UNIT-IV

7. (a) Explain basic 3D transformations with details. 10

   (b) Write short notes on : (i) Bezier curve (ii) Fractal 4

8. (a) What is 3D viewing pipeline? Draw the diagram of 3D viewing pipeline and explain. State any two points on the differences between 3D viewing and 2D viewing. 2+3+2=7

   (b) Write any two properties of perspective projections. 2

   (c) Write short note on 3D reflections and its cases with diagrams. 5

UNIT-V

9. (a) How do the various input devices like keyboard and mouse play an important role in interactive animation program? Explain them using example C cods. 8

   (b) Explain the functioning of a thaumatrope? 6

10. (a) Write basic principles of keyboard usage in graphics programming. Write an example C code to demonstrate it. 6

    (b) What is stop motion animation? Write down its steps. 8

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UG/Integrated Even Semester Examination, 2025

COMPUTER SCIENCE

(6th Semester)

Course No.: MCSC-602

(Computer Graphics)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

The figures in the right margin indicate full marks for the question.
Answer any five questions selecting one from each unit.

UNIT-I

1. (a) Choose the correct option : 5x1=15

   (A) Raster scan display where resolution is 800 x 600, time for horizontal retrace and vertical retrace is 1 millisecond each. If a pixel needs 10 microseconds for scanning, what will be the total time to display the frame?

   (i) 0.03835 sec (ii) Less than 10 msec

   (iii) 8 sec (iv) None of the above

   (B) If the size of a RGB 24-bit image is 3 MB then what is its resolution.

   (i) 1200 x 1200 (ii) 800 x 600

   (iii) 400 x 400 (iv) 1024 x 1024

(C) Choose the resolutions not suitable for aspect ration 16:9.

(i) 640 x 360 (ii) 800 x 600

(iii) 1280 x 720 (iv) 1920 x 1080

(D) The name of the powder used in CRT display:

(i) Phosphor (ii) CFC

(iii) DDT (iv) None of the above

(E) Basic difference between HEIC image and JPG image is :

(i) Colour variety

(ii) Compression and storage efficiency

(iii) Quality Difference

(iv) All the options are correct

(b) What is a pixel? Draw the grid structure of to show a pixel and its 8-neighbours with their co-ordinates. 3

(c) if screen resolution is 1200 x 1200 and frame rate is 24 fps, how many frames in a 1 minute video and calculate the total space required for that video. (Use bits/ pxel-24) 4

(d) Write the properties of CRT display. 2

2. (a) Choose the correct option : 5x1=5

(A) If aspect ration is unlocked and width is increased four times then

(b) Compare DDA algorithm and Bresenham's algorithm. 3

(c) Write the main step of DDA circle drawing algorithm. 3

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

UNIT-III

5. (a) What are the different cases of 2D rotation? Give examples. 5

(b) Translate along y-axis upto 4 points of an objct defined by coordinates A (0,0), B(1,0), C(1,1), D(0,1). 5

(c) Prove that two successive translations in the same direction is the sum of the two translations together. 4

6. (a) What do you understand by the 2D translation? 2

(b) A triangle A(0,0), B(6,1), C(3,6) is scaled using sx=2 and sy=2 about origin. Find the new vertices of the triangle. 4

(c) Write down the steps of 2D viewing pipeline. 2

(d) Find the reflection of a point A(5,9) about the line y= x+5. 2

(e) Consider two lines from P1(–2,2), to P2(8,7) and P3(2,2) 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

(i) Height is increased four times automatically

(ii) height will not be increased and it is to be increased manually.

(iii) Height is decreased four times authomatically.

(iv) None of the above.

(B) In random scan display :

(i) Refresh cycle is 30 to 60 times in each second.

(ii) Refreh cycle is 50 to 60 times in each second.

(iii) Refresh cycle is 40 to 60 times in each second.

(iv) Refresh cycle is above 60 times in each second.

(C) A frame buffer may be thought of as ____ organized as a two-dimensional array with each (x,y) addressable location corresponding to one pixel.

(i) Computer stack

(ii) Computer queue

(iii) Computer storage

(iv) Computer memory

(D) In 32-bit colour display, what are total colour varieties?

(i) 1.8446744e + 19 colors.

(ii) 6,777,216 colors

(iii) 16,767,216 colors

(iv) 16,777,216 colors

(E) Conversion of Cartesian coordinates (x,y)= (5,6) into polar coordinates gives :

(i) (r, Θ) = (√61,50.19)

(ii) (r, Θ) = (√65, 50.19)

(iiii) (r, Θ) = (√61, 55.19)

(iv) (r, Θ) = (√64.03, 51.03)

(b) Compare and draw the RGB and CMY colour model. 4

(c) Define hue, saturation and lightness. 3

(d) Write the function of NVDIA graphics card. 2

UNIT-II

3. (a) Write the DDA line drawing algorithm. 4

(b) Compare odd-even method and winding number method for a point near a polygon. 2

(c) Use polynomial method to find out the intermediate points of the line from (0,0) to (10,8). 3

(d) Explain conic-section generation. 3

(e) What is 4-way neighbourhood? 2

4. (a) Trace the line from (2,2) to (5,5) using DDA algorithm. 5