

AMIETE – CS/IT {NEW SCHEME}

Time: 3 Hours

JUNE 2015

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. The maximum number of points displayed on CRT without overlapping is known as
- (A) Pixel (B) Resolution
(C) Aspect ratio (D) Persistence
- b. Which method places the starting point of string at position (x, y) and draws the sequence of characters stored in the variable string?
- (A) drawString(x, y, string); (B) charAtString(x, y, string);
(C) setString(x, y, string); (D) drawChar(x, y, string);
- c. _____ is a function that returns a pseudorandom (an apparently random value) between 0 and some upper limit.
- (A) random() (B) rand()
(C) rad() (D) rdom()
- d. In OpenGL a _____ is a *line strip* and is drawn by drawing lines between successive pairs of points: p_0 to p_1 , p_2 to p_3 and so on.
- (A) Vertex (B) Polygon
(C) Polyline (D) Graphs
- e. Coordinates of a point (x,y) when reflected about a straight line $y = -x$ in 2-Dimension is.
- (A) (-x,y) (B) (y, x)
(C) (x,-y) (D) (-y,-x)

Code: AC111/AT111

Subject: COMPUTER GRAPHICS & VISUALIZATION

- f. _____ is a process which gives a special effect of melting down of one image into another.
- (A) Projection (B) Morphing
(C) Rendering (D) Rasterization
- g. The inverse transformation of an affine transformation is another affine transformation, whose matrix is the
- (A) Original matrix (B) Inverse matrix of the original
(C) Transpose matrix of the original (D) Image of the original matrix
- h. The z-buffer algorithm is used to _____
- (A) Find the largest depth value z
(B) Find the smallest depth value z
(C) Find the average of the frame buffer
(D) Calculate the intensity at (x, y)
- i. Reflection of a point about x-axis, followed by a counter-clockwise rotation of 90° , is equivalent to reflection about the line?
- (A) $x + y = 1$ (B) $y = -x$
(C) $x = y$ (D) none of these
- j. In displaying a clipped picture the efficient method is?
- (A) Clipping against the window and then applying the window transformation
(B) Applying window transformation and then clipping against the viewport
(C) Both (A) and (B) have the same efficiency
(D) Efficiency depends on whether the window is an aligned rectangle or not

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

- Q.2**
- a. List some of the application areas where computer graphics can be used? (4)
 - b. Discuss the major differences between raster scan and random scan display. (4)
 - c. What are the important components of GUI? Mention some of the general practices which should be maintained to develop an effective GUI. (8)
- Q.3**
- a. Define polygon filling. Explain boundary filling for a polygon with suitable example. (8)
 - b. Digitize a line from with endpoints (20, 10) and (30, 18) using Bresenham's straight line algorithm. Give first five pixel locations. (8)

- Q.4** a. What are the basic attributes of a straight line segment? Explain with the help of suitable functions. (8)
- b. Describe general Scan-Line Polygon-Fill Algorithm. (8)
- Q.5** a. Prove that a midpoint of a straight line PQ[(0, 2), (3, 2)] after transformation $\begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix}$ will be the same midpoint of the transformed straight line P'Q' drawn after the transformation. (8)
- b. Show that 2D rotation followed by scaling operation is commutative if $S_x=S_y$. (5)
- c. Explain scaling in 2D with respect to a general fixed point. (3)
- Q.6** a. Describe Liang-Barsky line clipping algorithm? (8)
- b. Using Cohen-Sutherland line clipping, compute the visible portion of the line segment A(0.6,0.8), B(2.4,1.7) for window $(x_{min},y_{min})=(0,0)$ and $(x_{max},y_{max})=(2,2)$. (8)
- Q.7** a. Define Diffuse reflection and Specular reflection. Give the intensity of light in both the cases. (8)
- b. Describe Back face hidden surface removal algorithm along with its limitations. (8)
- Q.8** a. Explain how logical input-device can be classified in terms of the kind of data to be input by the devices? (10)
- b. Explain virtual reality environment. (6)
- Q.9** a. What is animation? What are the different methods to produce real time animation? (8)
- b. Write short notes on: (2×4)
- (i) Frame-by-frame animation
- (ii) Keyframes