Code: AT14 **Subject: IMAGE PROCESSING & COMPUTER GRA**
Time: 3 Hours **Max. Marks:**

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 g... scale and pixel distance.

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)**