ROLL NO. _____

Code: AC111/AT111 Subject: COMPUTER GRAPHICS & VISUALIZATION

AMIETE – CS/IT (New Scheme)

Time: 3 Hours **JUNE 2017** **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. Refreshing is not needed in DVST because of the presence of _____.
(A) Primary gun **(B)** Focusing anode
(C) Control grid **(D)** Flood gun

b. All the following hidden surface algorithms employ image space approach except
(A) Back face removal **(B)** Depth buffer method
(C) Scan line method **(D)** Depth sort method

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

d. Gray scale is used in _____ .
(A) A Monitor that has color capability
(B) Raster scan display
(C) A Monitor that has no color capability
(D) Random scan display

e. Two dimensional color model is
(A) RGB and CMKY **(B)** RBG and CYMK
(C) RGB and CMYK **(D)** None of these

f. The anti-aliasing technique which allows shift of 114, 112 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

g. The object refers to the 3D representation through linear, circular or some other representation is called
(A) Quadric surface **(B)** Torus
(C) Sweep representation **(D)** None of these

h. A two-dimensional array contains the details of all the segments is called
(A) Segmentation table **(B)** Segment name
(C) Operation **(D)** None of these

i. The graphics method in which one object is transformed into another object is called
(A) Clipping **(B)** Reflection
(C) Shear **(D)** Morphing

j. The rectangle space in which the world definition of region is displayed is called
(A) Screen coordinate system
(B) World coordinate system
(C) Clipping window or world window
(D) None of these

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

Q.2 a. Discuss raster scan system with refresh operation and display processor with neat diagram. **(10)**

b. Discuss any two input devices in brief. **(6)**

Q.3 a. Write the DDA line generation algorithm. Compare DDA and Bresenham's line drawing algorithm. **(8)**

b. Consider the line from (2,7) to (5,5). Use Bresenham's line drawing algorithm to rasterize this line. **(8)**

Q.4 a. What is Antialiasing? Explain any two techniques used for antialiasing of a line. **(8)**

b. Discuss the procedure for scan-line algorithm for polygon filling by taking suitable example. **(8)**

Q.5 a. Find out the co-ordinates of a figure bounded by (0,0), (1,5), (6,3), (-3,-4) when reflected along the line whose equation is $y= 2x + 4$ and sheared by 2 units in x-direction and 2-units in y-direction. **(10)**

b. Derive the transformation matrix for rotation about an origin by an angle θ. **(6)**

Q.6 a. A clipping window *PQRS* has left corner at (3, 4) and upper right corner at (10, 9). Find the section of the clipped line *AB* shown in the Figure.1 using the Cohen-Sutherland line-clipping algorithm. Also find the region codes on which the end points of the lines *CD* and *EF* rest. **(10)**

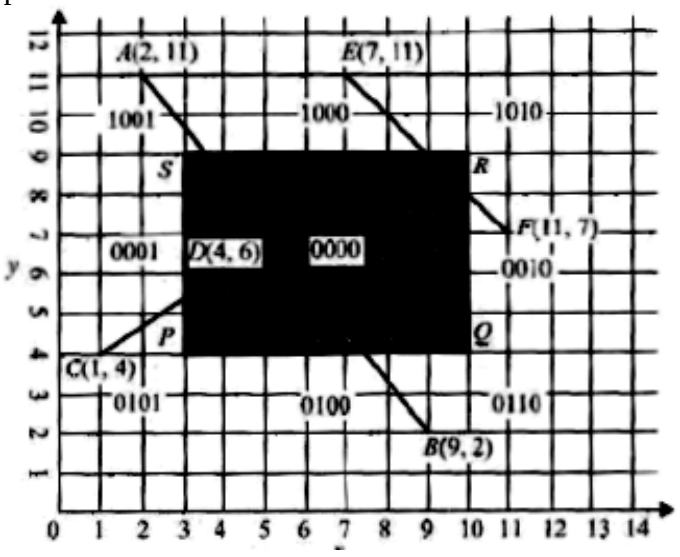

Fig.1

b. Explain Three Dimension (3-D) viewing process in brief. Discuss different viewing parameters in brief. **(6)**

Q.7 a. Develop a model in which the light source illuminates the picture using diffused illumination and point source illumination. **(10)**

b. Explain Back-face detection algorithm for removing hidden surfaces? **(6)**

Q.8 a. Define virtual Reality. What are the different features of Virtual Reality? Discuss different components of Virtual Reality Systems. **(10)**

b. What are the different Classes of Logical Input Device? **(6)**

Q.9 a. What is Animation? Explain real-time animation techniques. **(8)**

b. Give some common instances in which hierarchical models can be used. Discuss various modeling packages in brief. **(8)**