B4.4-R4: COMPUTER GRAPHICS AND MULTIMEDIA

NOTE:

1. **Answer question 1 and any FOUR from questions 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.
a) How are codes of the regions assigned in the Cohen-Sutherland algorithm?
b) Explain briefly JPEG compression technique.
c) Write the difference between vector and raster graphics.
d) Explain polar coordinates in two dimensions.
e) Describe the phong shading model for rendering polygon surface.
f) What is a shear transformation? Give a matrix for a general 2D y-shear.
g) Explain types of parallel projections.

(7x4)

2.
a) Describe oblique projections and display different types of oblique projections with example.
b) Consider a quadratic B-spline curve with uniform knot spacing. Consider a segment with control points (1, 0) (1, 1) and (0, 1) in that order. What are the end-points of the curve segment? What is the mid-point of the curve segment?
c) Explain construction of a CRT color monitor.

(6+6+6)

3.
a) Consider the line from (0,0) to (4,6). Use the simple DDA algorithm to rasterize this line.
b) What do you mean by perspective projection? How are vanishing point generated?
c) Explain midpoint Subdivision algorithm.

(6+6+6)

4.
a) Triangle ABC where the vertices of ΔABC are A(−1,−3), B(−4,−1), and C(−6,−4) undergoes a composition of transformations described as:
i) A translation 10 units to the right, then
ii) A reflection in the x-axis.
   Draw the diagram to represent this composition of transformations. What are the vertices of the triangle after both transformations are applied?
b) What is multimedia? Explain various applications of multimedia.
c) Is the position vector unique?

(8+6+4)

5.
a) What do you mean by input device? Explain any three input devices.
b) Consider the line from (0, 0) to (-8,-4), use general Bresenham's line algorithm to rasterize this line. Evaluate and tabulate all the steps involved.
c) Explain types of computer graphics.

(7+6+5)

6.

a) A homogenous co-ordinate point p[3,2,1] is translated in x, y and z direction by -2, -2 and -2 unit respectively followed by successive rotation 60° about x-axis. Find the final position of homogenous co-ordinate.

b) How MIDI (Musical Instrument Digital Interface) files are created and what is their role in multimedia application?

c) What is the fraction of total time per frame spent in retrace of electron beam for a non-interlaced raster system with resolution of 600x400? Refresh Rate is of 60 Hz, horizontal retrace time 5 micro second and a vertical retrace time of 500 micro second. If it supports 24 colors and transfer rate is 1 Mbps, what is the time required to load frame buffer?

(6+6+6)

7.

a) Translate a triangle with vertices A(2,2,2), B(3,4,7) and C(8,9,12) by translation vector T[2 4 5]. Determine the transformation matrix which reflects given object about X axis (Y=0 line) and diagonal (Y=X line).

b) What is Bezier Curves? List properties of Bezier Curves.

c) Explain Rigid Body and Non Rigid Body Transformations. Describe their types.

(9+5+4)