UG Even Semester Examination, September, 2023

COMPUTER SCIENCE

(6th Semester)

Course No.: MCSCC-602

(Computer Graphics)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

The figures in the margin indicate full marks for the questions.

Answer any five questions, taking one from each unit.

UNIT-I

1. (a) Write short answers : 5x1=5

(i) If the size of RGB 24-bit image is 4 MB, find out the resolution of the image.

(ii) What are the neighbours of a point P(x,y)?

(iii) What is OPENGL?

(iv) Who is the founder of thermal printer?

(v) What is quad pixel?

(b) Raster scan display where resolution is 800 x 600, time for horizontal retrace and vertical retrace is 1 millisecond each. If a pixel

needs 2 microseconds for scanning, what will be the total time to display the frame? 3

(c) Draw the structure of CRT. 4

(d) Defien VRAM 2

2. (a) Write short answers ; 5x1=5

(i) If the aspect ratio of an image file is unlcoked and width is increased four times then what changes will be there in the height of the image?

(ii) Define hue.

(iii) Who did first coin the term "Computer Graphics"?

(iv) What is random display?

(v) Write a function of display processor.

(b) Convert Cartesian coordinates (x,y)= (10,15) into polar coordinates. 2

(c) Draw the RGB colour model and compare it with CMYK colour model. 3

(d) Write the properties of MKV video format. 2

(e) Consider a raster system with a resolution of 720 x 480. How many pixels could be accessed per second by a display controller unit that refreshes the screen at the rate of 50 fps? 2

8. (a) What is 3D viewing pipeline? Draw the diagram of 3D viewing pipeline and explain. 4

(b) Write two properties of perspective projection and parallel projection each. 4

(c) Write different cases of 3D rotations with diagrams. 4

(d) What are the features of Barnsley's fern? 2

UNIT-V

9. (a) How are the different keys in the QWERTY keyboard used for interactive animation programs? Discuss. 6

(b) How do you represent a blinking rectangle in a display screen? Write the flowchart. 4

(c) "Animation without a computer is possible"- Justify it by a thaumatrope. 2

(d) What is a blobby object? 2

10. (a) Write basic principles of mouse usage in graphics programming using C code. 3

(b) What is stop motion animation? What are its properties? 4

(c) "Vertices, edges, faces, polygons and surfaces are the part of a 3D object representation"- Explain the statement with an example. 3

(d) Write about the animation effects used in the animated movies. 4

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UNIT-II

3. (a) Write the DDA line drawing algorithm. 5

   (b) Explain odd-even and winding number methods to determine a point inside or outside of a polygon. 4

   (c) Compare polynomial method with DDA methods for line drawing. 3

   (d) Explain conic-section generation. 2

4. (a) Trace the line from (2,2) to (7,7) using Bresenham's algorithm. 4

   (b) How is zigzag problem smoothened using antialiasing technique? 3

   (c) Write the main steps of DDA circle drawing algorithm. Explain processing of it in different quadrants. 4

   (d) Write down the basic four conditions in ellipse generation algorithm. 3

UNIT-III

5. (a) Explain 2D transformations. 5

   (b) Translate the object along x-axis up to 5 points if coordinates of the object are : A (0,0), B (1,0), C (1,1), D (0,1). 4

   (c) Prove that storing of a 2D picture is much easier than a 3D picture. 3

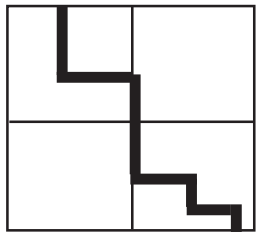
   (d) What are the types of solid modelling? 2

6. (a) What do you understand by the colour depth? 2

   (b) A triangle A(0,0), B(5,1), C(3,4) is scaled using sx= 2 and sy= 2 about origin. Find the new vertices of the triangle. 4

   (c) How interactive pictures can be constructed? Write the steps. 2

   (d) Draw the quadtree of the following picture. 2



   (e) Consider two lines from P1(–2,3) to P2(8,7) and P3(2,3) to P4(4,4) which is to be clipped in a clipping window P(0,0), Q(6,0), R(6,4), S(0,4) using Cohen-Sutherland line clipping algorithm. Find out the portion of lines which will be clipped. 4

UNIT-IV

7. (a) Explain basic 3D solid modelling. 4

   (b) Write short notes on : 6

   (i) Spline Curve (ii) Fractals (iii) Bezier Curve

   (c) How sweep representation can be considered as a series of transformations? Explain. 4