

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (2012 Onward) (Sem.-4)
INTERACTIVE COMPUTER GRAPHICS
Subject Code : MCA-403
Paper ID : [A2557]

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TWENTY marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

- 1) a) Give definition of computer graphics. Describe various applications of computer graphics.
b) Explain the working and use of following devices in computer graphics:
 - i) Light Pen
 - ii) Data Glove
- 2) a) Give architecture of a Raster and Random Graphics System with display processor, with a neat diagram.
b) Differentiate between beam penetration and shadow mask techniques of producing color displays with a CRT.

SECTION-B

- 3) a) List and explain various input and output primitives in OpenGL language for graphics programming. How do you interface OpenGL with C/C++ compiler?
b) What is the need of homogeneous coordinates? Give the homogeneous representation of scaling, translation and rotation matrices in 2D.
- 4) a) Describe the procedure of Bresenham's circle drawing algorithm.
b) Explain the logic of the Sutherland-Hodgeman polygon-clipping algorithm with the help of a neat flowchart. Illustrate the working of your flowchart with the help of a suitable example.

SECTION-C

- 5) Classify the projections in 3-D space. Explain the characteristics of each class. Derive the generalized transformation matrix for rotation about an arbitrary axis in three dimensional domains.
- 6) Write short notes on :
 - a) B-Spline curves
 - b) Fractals and its classification

SECTION-D

- 7) What is the basic concept of hidden surfaces and line removal methods with suitable examples? Distinguish between Painters algorithm and z-buffer algorithm for hidden surface removal.
- 8) Write short notes on :
 - a) Gouraud shading
 - b) Dithering techniques

SECTION-E

- 9) **Write briefly :**
 - a) Name the person generally credited with laying the foundations of modern interactive computer graphics through his doctoral thesis “Sketchpad” done at MIT in 1963
 - b) Consider a frame buffer having 4 bits per pixel and suppose that 5 bits drive each of three DAC's. How many entries are there in the lookup table (LUT)?
 - c) What is CMY?
 - d) Explain briefly flood fill technique.
 - e) What is a digital frame buffer?
 - f) What are advantages of B-splines over Bezier curves?
 - g) What is Morphing of objects?
 - h) What is diffuse reflection?
 - i) Define Refresh Rate.
 - j) What is wire-frame rendering?