

## 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: (2×10)**

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  $(x, y, w)$ ,  $w \neq 0$ , is a point in the homogeneous coordinate system then its 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  $30^\circ$  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)  $2x+3y+4z=10$

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

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- 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  $45^\circ$ , followed by y-roll of  $30^\circ$ , followed by z-roll of  $60^\circ$ . (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)