Code: DC66   **Subject: COMPUTER GRAPHICS**

DipIETE – CS

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. Aspect ratio is

   (A) The ratio of image's width to its height
   (B) The ratio of window to viewport height
   (C) The ratio of image's intensity levels
   (D) The ratio of image's height to its width

b. Aliasing means

   (A) Rendering effect   **(B)** Shading effect
   (C) Staircase effect   **(D)** Cueng effect

c. In the Cohen-Sutherland line clipping algorithm, if the codes of the two points P & Q are 0000 and 0000 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. The blending functions of Bezier curves are _____

   (A) Splines   **(B)** Bernstein polynomials
   (C) Lagrangian polynomials   **(D)** Newton polynomials

e. The control points are used to control the _____ of the curve.

   (A) shapes   **(B)** edges
   (C) values   **(D)** iterations

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f. The two dimensional matrix transformation for reflection of a point with respect to x-axis is _____.

(A) $\begin{bmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 0 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$

g. Parallel projection is characterized by the

(A) view plane alone
(B) direction of projection and the view plane
(C) centre of projection and the view plane
(D) centre of projection alone

h. The Z-buffer algorithm

(A) finds the largest depth value z
(B) finds the smallest depth value z
(C) finds the average of the frame buffer
(D) calculate the intensity at (x,y)

i. What is animation?

(A) A cartoon   (B) The apparent movement of an object
(C) A file format   (D) All of these

j. What is multimedia?

(A) Multimedia is the use of audio
(B) Multimedia is the presentation of information
(C) Multimedia is the use of video
(D) Multimedia is the combination of audio and video

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

Q.2 a. Explain the use of computer graphics in education and training.   **(8)**

b. Describe the working of raster scan CRT.   **(8)**

Q.3 a. Explain Seed Fill algorithm for polygon filling with a suitable example.   **(8)**

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b. Explain circle generating algorithm to generate a circle with centre (0, 0) and radius 5. **(8)**

Q.4 a. Perform a 45^0 rotation of triangle A(0,0), B(1,1), C(5,2) about the point (-2,-2). **(8)**

b. Explain the steps required to reflect an object about an arbitrary line. **(8)**

Q.5 a. Describe the Sutherland-Hodgeman polygon clipping algorithm. **(8)**

b. Briefly explain how line clipping is done using Cohen Sutherland clipping algorithm. **(8)**

Q.6 a. Distinguish between parallel and perspective projections. Explain perspective projection. **(8)**

b. Show that the Bezier form of curve segment is
$P(t) = (1-t)^3 P0 + 3t (1-t)^2 P1 + 3 t^2(1-t) P2 + t^3 P3$
where the coefficients are Bernstein polynomials. **(8)**

Q.7 a. Briefly explain various hidden line removal methods. **(8)**

b. Why are hidden surface algorithms needed? How does the Z-buffer algorithm determine which surfaces are hidden? **(8)**

Q.8 a. What is the concept of animation? Explain the basic rules of animation. **(8)**

b. Describe the real-time animation techniques. **(8)**

Q.9 a. How might multimedia be used to improve the lives of its users? **(8)**

b. What is multimedia storage? Explain. **(8)**