



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/M.Tech(CSE)/SEM-3/PGCS-302/2011-12**  
**2011**  
**MULTIMEDIA & GRAPHICS**

Time Allotted : 3 Hours

Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

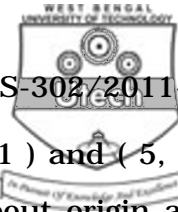
Answer Question No. 1 and any *three* from the rest.

1. Answer any *seven* of the following : 7 × 4 = 28

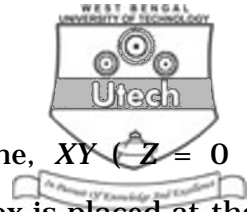
- a) Discuss the merits and demerits of various clipping algorithms.
- b) How does the Z-buffer algorithm determine which surfaces are hidden ?
- c) Explain the Sutherland-Cohen line-clipping algorithm. Is this applicable to any type of window ? Justify your answer.
- d) Explain how MIDI files are created and what are their applications in multimedia applications ?



- e) Describe briefly the Phong shading and compare it with Gourand shading.
  - f) Explain the importance of vanishing point. What type of projection is associated with it ? Explain that projection.
  - g) Describe the importance of compression in multimedia system. Compare and contrast JPEG and MPEG techniques.
  - h) What are the advantages and disadvantages of homogeneous co-ordinates ?
  - i) What do you mean by vanishing point in perspective projection ? Draw a diagram indicating two vanishing points.
2. a) Describe the construction of a typical cathode ray tube for monitor. 4
- b) Explain the Bresenham's line drawing algorithm in 2D. Hence, give the pixel positions for the line joining the points ( 4, 4 ) and ( 9, 9 ). 10
3. a) Derive the transformation matrix for y-direction shearing relative to the line  $x = a$ . Hence, give the transformation matrix for shearing parameter value of  $\frac{1}{2}$  and  $a = -1$ . 6



- b) A triangle having vertices at  $(0, 0)$ ,  $(1, 1)$  and  $(5, 2)$  is rotated by 45 degree clockwise (i) about origin and (ii) about point  $P(-1, -1)$ . Obtain the co-ordinates of the vertices of the triangle using homogeneous co-ordinate system. 6
- c) What are the advantages of parametric representation of curves and surfaces in computer graphics ? 2
4. a) How is *B-spline* curve different from Bezier curve ? 3
- b) What do you mean by rational *B-spline* ? How is it more useful than non-rational *B-spline* in drawing curves ? 5
- c) Show that, *n*th degree *B-spline* basis function  $B_{i,n}(x) = 0$ , if  $x < t_1$  or  $x > t$ . 6
5. a) Explain why RGB colour model is used for display. How different shades of colours are generated on the RGB monitors ? 3
- b) How is clipping done in three-dimensional domain ? Discuss the various options for selecting different types of view volumes. 5
- c) Describe Painter's algorithm. Give its relative advantages and disadvantages over other methods. 6



6. a) In a 3D co-ordinate system the plane,  $XY (Z = 0)$  represents the screen of monitor. A box is placed at the origin such that its three edges are touching  $x$ ,  $y$  and  $z$  axes. Describe the transformation matrix needed to show the side view of the box on the screen. 7
- b) What did you understand by morphing ? Explain with the help of practical application. 7

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