

B4.4-R3: COMPUTER GRAPHICS & MULTIMEDIA SYSTEM

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.

- a) Discuss the merits and demerits of various clipping algorithms.
- b) How does the Z buffer algorithm determines which surfaces are hidden?
- c) Explain the Sutherland Cohen line-clipping algorithm. Is this applicable to any type of window? Justify your answer.
- d) Explain how MIDI files are created and what are their applications in multimedia applications.
- e) Describe briefly the Phong shading and compare it with Gouraud shading.
- f) Explain the importance of vanishing point. What type of projection is associated with it? Explain that projection.
- g) Describe the importance of compression in multimedia system. Compare and contrast JPEG and MPEG techniques.

(7x4)

2.

- a) Differentiate between video compression standards and multimedia video compression standards.
- b) What are the components of multimedia systems? Explain in brief each component.
- c) Describe the functions of flat panel displays.

(4+10+4)

3.

- a) Show that n^{th} degree B-spline basis function $B_{i,n}(x) = 0$, if $x < t_1$ or $x > t_{i+n-i}$.
- b) A triangle having vertices at (0,0), (1,1) and (5,2) is rotated by 45 degree clockwise i) about origin and ii) about P(-1, -1) point. Obtain the coordinates of the vertices of the triangle using homogenous coordinate system.
- c) What are the advantages of parametric representation of curves and surfaces in computer graphics?

(6+10+2)

4.

- a) Describe different models used for illumination. How do you define surface normal vector? Explain its importance.
- b) Explain ray tracing and compare it with ray casting. Describe the intersection of an arbitrary ray with yz plane.
- c) Explain rendering. What are the approaches used for volume rendering? What are the steps used in the process of smooth shading?

(6+6+6)

5.

- a) Explain why RGB color model is used for display. How different shades of colors are generated on the RGB monitors.
- b) How is clipping done in three-dimensional domain? Discuss the various options for selecting different types of view volumes.
- c) Describe Painter's algorithm. Give its relative advantages and disadvantages over other methods.

(6+6+6)

6.

- a) In a 3D coordinate system the plane $XY(z = 0)$ represents the screen of monitor. A box is placed at the origin such that its three edges are touching x , y and z axes. Describe the transformation matrix needed to show the side view of the box on the screen.
- b) What did you understand by morphing? Explain with the help of practical application.
- c) Write a routing to design a two dimensional cubic Bezier curve shapes having first order continuity. Use interactive technique for selecting control points in XY plane for each section of curve.

(6+6+6)

7.

- a) Explain where and why the magnetic storage is used in multimedia system?
- b) Describe the operation of scanner. What criteria would you use for selecting scanner?
- c) What are the main design issues for the multimedia authoring system? Briefly explain each one of these issues.

(4+4+10)