AMIETE – CS/IT (NEW SCHEME) – Code: AC60 / AT60

Subject: COMPUTER GRAPHICS

Time: 3 Hours   **JUNE 2009**   Max. Marks: 100

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.**
- **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. The mouse is most often used to perform _____.

   (A) a valuator function   **(B)** only locate function
   (C) a locate or a pick function   **(D)** only pick function

b. OpenGL is often called _____.

   (A) a graphics program   **(B)** an API
   (C) a library function   **(D)** a drawing

c. The aspect ratio of a rectangle is _____.

   (A) the ratio of its width to its height   **(B)** the ratio of its width to its area
   (C) the ratio of its area to its width   **(D)** the ratio of its height to its area

d. OpenGL comes with a _____ which provides tools to assist with event management.

   (A) Events Toolkit   **(B)** Management Toolkit
   (C) Graphics kit   **(D)** Utility Toolkit

e. Cohen-Sutherland algorithm applies a _____ approach to the problem.

   (A) slow divide-and-conquer   **(B)** recursive
   (C) rapid divide-and-conquer   **(D)** negative

f. The process of applying several transformations in succession to form one overall transformation is called _____ the transformations.

   (A) concatenating   **(B)** dividing
   (C) translating   **(D)** scaling

g. The normal list contains _____ information.

   (A) locational   **(B)** geometric
   (C) orientation   **(D)** connectivity

h. Specular reflections are _____.

   (A) highly directional   **(B)** non directional

(C) absorbed   **(D)** transmitted

i. BitBLT stands for _____.

     (A) clipping   **(B)** bit boundary block transfer
     (C) bit colour   **(D)** graphics program

j. The de Casteljau Algorithm produces _____.

     (A) elegant curves   **(B)** B-splines
     (C) polylines   **(D)** Bezier curves

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

Q.2   a.   Briefly discuss the applications that use computer graphics.   **(6)**

     b.   Rotate the point P = (3, 1, 4) through 30 degrees about the y-axis.   **(10)**

Q.3   a.   With an example, show how lines are drawn using OpenGL?   **(4)**

     b.   Define world window and viewport. Derive window-to-viewport mapping.   **(12)**

Q.4   a.   Explain the Cohen-Sutherland Clipping algorithm.   **(10)**

     b.   What are the four possible situations and actions in Sutherland-Hodgman Polygon Clipping process? **(6)**

Q.5   a.   What is object transformation and co-ordinate transformation?   **(4)**

     b.   Build a transformation that performs a 45 degree rotation of triangle A(0,0), B(1,1), C(5, 2) about the point P(-1, -1). Find the new points of the triangle A, B and C.   **(12)**

Q.6   a.   What is a mesh and what are its properties?   **(6)**

     b.   What is orthographic projection and what are the different types of orthographic projections? Write the OpenGL projection matrix for orthographic projection.   **(10)**

Q.7   a.   Explain Gouraud shading.   **(10)**

     b.   What is depth buffer algorithm? What are its limitations? How do you instruct OpenGL to create a depth buffer?   **(6)**

Q.8   a.   What is a pixmap? Discuss the usefulness of combining pixmaps with examples.   **(8)**

     b.   What is aliasing? Briefly discuss the commonly used antialiasing techniques.   **(8)**

Q.9   a.   What is parametric continuity and geometric continuity?   **(4)**

     b.   Give the applications of Bezier Curves and explain its properties.   **(12)**