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Code: AC15 **Subject: COMPUTER GRAPH**
Time: 3 Hours **Max. Marks: 1**

JUNE 2011

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: **(2 × 10)**

a. Coloured CRT create image of

(A) single colour
(B) multiple colour
(C) single colour with no intensity information
(D) no colours

b. Boundary fill and flood fill algorithm begins with a

(A) Fruit **(B)** Leaf
(C) Picture **(D)** Seed

c. A point (x, y) is rotated about origin by 30° using the transformation $\begin{bmatrix} x' \\ y' \\ 1 \end{bmatrix} = R \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$

Indentify the R matrix from following where $a = \sqrt{3}/2 \quad b = 1/2$

(A) $\begin{bmatrix} a & b & 0 \\ b & a & 0 \\ 0 & 0 & 1 \end{bmatrix}$ **(B)** $\begin{bmatrix} a & -b & 0 \\ b & a & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} a & b & 0 \\ -b & a & 0 \\ 0 & 0 & 1 \end{bmatrix}$ **(D)** $\begin{bmatrix} a & -b & 0 \\ a & b & 0 \\ 0 & 0 & 1 \end{bmatrix}$

d. A polygon is called _____ if the line joining any two exterior points of a polygon lies completely inside the polygon

(A) windowing **(B)** concave
(C) convex **(D)** window

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e. Given a rectangular window P(0, 0), Q(30, 0), R(30, 20), S(0, 20), wha
outcode of an end point A(40, 10) of a line. The outcode format is L,R,B,

(A) 1010 **(B)** 0100
(C) 0110 **(D)** 1000

f. Difference between parallel and perspective projection lies in the

(A) center of attraction **(B)** centre of projection
(C) line of control **(D)** none

g. A Bezier cubic curve with control points P_0, P_1, P_2, P_3 is defined by the equation $f(u) = \sum_{i=0}^{3} P_i B_i^3(u)$. Identify B_2^3 from the following:

(A) $(1-u)^3$ **(B)** u^3
(C) $3u(1-u)^2$ **(D)** $3u^2(1-u)$

h. If we use 12-bit pixel address in a lookup table representation, how many bytes does the lookup table occupy

(A) 4096 **(B)** 2048
(C) 1024 **(D)** None

i. Cohen-Sutherland algorithm is used for

(A) Polygon clipping **(B)** Graph colouring
(C) Line clipping **(D)** 3D Modelling

j. Lambert's cosine law involves the angle of

(A) refraction. **(B)** illumination.
(C) normal with the surface. **(D)** reflection.

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain how shadow mask method generate colors in raster scan system? **(4)**

b. Describe the working of Light Pen. **(4)**

c. Write the steps to plot a line whose 2 end points are given as (10, 5) and (15, 9) using Bresenham's line algorithm. **(8)**

Q.3 a. What steps are required to scan-convert a polygonal area using the scan line algorithm? **(7)**

b. Describe Midpoint subdivision clipping algorithm. **(9)**

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Q.4 a. Perform a 45° rotation of triangle A(0,0), B(1,1) and C(5,2) about $P(-2,-2)$. **(8)**

b. Find a transformation which aligns the vector V = I+J+K with the vector N = 2I–J–K. **(8)**

Q.5 a. Develop the transformation matrix for generating a parallel projection. **(4)**

b. What do you understand by principal vanishing point? Describe the one-principal-vanishing-point-perspective transformation. **(4)**

c. Write an algorithm for traversing a BSP tree. **(8)**

Q.6 a. Write an expression for the Bezier curve in terms of parameter t and the 4 control points P_1, P_2, P_3 and P_4. Using this show that the Bezier curve ends in point P_4 with slope given by line P_3P_4. **(8)**

b. What is a Bezier curve? Give the polynomial of degree n representing a Bezier curve. **(8)**

Q.7 a. Explain with the help of examples the sweep representation and constructive solid geometry methods for solid geometry. **(8)**

b. Explain briefly the z-buffer algorithm. How does the z-buffer algorithm determine which surfaces are hidden? **(8)**

Q.8 a. Develop the specular illumination model for rendering a surface. How is it different from the diffuse model? **(8)**

b. Describe how phong shading model is different from Gourad shading model? Which one is better to use? **(8)**

Q.9 a. Explain what do you understand by the terms fractal dimension, initiator and generator. Illustrate with examples. **(8)**

b. Write a note on Morphing. **(8)**

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