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

AMIETE – CS/IT (Current Scheme)

Time: 3 Hours   **June 2018**   **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 height.
   (B) the ratio of window to viewport height.
   (C) the ratio of image's intensity levels.
   (D) None of these

b. Aliasing means
   (A) rendering effect   **(B)** shading effect
   (C) staircase effect   **(D)** cueing effect

c. _____ acts as anode in CRT
   (A) the deflectors   **(B)** the phosphorous coating
   (C) the glass panel   **(D)** None of these

d. Reflection of a point about x-axis, followed by a counter-clockwise rotation of 90° is equivalent to reflection about the line
   (A) x = -y   **(B)** y = -x
   (C) x = y   **(D)** x + y = 1

e. In Cohen-Sutherland line Clipping algorithm, if the codes of the two end-points of the line PQ are 0101 and 0001, then the line will be _____ the clipping window.
   (A) totally outside   **(B)** partially outside
   (C) totally inside   **(D)** None of these

f. The point at which a set of projected parallel lines appears to converge is called as a
   (A) convergence point   **(B)** vanishing point
   (C) point of fusion   **(D)** point of illusion

g. The blending functions of Bezier Curves are
   (A) Splines   **(B)** Bernstein polynomials
   (C) Lagrangian polynomials   **(D)** Newton polynomials

h. $x = at^2$; $y = at$ is the parametric equation of
   (A) circle   **(B)** parabola
   (C) rectangular hyperbola   **(D)** ellipse

i. Gouraud Shading is
   (A) A subdivision shading method   **(B)** An averaging shading method
   (C) An interpolative shading method **(D)** Not a shading method

j. LCD is categorized under which type of display device?
   (A) thin-plate   **(B)** emissive
   (C) non-emissive   **(D)** None of these

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

Q.2 a. What do you understand by the term resolution of an image?   **(3)**

b. If we want to resize a 1024×768 image to that of 640 pixels wide with the same
aspect ratio. What should be the height of the resized image?   **(5)**

c. Explain the functioning of the following: **(8)**
(i) Laser Printers   (ii) Joystick and trackball

Q.3 a. Give the function for drawing polylines stored in a file. The function should be
well documented.   **(8)**

b. Derive the window-to-viewport transformation equations. Using these
equations give the window-to-viewport mapping for a window (W.l, W.r, W.b,
W.t) = (0, 2.0, 0, 1.0) and a viewport given by (V.l, V.r, V.b, V.t) = (40, 400,
60, 300).   **(8)**

Q.4 a. Explain the polygon clipping algorithm given by Weiler-Atherton.   **(8)**

b. Give the pseudocode Cyrus-Beck Algorithm for line clipping.   **(8)**

Q.5 a. Rotate an object defined by A(0,0), B(1,0), C(1,1) and D(0,1) by 45° about
Origin. Then translate the object by 2 units and 3 units in x and y direction
respectively.   **(8)**

b. Derive the transformation equations for scaling an object along arbitrary
directions in 2D.   **(8)**

Q.6   a. How are polygonal Mesh represented and discuss the properties of Meshes. **(8)**

     b. Derive the transformation equations and the corresponding homogeneous matrix representation for perspective projection. **(8)**

Q.7   a. What is Gauraud Shading? Show the limitations of this shading method. Which shading method can be used to overcome these limitations? **(8)**

     b. What is the use of z-buffer or depth-buffer algorithm? Explain the algorithm. **(8)**

Q.8   a. Discuss the side-effects of scan-conversion. **(8)**

     b. What steps are required to plot a line whose slop is between 0° and 45° using Bresenham's method? **(8)**

Q.9   a. What do you understand by curve design and what are Blending functions? Discuss. **(8)**

     b. Give the properties of Bezier-Bernstein approximation. **(8)**