Exam.Code:0917
Sub. Code: 33435

2124

B.E. (Computer Science and Engineering)
Fifth Semester
CS-502: Computer Graphics

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

I. Give short answers of the following:
   a. What is meant by horizontal and vertical retrace?
   b. List various application areas of computer graphics.
   c. What are cabinet and cavalier projections? Which of them is more realistic?
   d. What are vanishing points?
   e. What is meant by diffuse and specular reflection? **(2 marks each)**

Section-A

II.
   a. Describe in detail Bresenham line drawing algorithm. What are the advantages of Bresenham line drawing algorithm over DDA line drawing algorithm?
   b. Using Midpoint circle generation algorithm, compute the coordinates of points that lie on the circumference of the circle with radius 5 and center as (7,7). **(5, 5)**

III.
   a. Explain in detail working of various graphical input devices.
   b. What is meant by clipping? Describe in detail Liang-Barsky line clipping algorithm. **(5, 5)**

IV.
   a. Find out the conditions under which scaling and rotation forms a commutative pair of operations.
   b. What are seed fill algorithms? Describe in detail an algorithm to fill a region bounded by other regions of multiple colors. **(5, 5)**

Section-B

V.
   a. What are perspective projections? What are the various anomalies associated with the perspective projections?
   b. Derive the general perspective transformation onto a plane with reference point $R_0(x_0, y_0, z_0)$, normal vector $N = n_1 I + n_2 J + n_3 K$, using $C(a, b, c)$ as the centre of projection. **(5, 5)**

VI.
   a. Explain Gourard's method for smooth shading.
   b. Describe in detail depth-buffer method for visible surface detection. How is it different from A-buffer method? **(5, 5)**

VII.
   a. Find the transformation A_V which aligns a given vector V with the vector K along the positive z-axis.
   b. What are B-splines? Describe in detail their properties. **(5, 5)**

x-x-x