ROLL NO. _____

Code: DC66 **Subject: COMPUTER GRAPHICS**

DipIETE – CS

Time: 3 Hours **DECEMBER 2012** **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. Which of the following is correct about MPEG?

(A) It is an image format **(B)** It is an audio format
(C) It is a video format **(D)** It is text format

b. The general representation $(2 - 6t, 4 + 3t)$ for $0 \leq t \leq 1$, in parametric representation, represents

(A) a line with end points (2, -4) and (-6, 3)
(B) a curve between end points (2, 4) and (-6, 3)
(C) a line with end points (2, 4) and (-4, 7)
(D) not a line but a circle with centre at (2, 4).

c. If a square having side of length k is to be transformed into rhombus then it can be done by

(A) first shear along x axis then along y-axis
(B) first shear along y axis then along x-axis
(C) Either **(A)** or **(B)**
(D) None of these

d. Visible point is assigned the following bit-code in the Cohen Sutherland clipping algorithm

(A) 0000 **(B)** 1001
(C) 0110 **(D)** 1111

e. Affine transformation retains which of the following features

(A) Shape **(B)** Angle
(C) Length **(D)** Parallelism of lines

f. How many control points are essentially present in a quadratic blending Bezier curve?

(A) 5 **(B)** 4
(C) 2 **(D)** 3

g. In Z-buffer algorithm, which of the following initialization is performed?

(A) Depth(x, y) = 0, refresh (x, y) = Intensity (Background)
(B) Depth(x, z) = 0, refresh (x, z) = Intensity (Background)
(C) Depth(y, z) = 0, refresh (y, z) = Intensity (Background)
(D) Depth(x, y) = Z_{max}, refresh (x, y) = Intensity (Foreground)

h. Which of the following algorithm is not used for removal of hidden surface?

(A) Back Face Removal **(B)** Z-Buffer
(C) Depth-Buffer **(D)** Cyrus-Beck

i. A point (2, 3) is rotated anti clockwise around origin by an angle 90^0. The final point is then

(A) (3, 2) **(B)** (-3, 2)
(C) (2, -3) **(D)** (-2, -3)

j. Which of the following is not a video format?

(A) NTSC format **(B)** PAL format
(C) GBR format **(D)** SECAM format

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

Q.2 a. How Interactive graphics system is more useful than non-interactive graphics system? **(7)**

b. Give very brief description of **(9)**
(i) Input Devices
(ii) GUI
(iii) Tablet

Q.3 a. Write an algorithm to draw a circle centred at (2, 3) and of radius 5. **(8)**

b. Discuss scan line seed free algorithm using suitable example. **(8)**

Q.4 a. Find the new points when the point (3, 4) is rotated by an angle of 45^0 anticlockwise and then translating the resultant point by 2 unit along x-axis and 5 units along y-axis. **(8)**

b. Explain homogeneous co-ordinate system. Why is it required to be considered while transforming an object from one reference frame to other reference frame? **(8)**

Q.5 a. Write the Sutherland Hodgman Clipping algorithm and clip a line segment between points (4, 3) to (5, 7) so that it fits into view port with left bottom at (4,4) and right top at (5, 7). **(8)**

b. Determine a transformation matrix to view a digital object of extent (1, 1) to (20, 20) on display area of width = 15 and height = 10 starting from (0, 0). Unit of measurement is same for both object and display area. **(8)**

Q.6 a. Compute the transformation matrix that is required to project a polygon with vertices at (1, 4, 5), (3, 2, 4) and (2, 9, 7) onto x-z plane viewing along y-axis. **(8)**

b. Differentiate between spline and curve. Define a cubic Bezier curve and give the formula to compute its control points. **(8)**

Q.7 a. Write the z-buffer algorithm to detect visible surface. If the colour of the projection surface is same as that of visible surface, then how the surface will be made visible? **(8)**

b. Can lines behind any face be hidden completely or be drawn with different attributes? Discuss. Also describe briefly "direct Method" and "Visible Surface Detection Method". **(8)**

Q.8 a. What is animation? What are the different methods to produce real time animation? **(8)**

b. Define the term morphing and explain basic restrictions imposed on the number of features required to be maintained on two consecutive frames. **(8)**

Q.9 a. Write short notes on:
(i) BMP File Format.
(ii) PCX File Format. **(8)**

b. Briefly explain use of audio, visual and text elements in multimedia. How are they stored? **(8)**