

**AMIETE – CS/IT (NEW SCHEME) – Code: AC60 / AT60****Subject: COMPUTER GRAPHICS**

Time: 3 Hours

Max. Marks: 100

**JUNE 2010****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. Oblique projection with an angle of  $45^\circ$  to the horizontal plane is called as \_\_\_\_\_.
- (A) isometric projection                      (B) cavalier projection  
(C) cabinet projection                        (D) none of the above
- b. A line connecting the points (1, 1) and (5, 3) is to be drawn, using the DDA algorithm. Find the value of x and y increments \_\_\_\_\_.
- (A) x-increment = 1, y-increment = 1  
(B) x-increment = 0.5, y-increment = 1  
(C) x-increment = 1, y-increment = 0.5  
(D) None of the above
- c. In the Cohen & Sutherland clipping algorithm, if the out codes of two end points are 0110 and 1000 then the line is \_\_\_\_\_.
- (A) completely invisible                      (B) completely visible  
(C) partially visible                            (D) incomplete data
- d. Reflection of a point about x-axis, followed by a counter-clockwise rotation of  $90^\circ$ , is equivalent to reflection about the line \_\_\_\_\_.
- (A)  $x = -y$                                       (B)  $x = y$   
(C)  $y = -x$                                       (D)  $x + y = 1$
- e. Which of the following is NOT a valid ending for a graphics file?
- (A) .jpg    (B) .tif  
(C) .mid    (D) .gif
- f. The rate at which a graphics monitor scanned is known as \_\_\_\_\_.
- (A) resolution                                    (B) refresh rate

- (C) stroke rate (D) bandwidth

g. Which of the following is not rigid body transformation?

- (A) Reflection (B) Translation  
(C) Rotation (D) Shearing

h. A Bezier cubic curve with control points  $P_0$ ,  $P_1$ ,  $P_2$  and  $P_3$  is defined by the equation

$$P(t) = \sum_{i=0,3} B_i^3(t) P_i$$

here,  $B_2^3(t)$  is \_\_\_\_\_.

- (A)  $(1-t)^3$  (B)  $3t^2(1-t)$   
(C)  $3t(1-t)^2$  (D)  $t^3$

i. If two lines in 3D are parallel to each other and to the view plane as well, they project to \_\_\_\_\_.

- (A) a single point (B) one single line  
(C) two parallel lines (D) two intersecting lines

j. Refreshing every alternate line on the screen and picking up the skipped line in every refresh cycle is known as

- (A) raster scan (B) interlacing  
(C) refresh vector (D) none of the above

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

- Q.2** a. Describe DDA line drawing algorithm. Draw a line from (24,24) to (32,30) using DDA algorithm. (8)
- b. Write Bresenham's Circle drawing algorithm to draw one eighth part of a circle with centre 0, 0 and Radius R. (8)
- Q.3** a. Perform a  $45^\circ$  counter clock wise rotation of an object defined by A(0,0), B(1,0), C(1,1) and D(0,1) about the origin. (6)
- b. Define perspective and parallel projections. Give various types of perspective and parallel projections. (10)
- Q.4** a. Use Cyrus Beck algorithm to clip a line P(25, 25) – Q(45, 10) against a rectangular window A(0, 0), B(40, 0), C(20, 40), D(0, 20). (8)
- b. Explain the Sutherland-Hodgman polygon clipping algorithm with an example. (8)
- Q.5** a. Describe the working of image scanners (8)

b. Explain necessary equations for representing Bezier curves and describe the method for generating these curves. (8)

**Q.6** a. Describe Phong's shading method. (10)

b. Perform  $45^\circ$  counter clock wise rotation of a triangle P1(1,1), P2(3,1), P3(3,4) about the point (2,2). (6)

**Q.7** a. Write the steps of the Seed Fill Algorithm. Fill the closed polygon with the vertices (5, 6), (5,12), (14,12), (14,6). Use scan line seed fill algorithm with (9,9) as seed Fill only first two scan lines. (8)

b. What do you understand by homogeneous coordinates? What are their applications in computer graphics? (8)

**Q.8** a. Describe how the z-buffer hidden surface removal algorithm works. (8)

b. What is Multimedia? What are the main applications of multimedia?. (8)

**Q.9** Write short notes on the following: (4×4)

- (i) Solid modeling.
- (ii) Affine transformation.
- (iii) Optical Mouse.
- (iv) Antialiasing.