विश्वजीवनामृतं ज्ञानम्

Atal Bihari Vajpayee Indian Institute of Information Technology & Management, Gwalior

IT303: Computer Graphics

Major Examination (Session 2024–25)

Maximum Time: 3 Hours **Max Marks: 45**

Note: Answer all questions. Figures must be drawn neatly for full marks.

1. (a) Explain the Digital Differential Analyzer (DDA) algorithm for line drawing. (b) Compare its efficiency with Bresenham's algorithm. (7 Marks)

2. (a) Derive the midpoint circle drawing algorithm. (b) Demonstrate the steps for drawing a circle of radius 10 units. (8 Marks)

3. (a) Derive the transformation matrices for reflection and rotation. (b) Apply a transformation to rotate the point $(4, 2)$ by 45° and then scale it by factor 2 along both axes. (8 Marks)

4. (a) What is Cohen–Sutherland line clipping? Explain with an example. (b) How does it differ from Liang–Barsky algorithm? (7 Marks)

5. (a) Explain 3D projection techniques. (b) Derive the matrix for isometric projection. (8 Marks)

6. Write short notes on any two: (i) Hidden surface removal techniques (ii) Phong shading (iii) Antialiasing methods (7 Marks)