ROLL NO. ___________________

Code: AC60/AT60 Subject: COMPUTER GRAPHICS

AMIETE – CS/IT

Time: 3 Hours **DECEMBER 2013** **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$\times$10)

a. Pixel is

(A) the smallest addressable point on the screen
(B) a memory block
(C) an input device
(D) a data structure

b. World coordinate system is

(A) the coordinate system in which the image is defined
(B) the coordinate system in which the object is defined
(C) the coordinate system in which the surfaces are defined
(D) the coordinate system in which the transformations are defined

c. In the Cohen-Sutherland line clipping algorithm, if the codes of the two points P & Q are 0101 and 0001 then the line segment joining the points P and Q will be ______ the clipping window.

(A) totally outside **(B)** partially outside
(C) totally inside **(D)** none of these

d. If (x,y,w), w≠0, is a point in the homogeneous coordinate system then it 's equivalent in the two dimensional system is ____________

(A) (x,y,1) **(B)** (x,y,0)
(C) (x/w, y/w) **(D)** (x, y, x-y)

e. If the direction of the projection is perpendicular to the view plane then it is called _____

(A) orthographic projection **(B)** oblique projection
(C) perspective projection **(D)** cavalier projection

f. The technique of splitting the scan pattern into two separate patterns is called _________

(A) persistence (B) interlacing
(C) overscan (D) none of these

g. The term refers to the plotting of a point in a location other than its true location in order to fit the point into raster is called _______

(A) resolution (B) overscan
(C) antialiasing (D) none of these

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. If we rotate the point P = (3,1,4) through 30^0 about the y-axis, then

(A) the x-coordinate of the point is not altered
(B) the y-coordinate of the point is not altered
(C) the z-coordinate of the point is not altered
(D) none of these

j. The equation of the plane passing through the point (1,2,3) having the normal vector V=2i+3j+4k is ___

(A) 3(x–1) +4(y–2) +2(z–3) =0 (B) 2x+3y+4z=20
(C) 4(x–1) +3(y–2) +2(z–3) =0 (D) 2x+3y+4z=10

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

Q.2 a. What do you understand by the raster image? Explain. **(8)**

b. Explain any four types of physical input devices. **(8)**

Q.3 a. How lines are drawn using moveto( ) and lineto( )? **(8)**

b. What are the different types of arches? How can they be drawn? **(8)**

Q.4 a. Write the pseudocode for the Cyrus-Beck clipper for a convex polygon, 2D case. **(8)**

b. Explain the logic of the Sutherland-Hodgman polygon clipping algorithm with the help of an example. **(8)**

Q.5 a. Explain the geometric effects of elementary 2D affine transformations. **(8)**

b. What is the matrix associated with x-roll of 45°, followed by y-roll of 30°, followed by z-roll of 60º. **(8)**

Q.6 a. Describe the properties of meshes in solid modelling. **(8)**

b. Describe the oblique parallel projections. **(8)**

Q.7 a. Describe the technique of Phong shading. **(8)**

b. How does the depth-buffer approach determine which surfaces are hidden? **(8)**

Q.8 Explain the following:
(i) Filling polygon-defined regions
(ii) Antialiasing techniques. **(8×2)**

Q.9 a. How curves are described by means of polynomial? **(8)**

b. Explain the properties of Bezier curves. **(8)**