ROLL NO. _____

Code: AC60 / AT60 **Subject: COMPUTER GRAPHICS**

AMIETE – CS/IT

Time: 3 Hours **JUNE 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)**

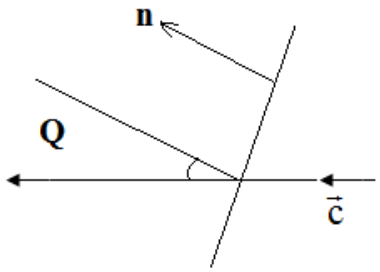
a. Which one of the following plotters moves pen in two dimension ?

(A) pen plotter **(B)** flatbed plotter
(C) drum plotter **(D)** None of these

b. The aspect ratio of a screen of size 17''×15'' having resolution 1024×1024 is

(A) 1 **(B)** 17/15
(C) 15/17 **(D)** 1.1

c. Given the vectors as below, the value of $\vec{n} \cdot \vec{c}$ is



(A) >0
(B) <0
(C) =0
(D) None of these

d. The normal to the polygon with vertices P_0 (-6, 2, 5), P_1(8, 6, 7), P_2(3, 4, 5)

(A) (-6, -8, 0) **(B)** (8, -6, 0)
(C) (0, 8, -6) **(D)** (0, -6, 8)

e. Axonometric projection is a type of

(A) Perspective projection **(B)** Cavalier projection
(C) Parallel projection **(D)** None of these

f. Which is provided by the open GL?

(A) Gouraud shading **(B)** Phong shading
(C) Both **(A)** & **(B)** **(D)** None of these

g. In an RGB image, each colors is represented by 8 bits. The number colors for each pixel would be

(A) 2^8 **(B)** 2^{24}
(C) 3×2^{-8} **(D)** 8×2^3

h. The matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ represents reflection along _____.

(A) the line y = x
(B) y - Axis
(C) x - Axis
(D) None of these

i. The stereo view reduces

(A) camera control **(B)** picture realism
(C) sense of depth **(D)** visually ambiguity

j. The homogeneous co-ordinate of the point (2, 3) is

(A) (2, 3, 1) **(B)** (2, 3, 2)
(C) (3, 2, 1) **(D)** (3, 2, 2)

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

Q.2 a. What do you mean by frame buffer ? Draw a block diagram showing the technique for scanning out an image from frame buffer to display surface. **(8)**

b. Describe the structure of plasma panel display. **(4)**

c. Write about any two applications that uses computer graphics. **(4)**

Q.3 a. Write the name of three main open GL libraries. **(3)**

b. Explain in detail "window to the viewport" mapping. **(8)**

c. Explain the most general form of the format of open GL command. Also explain open GL data types. **(5)**

Q.4 a. Explain the Cohen – sutherland polygon clipping algorithm with an example. **(8)**

b. Write the pseudocode for the Cyrus Beck algorithm. **(8)**

Q.5 a. Give the composite transformation matrix in homogenous co-ordinate system to rotate a line about the point (30, 40) through an angle of 45º. **(6)**

b. Explain how can we change the usual co-ordinate system for performing rotation after translation of an object. **(6)**

c. What are the co-ordinate of the point (3,1,4) after it has been rotated by 30º about y – Axis. **(4)**

Q.6 a. What do you mean by perspective projection ? Derive an expression for finding perspective projection of a point onto a plain surface. **(6)**

b. Let $P_i\,(x_i, y_i, z_i)$ i = 1....., N be the vertices of a polygon not perfectly planar. Give the components of the normal vector $\vec{m}$ (m_x, m_y, m_z) to the polygon. **(6)**

c. What do you mean by vanishing points? Explain. **(4)**

Q.7 a. What is depth buffer algorithm? What are its limitations? How do you instruct OpenGL to create a depth buffer? **(8)**

b. Explain the Gourand shading method. **(8)**

Q.8 a. What do you mean by aliasing? What are its disadvantages? Describe a method to remove aliasing, using post filtering. **(10)**

b. How can you copy a Pixmap from one place to another? Write two OpenGL functions for performing these copying operation. **(6)**

Q.9 a. Explain parametric and geometric continuity of a curve. **(4)**

b. Using de Casteljau algorithm, write about the technique for drawing a Bezier curve passing through the four points P_0, P_1, P_2, P_3. **(8)**

c. Show by a diagram the distinction between interpolating and approximating curve generation methods. **(4)**