No. of Printed Pages : **2**

Sl. No.

B4.4-R4 : COMPUTER GRAPHICS AND MULTIMEDIA

NOTE :

1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time : 3 Hours **Total Marks : 100**

1. Answer the following questions.

(a) What is the difference between vector and raster graphics ?

(b) Define the following :

(i) Aspect ratio

(ii) Frame buffer

(iii) Resolution

(iv) Rasterization

(c) Explain the merits and demerits of Direct View Storage Tube(DVST).

(d) What is DDA ? What are the advantages and disadvantages of DDA Algorithm ?

(e) Consider two raster systems with the resolutions of 640×480 and 1280×1024.

(i) How many pixels could be accessed per second in each of these systems by a display controller that refreshes the screen at a rate of 60 frames per second ?

(ii) What is the access time per pixel in each system ?

(f) Define Multimedia. What are the basic building blocks of multimedia systems ?

(g) Briefly explain animation file formats. **(7x4)**

2. (a) Write in short about the following :

(i) Aliasing

(ii) Window port and View port

(iii) Homogeneous coordinates

(iv) Bitmap and Pixmap

(b) Write and explain Bresenham's line drawing Algorithm. Use the algorithm to scan convert the line segment with starting and ending positions (1, 1) and (8, 5).

(c) Explain scan line algorithm for polygon filling. **(6+8+4)**

3. (a) Consider a triangle whose vertices are (2, 2), (4, 2) and (4, 4). Find the transformed vertices for rotation of 90° about the origin followed by reflection through the line $y = -x$. What is the effect if the transformations are reversed i.e. the triangle is reflected through the line $y = -x$ and then rotated 90° about the origin ?

(b) Explain Sutherland-Hodgeman Polygon Clipping algorithm with suitable example.

(c) Show that the shear transformation in x and y directions together is not the same as shear along x followed by shear along y. **(7+7+4)**

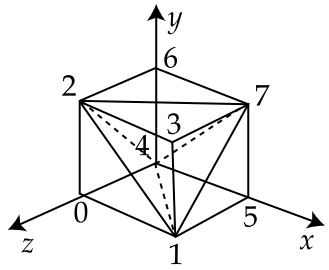
4. (a) What is Projection ? Differentiate between parallel projections and perspective projection.

(b) Define parallel projection. Discuss different types of parallel projections with suitable diagrams. **(8+10)**

5. (a) What are the properties of B spline curve ? Discuss the advantages of B spline over Bezier curve.

(b) Given a Bezier curve with 4 control points - B0[1, 0], B1[3, 3], B2[6, 3], B3[8, 1]. Determine 5 points (for $t = 0, 0.2, 0.5, 0.7, 1$) lying on the curve. Also, draw a rough sketch of the curve. **(11+7)**

6. (a) Explain mesh representation for 3D objects. Provide the vertex list and triangle list to have a mesh representation of the following cube.



(b) Derive a composite transformation matrix for 2D reflection about an arbitrary line $y = mx + b$. Use the matrix to reflect triangle (2, 4), (4, 6), (2, 6) about line $y = 0.5\ (x + 4)$. **(10+8)**

7. (a) Explain JPEG file format. Discuss some of it's disadvantages as compared to other file formats.

(b) Explain different types of coherences used in Hidden Surface Removal algorithms. Differentiate between Object space and Image space method. **(9+9)**

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