

**JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT**  
**TEST -1 EXAMINATION- 2023**  
**B. Tech 5<sup>th</sup> Semester (CSE)**

**COURSE CODE (CREDITS):** 18B11CI515 (3)

**MAX. MARKS:** 15

**COURSE NAME:** Computer Graphics

**MAX. TIME:** 1 Hour

**COURSE INSTRUCTORS:** Dr. Amol Vasudeva, Dr. Nancy Singla, Dr. Anita and Mr. Prateek

**Note:** (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make suitable assumptions wherever required

1. Write down various steps involved in Bresenham's circle drawing algorithm. Using this algorithm, identify the successive decision-parameters and the pixel positions along the circle with radius  $r = 9$  centered at origin  $(0, 0)$ . The successive values should be inserted in the following format. (CO-2)

[4 marks]

|     |       |                      |
|-----|-------|----------------------|
| $k$ | $P_k$ | $(x_{k+1}, y_{k+1})$ |
|-----|-------|----------------------|

2. Given input ellipse parameters as  $a = 8$  (major axis) and  $b = 6$  (minor axis) and center at  $(0, 0)$ . Illustrate the steps involved in the *mid-point* ellipse algorithm by determining raster positions along the ellipse path in the first quadrant. Successive midpoint decision-parameter values and the pixel positions along the ellipse should be listed as per the following format. (CO-2)

[3.5 marks]

|     |       |                      |               |               |
|-----|-------|----------------------|---------------|---------------|
| $k$ | $P_k$ | $(x_{k+1}, y_{k+1})$ | $2b^2x_{k+1}$ | $2a^2y_{k+1}$ |
|-----|-------|----------------------|---------------|---------------|

3. The coordinates of vertices of a polygon are shown in Fig. 1. (CO-2) [2+1 = 3 marks]

- a. Using the polygon scan line algorithm, write the initial edge list table for the polygon.  
 b. State which edges will be active and de-active on scan lines  $y = 2, 4, 6, 8$ , and  $10$ .

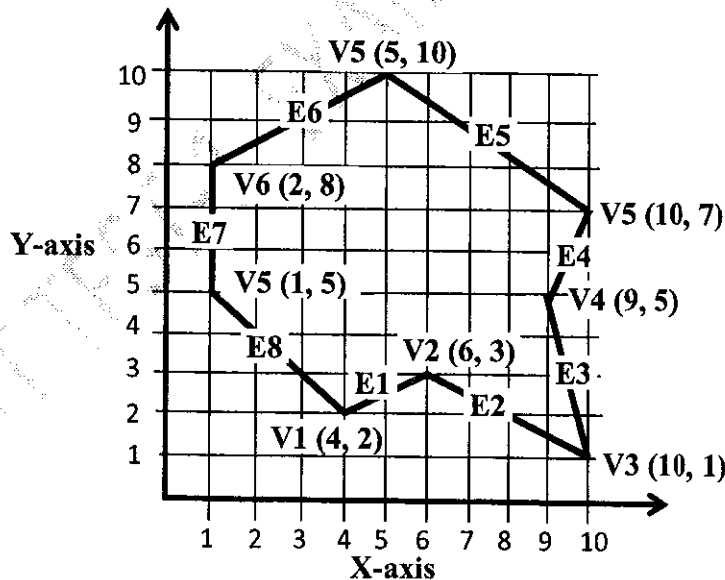


Fig. 1: Scan line polygon filling

4. Differentiate between the following terms (within 3-6 lines).

[4.5 marks]

- Raster Scan Display vs. Random Scan Display (CO-1)
- Liquid Crystal Display vs. Plasma Display (CO-1)
- Emissive vs. Non-Emissive Devices (CO-1)