgeman algorithm for polygon clipping. Also, differentiate Cohen-Sutherland line clipping with mid-point subdivision algorithm.	7

SECTION - II

Q.4 (A) Define the following Terms : (Any Five) 10

1. Pure Reflection
2. Direct view storage tubes
3. Digitizer
4. Cabinet Projection
5. Fractals
6. Translation

(B) Explain RGB color model. 05

OR

Explain the architecture of a simple random scan systems? 05

© Show that the 2-D matrix [T] 05

$$\begin{bmatrix} \frac{1-t^2}{1+t^2} & \frac{2t}{1+t^2} \\ \frac{-2t}{1+t^2} & \frac{1-t^2}{1+t^2} \end{bmatrix}$$

represents a pure rotation.

Q.5 (A) Triangle ABC is represented by position vectors [2 4 1], [4 6 1] and [2 6 1] in homogeneous coordinate system. The equation of the line L is y=1/2 (x+4). Reflect the triangle ABC about line L. 08

OR

Explain rotation about an arbitrary axis in space. 08

(B) Explain Homogeneous co-ordinate system. 07

Q.6 (A) Derive the matrix for perspective projection. 08

OR

(A) Explain Shearing transformation in detail. 08

(B) Do as directed.

(I) State True or False: 03

1. When a general transformation matrix is used to transform a pair of intersecting straight lines, the result is also a pair of intersecting straight lines.

2. In parallel projection, the centre of projection is finite.
3. A reflection is a transformation that produces a mirror image of an object.

(II) Fill in the Blanks: 04

1. The transformation matrix for reflection about y=0, the x-axis is _____

2. The transformation matrix for 3-D rotation by an angle α about the y-axis is _____.

3 The _____ factor is the ratio of the projected length of a line to its true length.

4. A cavalier projection is obtained when the angle between the oblique projectors and the plane of projection is _____.