

AMIETE – IT (OLD SCHEME)

Time: 3 Hours

DECEMBER 2011

Max. Marks: 100

NOTE: There are 9 Questions in all.

- Please write your Roll No. at the space provided on each page immediately after receiving the Question Paper.
- 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. Refresh rate on a random access device depends on

- (A) The architecture of the system.
- (B) The colour of the CRT.
- (C) The number of lines to be displayed.
- (D) The size of the monitor.

b. In the Cohen & Sutherland clipping algorithm, if the out codes of two end points of line are non zero but their AND operation gives (0000) then the line is

- (A) completely invisible
- (B) completely visible
- (C) partially visible
- (D) incomplete data

c. This projection is formed by parallel projectors from a center of projection at infinity that intersect the plane of projection at an oblique angle.

- (A) Orthographic
- (B) Axonometric
- (C) Oblique
- (D) Isometric

d. Intra and Inter compression scheme is used in

- (A) Text
- (B) Images
- (C) Video
- (D) All of these

e. Having a jagged or stair step appearance of lines is known as

- (A) Scanning
- (B) Aliasing
- (C) Anti-aliasing
- (D) Persistence

Code: AT14 Subject: IMAGE PROCESSING & COMPUTER GRAPHICS

- f. Which refresh procedure is used in TV sets to avoid flicker?
- (A) Horizontal retrace (B) Vertical retrace
(C) Interlaced refresh (D) None of the above
- g. Image compression techniques that reduce only coding redundancy are
- (A) Transform coding techniques (B) Lossy compression techniques
(C) Region splitting and Merging (D) Lossless compression techniques
- h. Morphology refers to
- (A) Dilation and Erosion (B) Erosion and Probe
(C) Probe and Dilation (D) Erosion, Dilation and Probe
- i. This algorithm is applicable to any object for which depth and shading characteristics can be calculated.
- (A) Z-buffer (B) Cohen-Sutherland
(C) Midpoint circle (D) DDA
- j. Two-principal vanishing point projection occurs when
- (A) the projection plane intersects exactly two of its principal axes.
(B) the projection plane is perpendicular to two axes.
(C) the projection plane is perpendicular to one axis.
(D) the projection plane intersects all the three axis.

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

- Q.2** a. Write short notes on
(i) Scanners
(ii) Data gloves (8)
- b. Explain the algorithm to generate a circle using the mid-point technique. (8)
- Q.3** a. Determine the transformation matrix corresponding to a 2D reflection about (i) a horizontal line (ii) an arbitrary line. (8)
- b. What is image enhancement? How spatial filter is used for the purpose? (8)
- Q.4** a. Explain the Z-buffer algorithm for visible surface detection. (8)
- b. Write a note on homogeneous coordinates system. (8)
- Q.5** a. What is importance of a color model? Explain the RGB color models with necessary equations and applications. (4)

- b. Describe the JPEG continuous still image compression standard with a block diagram. (8)
- c. Write a note on merging technique. (4)
- Q.6** a. What is image acquisition? Explain different techniques employed for image sensing and acquisition with suitable diagrams. (8)
- b. What is a histogram? Explain how histogram statistics are used for image enhancement. (8)
- Q.7** a. Describe two-dimensional Fourier transform and explain the following properties:
(i) Translation
(ii) Separability (8)
- b. What are visible surface detection algorithms? Explain the steps of a depth buffer algorithm with necessary figures. (8)
- Q.8** a. Explain the following:
(i) Parallel projection
(ii) Perspective projection (8)
- b. Given a clipping window A(0,0), B(40, 0), C(40, 20), D(0, 20), use Cohen Sutherland clipping algorithm to clip the line P(-10, 10) - Q(30, 30) against this window. (8)
- Q.9** a. Explain the following coding techniques with examples
(i) Line detection in an image
(ii) Thresholding (8)
- b. (i) Find the mirror reflection of the triangle P(10, 50), Q(40, 60), R(10, 80) about the line $x = 5$.
(ii) Work out the transformation to rotate the above triangle about the point P clockwise by 90° . (8)