

**MCA (Revised)**

**Term-End Examination**

**December, 2013**

**MCS-053 : COMPUTER GRAPHICS AND  
MULTIMEDIA**

*Time : 3 hours*

*Maximum Marks : 100*

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*Note : Question number 1 is compulsory. Attempt any three questions from the rest.*

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1. (a) Differentiate between raster scan and random scan display devices. 5
- (b) What is homogeneous co-ordinate system ? Why is it needed ? Explain this with the help of an example. 6
- (c) What are the various parametric countinuity conditions in curve drawing ? 5
- (d) Explain Z buffer algorithm for hidden surface removal. State its advantages. 6
- (e) Explain the following terms : 6
  - (i) Resolution (Screen)
  - (ii) Aspect Ratio
  - (iii) Refresh rate
- (f) Differentiate between vector graphics and bitmap graphics. 3

- (g) Explain Phony Specular Reflection model. 4
- (h) Explain Bresenham's algorithm for drawing a line whose slope is  $|m| \leq 1$ . 5
2. (a) Draw a line from (5, 6) to (15, 12) on a raster screen using DDA algorithm. 6
- (b) Using Cohen Sutherland line clipping algorithm clip the following line against a window which has lower left corner at (2, 2) and upper right corner at (5, 5)  
 Line 1 : A(3, 1) B (2, 4)  
 Line 2 : C(6, 4) D(13, 8) 6
- (c) Differentiate between window and view port : Find the normalized transformation N which uses the rectangle A (1, 4) B(4, 1) C(8, 5) D(5, 8) as a window and the normalized device screen as a view port whose lower left corner L(0, 0) and upper right corner R(1, 1). 8
3. (a) Find the transformation matrix for the reflection about the line  $y = -x$  5
- (b) Given a Square ABCD whose co-ordinates are A(0, 0), B (3, 0), C(3, 3), D(0, 3) find the final transformation matrix after translating 2 units in both  $x$  and  $y$  direction, followed by scaling of 1.5 units in the  $x$ -direction. 6

- (c) Differentiate between parallel and perspective projection. Derive the general transformation for parallel projection on to a given view plane, where the direction of projection :
- $d = ai + bj + ck$  is along the normal  $N = n_1i + n_2j + n_3k$  with the reference point  $R_0 (x_0, y_0, z_0)$  9
4. (a) Derive a mathematical expression for drawing a cubic Bezier curve. 8  
 Given four control points  $P_0(1, 1)$ ,  $P_1(2, 3)$ ,  $P_2(4, 3)$  and  $P_3(3, 1)$ . Determine 2 more points on the same Bezier curve
- (b) Find the 2D - transformation matrix of reflection of the  $\Delta ABC$ , where  $A(0, 0)$ ,  $B(4, 0)$  and  $C(3, 3)$  about the line passing through the points  $(1, 3)$  and  $(-1, -1)$  8
- (c) Categories the various types of parallel and perspective projection 4
5. (a) Explain different types of animation ? 5  
 (b) What is compression ? Explain the need for video compression. 5  
 (c) Explain various video file formats. 5  
 (d) Explain any two types of authoring tools. 5