Code: AC60 / AT60   **Subject: COMPUTER GRAPH**

AMIETE – CS/IT (NEW SCHEME)

Time: 3 Hours | **JUNE 2012** | **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

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. Pixel is

   (A) the smallest addressable point on the screen
   (B) an input device
   (C) a memory block
   (D) a data structure

b. Aliasing means

   (A) Rendering effect   **(B)** Shading effect
   (C) Staircase effect   **(D)** Cueing effect

c. The slope of the line joining the points (1,2) and (4,5) is

   (A) 0   **(B)** 1
   (C) 2   **(D)** 3

d. If (x, y) is the a point inside the clipping window then it's code according to the Cohen-Sutherland algorithm is
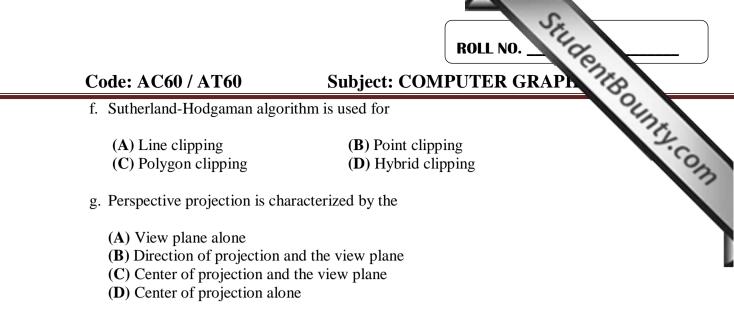
   (A) 0000   **(B)** 0001
   (C) 1000   **(D)** 1111

e. If (x,y,w), $w \neq 0$, is a point in the homogeneous coordinate system then it's equivalent in two dimensional system is

   (A) $(x,y,1)$ **(B)** $(x,y,0)$
   (C) $(x/w, y/w)$ **(D)** $(x,y,x-y)$

f. Sutherland-Hodgaman algorithm is used for

   (A) Line clipping   **(B)** Point clipping
   (C) Polygon clipping   **(D)** Hybrid clipping

g. Perspective projection is characterized by the

   (A) View plane alone
   (B) Direction of projection and the view plane
   (C) Center of projection and the view plane
   (D) Center of projection alone

h. The blending functions of Bezier curves are

   (A) Splines
   (B) Berstien polynomials
   (C) Lagrangian polynomials
   (D) Newton polynomials

i. The three dimensional matrix transformation for reflection of a point with respect to xy-plane is

   (A) $\begin{Bmatrix} -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{Bmatrix}$ **(B)** $\begin{Bmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{Bmatrix}$

   (C) $\begin{Bmatrix} 1 & 0 & 0 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{Bmatrix}$ **(D)** $\begin{Bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 1 \end{Bmatrix}$

j. Gouraud shading is

   (A) An interpolative shading method **(B)** An averaging shading method
   (C) A subdivision shading method   **(D)** Not a shading method

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

Q.2 a. Explain the use of computer-generated pictures in computer-aided design. **(8)**

   b. How are raster images created? Explain.   **(8)**

Q.3 a. How a polyline using the mouse is created? Explain.   **(8)**

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    b. Describe how an arc of a circle is drawn.

Q.4   a. Explain the Cohen-Sutherland line clipping algorithm.   **(8)**

    b. Describe the task of finding the Intersection of a line with another lie and a plane.   **(8)**

Q.5   a. Find the form of the matrix for reflection about a line L with slope m and y intercept (0, b).   **(8)**

    b. Explain the rotation about an axis through the origin in 3-D affine transformations.   **(8)**

Q.6   a. Write a method for drawing a mesh using OpenGL.   **(8)**

    b. Describe two-and three-point perspective projections.   **(8)**

Q.7   a. Explain the technique of Gouraud shading.   **(8)**

    b. Describe the Depth buffer algorithm for removing hidden surfaces.   **(8)**

Q.8   a. Explain recursive flood-fill algorithm.   **(6)**

    b. Which pixels on an edge belong to a polygon? Explain.   **(5)**

    c. Briefly explain prefiltering and post filtering approaches to antialiasing.   **(5)**

Q.9   a. Explain the de Casteljau algorithm for three points. Can de Casteljau algorithm be extended to any number of point?   **(8)**

    b. Explain 'Affine Invariance' and Convex Hull property' with respect to Bezier curve.   **(8)**