ROLL NO. _____

Code: AC111/AT111 Subject: COMPUTER GRAPHICS & VISUALIZATION

AMIETE – CS/IT (New Scheme)

Time: 3 Hours **DECEMBER 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. Raster graphics are composed of
(A) Pixels **(B)** Paths
(C) Palette **(D)** None of these

b. A line connecting the points (1,1) and (5,3) is to be drawn, using DDA algorithm. Find the value of x and y increments
(A) x-increments = 1; y-increments =1
(B) x-increments = 0.5; y-increments =1
(C) x-increments =1; y-increments = 0.5
(D) None of these

c. The anti-aliasing technique which allows shift of 1/4, 1/2 and 3/4 of a pixel diameter enabling a closer path of a line is
(A) Pixel Phasing **(B)** Filtering
(C) Intensity Compensation **(D)** Sampling Technique

d. The two-dimensional scaling equation in the matrix form is
(A) P'=P+T **(B)** P'=S*P
(C) P'=P*R **(D)** P'=R+S

e. A line with endpoints codes as 0000 and 0000 is
(A) Partially invisible **(B)** Completely visible
(C) Completely invisible **(D)** Trivially invisible

f. The best hidden surface removal method used for complex scenes with more than a few thousand surfaces is
(A) Depth sorting method **(B)** Scan line algorithm
(C) Depth buffer algorithm **(D)** None of these

g. Graphics and image processing technique used to produce a transformation of one object into another is called
(A) Animation **(B)** Morphine
(C) Half toning **(D)** None of these

h. The painter algorithm are based on the property of
(A) Polygon **(B)** Frame buffer
(C) Depth buffer **(D)** None of these

i. A monitor is having resolution of 640 x 480, then aspect ratio will be
(A) 1.33 **(B)** 0.75
(C) 1.35 **(D)** 1.7

j. User can make any change on image with the use of
(A) Non-interactive graphics **(B)** Interactive graphics
(C) Both **(A)** & **(B)** **(D)** None of these

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

Q.2 a. Write a short note on the following:
(i) Digitizers
(ii) Light Pens **(8)**

b. What is raster scan system? Discuss in brief. **(8)**

Q.3 a. Write OpenGL function to state the coordinate value of a point position. Write an OpenGL function for the points (50, 100), (75, 150), (100, 200) for 2 dimension. **(8)**

b. Write a Bresenham's Line drawing algorithm for slope >= 1. Also discuss the advantages and disadvantages of Bresenham's algorithm. **(8)**

Q.4 a. What is color table? What is the use of color table? Write an OpenGL function to set the color display mode to RGB. **(8)**

b. Discuss the scan-line polygon filling algorithm with proper example. **(8)**

Q.5 a. What is homogeneous coordinates? How it is useful in transformation? **(8)**

b. Derive the transformation matrix for rotation about an origin by an angle θ. **(8)**

Q.6 a. A line P(-1, -2) – Q(2, 4) is to be clipped against a polygon A(0, 0), B(1, 0), C(1, 1), D(0, 1). Using Liang-Barsky algorithm, find the visible portion of the clipping line. **(8)**

b. Discuss 3-D viewing parameters in brief. **(8)**

Q.7 a. Explain depth-buffer method for removing hidden surfaces. What are the advantages and disadvantages of this method? **(8)**

b. Develop a model in which the light source illuminates the picture using diffused illumination and point source illumination. **(8)**

Q.8 a. What is logical input devices? What are the standard logical classification of input devices? Discuss each in brief. **(8)**

b. Discuss following Interactive Picture-Construction Techniques in brief.
(i) Rubber-Band Methods
(ii) Interactive Painting and Drawing Methods **(8)**

Q.9 a. Discuss Direct Motion Specification in brief. **(8)**

b. Explain the OpenGL Animation Procedures in brief. **(8)**