

Code: AC15

Subject: COMPUTER GRAPHICS

AMIETE –CS (OLD SCHEME)

Time: 3 Hours

OCTOBER 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. A 512x512 raster requires

- (A) 2^{12} (B) 2^{18}
(C) 2^8 (D) 2^{10}

b. Aliasing means

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

c. The slope of the line joining the points (3,0) and (5,0) is

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

d. The technique of using a minimum number of intensity levels to obtain increased visual resolution is called

- (A) Dithering (B) Halftoning
(C) Depth cueing (D) Rendering

e. If two bits are zeros and two bits are ones in a code of a sub-region in Cohen–Sutherland line clipping algorithm then the sub region is

- (A) Corner region (B) Middle region
(C) Central region (D) None of these

f. 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

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g. The blending functions of Bezier curves are

- (A) Splines (B) Bernstein polynomials
(C) Lagrangian polynomials (D) Newton polynomials

h. The three dimensional matrix transformation for reflection of a point with respect to zx-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)
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

i. Axonometric projection is

- (A) An orthographic projection (B) A perspective projection
(C) An oblique projection (D) A multiview projection

j. Painter's algorithm is also called

- (A) Scan line algorithm (B) Subdivision algorithm
(C) Depth sort algorithm (D) Rendering algorithm

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

- Q.2** a. Explain the following physical Interactive devices
(i) Tablets (ii) Joystick
(iii) Trackball (iv) Light Pen (8)
- b. Using Bresenham's algorithm, scan convert a circle with centre (0,0) and radius 5 units. (8)
- Q.3** a. Reflect the diamond-shaped polygon whose vertices are A(-1,0), B(0,-2), C(1,0) and D(0,2) about the horizontal line y=2. (8)
- b. Describe two-point and three-point perspective projections for a cube. (8)

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- Q.4** a. Describe Oblique parallel projections using suitable diagram. (8)
- b. Explain the sweep representations of solid modeling. Give suitable examples. (8)
- Q.5** a. Describe the scan line Z-buffer algorithm. (8)
- b. Explain the Painter's algorithm for hidden surface removal. (8)
- Q.6** a. Discuss advantages and disadvantages of various shading models over one another. (8)
- b. Describe the Gouraud shading method for rendering an object. (8)
- Q.7** Explain the following:
- (i) Raster animation.
 - (ii) Key-frame systems
 - (iii) Morphing
 - (iv) Simulating accelerations (4×4)
- Q.8** a. Describe the properties of Bezier curves. (8)
- b. Explain the Cohen-Sutherland subdivision algorithm. (8)
- Q.9** Write short notes on any **FOUR** the following:
- (i) Periodic and non-periodic B-spline curves.
 - (ii) Aliasing and Half toning
 - (iii) 3-D transformations
 - (iv) Cubic spline curves
 - (v) Back- face detection (4×4)