



**BRAINWARE UNIVERSITY**

**Term End Examination 2018 - 19**

**Programme – Bachelor of Technology in Computer Science & Engineering**

**Course Name - Computer Graphics**

**Course Code - BCSE403**

(Semester – 4)

**Time allotted: 3 Hours**

**Full Marks : 70**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

**Group –A**

(Multiple Choice Type Question)

10 x 1 = 10

1. *Choose the correct alternative from the following*
  - (i) Vector graphics is composed of
    - a. pixel
    - b. path
    - c. palette
    - d. none of these.
  - (ii) Raster graphics is composed of \_\_\_\_\_ .
    - a. pixel
    - b. path
    - c. palette
    - d. none of these
  - (iii) In cabinet projection, the angle of projection is \_\_\_\_\_ .
    - a. 63.4 degree
    - b. 45 degree
    - c. 30 degree
    - d. 90 degree
  - (iv) \_\_\_\_\_ is a rigid body transformation that moves objects without deformation.
    - a. Rotation
    - b. Scaling
    - c. Translation
    - d. Shearing
  - (v) The stopping criteria of Bresenham circle drawing algorithm is \_\_\_\_\_ .
    - a.  $x = y$
    - b.  $x > y$
    - c.  $x < y$
    - d.  $x \leq y$



**Group – C**

(Long Answer Type Questions)

3 x 15 = 45

Answer any *three* from the following

- 7. (a) Show that transformation matrix for a reflection about the line  $y=x$ , is equivalent to reflection relative to x-axis followed by a rotation of 90 degree. 7
- (b) Plot pixels to draw an ellipse centred at origin in the first quadrant with two radius as  $r_x=8$  and  $r_y=3$ . 8
- 8. (a) What are the properties of Bezier Curves? 7
- (b) A Bezier curves  $P(t)$  is described by the following 4 control points (0,0), (10,20), (30,30), (40,0). Another Bezier curve  $Q(t)$  has control points (a,b), (c,d), (e,f) and (70,80). Find values of a,b,c,d,e and f such that curves  $P(t)$  and  $Q(t)$  joins smoothly. 4+4
- 9. (a) Derive the transformation matrix of Hermite curve. 7
- (b) Find the equation of Bezier curve which passes through points (0,0), (-2,1) and is controlled by (7,5) and (2,0) . Sketch the curve at  $t=0.2$  and  $0.4$  . 6+2
- 10. (a) Clip the polygon ABCDEFG with vertices (15,-3) , (26,-3), (32,0), (20,0), (20,8), (5,-1), (10,-8) against window edges at  $x=10$  &  $30$  and  $y=-5$  &  $5$  using Sutherland Hodgeman Polygon clipping algorithm. Also find the coordinates of clipped polygon. 7
- (b) A unit cube is projected onto xy plane. Find the coordinates of projected image using standard perspective transformation with  $d=1$  where  $d$  is distance from view plane. 8
- 11. (a) Explain Binary Space Partition (BSP) Trees with example. How disadvantage of Z-buffer is overcome using A-Buffer algorithm? 4+3
- (b) Flip the given quadrilateral with vertices A(10,8), B(22,8), C(34,17) and D(10,27) about origin and then zoom it to twice its size. Find new positions of quadrilateral. 4+4

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