

AMIETE – IT (OLD SCHEME)

Code: AT14
Time: 3 Hours

Subject: IMAGE PROCESSING & COMPUTER GRAPHICS
Max. Marks: 100

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. Which of the following is not a graphical output device?

- (A) Plotter (B) TFT monitor
(C) Hard disk (D) Tablet

b. In a World coordinate systems, which of the followings does not represent the 2-Dimensional point (2, 3, 1)?

- (A) (8, 12, 4) (B) (6, 9, 1)
(C) (4, 6, 2) (D) (20, 30, 10)

c. Which position of window is represented by bits pattern **1010** in Cohen Sutherland clipping algorithm?

- (A) Top and Right (B) Top and Left
(C) Bottom and Right (D) Bottom and Left

d. Rotation of a point about an axis parallel to X- axis is given by which of the following sequence of operations of Translation (T), Rotation (R) and Scaling (S)?

- (A) T, R, T (B) T, S, R, S, T
(C) R, T, R (D) R, T, S, T, R

e. Which of the following is not a Parallel projection?

- (A) Isometric (B) One Point Projection
(C) Trimetric (D) Oblique

f. Nyquist Theorem is related to

- (A) Image enhancement (B) Image Segmentation
(C) Image sampling (D) Compression

- g. Which of the following is not Remote sensing image file format?
- (A) BIL (B) BIP
(C) BSQ (D) JPEG
- h. Which of the following is not a valid class of operations applied on pixels (raster data) in Image processing?
- (A) Logical (B) Overlay
(C) Geometric Invariance (D) Geometric Transformation
- i. _____ implies that image is segmented based on abrupt changes in gray level.
- (A) Discontinuity (B) Similarity
(C) Continuity (D) Filtering
- j. Which of the following does not limit the effective resolution and fidelity of final digital image?
- (A) Sensor sampling frequency (B) Bandwidth of video signal
(C) Color Model (D) Frame Grabber

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

- Q.2** a. Explain the display mechanism used in a TFT display device. (6)
- b. Deduce the basic decision parameter for drawing a line using Bresenham's algorithm. (10)
- Q.3** a. Discuss rotation and scaling transformations. (8)
- b. Write Back-Face detection algorithm and explain the role of Z axis value of a point in the algorithm. (8)
- Q.4** a. Explain the concept of homogeneous coordinate system and its importance in application in computer graphics. (8)
- b. Find a transformation matrix for perspective transformation of 3D image in 2D x-y plane. (8)
- Q.5** a. Define vanishing points and give example for 1, 2 and 3 vanishing points in a perspective projection system. (8)
- b. Explain composite transformations. (8)

- Q.6** a. How a digital image is represented in grayscale? Explain the term gray scale and pixel distance. (8)
- b. List the practical limitations in sampling and reconstruction of a digital image. Draw the block diagram of contrast quantization. (8)
- Q.7** a. Give the steps in histogram specification and then draw the histogram for bright image and low contrast image. (8)
- b. Explain RGB and CMYK colour model and write equation to convert RGB model to CMYK model. (8)
- Q.8** a. Describe Hoffman coding for image compression. (10)
- b. Explain the process of edge detection using gradient operators. (6)
- Q.9** Write short notes on any **TWO** of the followings:
- (i) Image Acquisition Hardware
 - (ii) Bit plane encoding
 - (iii) Line detection in an image (8+8)