Instructions : (1) All Questions are Compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.

1. Attempt any FIVE of the following: [10]
   (a) Define : (i) Pixel    (ii) Resolution
   (b) List any four applications of computer graphics.
   (c) Explain Raster Scan.
   (d) State two line drawing algorithms.
   (e) List types of Polygon.
   (f) List various polygon filling algorithms.
   (g) Give matrix representation for 2D scaling.

2. Attempt any THREE of the following: [12]
   (a) Differentiate between Random Scan and Raster Scan.
   (b) Explain and write steps for DDA line drawing algorithm.
   (c) List out basic transformations techniques. Explain scaling transformation with respect to 2D.
   (d) Explain different types of Text clipping in brief.

3. Attempt any Three of the following: [12]
   (a) Explain stroke method and Bitmap method with example.
   (b) Explain types of Parallel Projection with example.
   (c) Write down Cohen-Sutherland Line clipping algorithm.
   (d) Write a short note on fractals.

4. Attempt any THREE of the following: [12]
   (a) Explain 2DViewing transformation.
   (b) Consider line from (4, 4) to (12, 9). Use Bresenham's algorithm to rasterize this line.
   (c) Use Cohen-Sutherland algorithm to clip two line P1(40, 15) – P2(75, 45) and P3(70, 20) – P4(100, 10) against a window A(50, 10), B(80, 10), C(80, 40) & D(50, 40)
   (d) Consider the square A(1, 0), B(0, 0), C(0, 1) D(1, 1). Rotate the square ABCD by 45° anticlockwise about point A(1, 0).
(e) Explain properties of Bezier curve.

5. Attempt any TWO of the following: [12]
   (a) Rotate a triangle defined by A(0, 0), B(6, 0) & C(3, 3) by 90° about origin in anti-clockwise direction.
   (b) Explain boundary fill algorithm with pseudo-code. Also mention its limitations, if any.
   (c) Obtain the curve parameters for drawing a smooth Bezier curve for the following points A(0, 10), B(10, 50), C(70, 40) & D(70, -20).

6. Attempt any TWO of the following: [12]
   (a) Write matrices in homogeneous co-ordinate system for 3D scaling transformation.
   (b) Write down Sutherland Hodgeman polygon clipping algorithm.
   (c) Derive the expression for decision parameter used in midpoint circle drawing algorithm.

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**S.Y. Diploma Sem-III: Paper Discussion Schedule**

<table>
<thead>
<tr>
<th>Branches</th>
<th>Date</th>
<th>Day</th>
<th>Timing</th>
<th>Centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Group</td>
<td>6 Nov. 2019</td>
<td>Wednesday</td>
<td>8 a.m. to 9 a.m.</td>
<td>Dadar</td>
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<td>6 Nov. 2019</td>
<td>Wednesday</td>
<td>10 a.m. to 11 a.m.</td>
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- 2 -