MCA (Revised)
Term-End Examination
June, 2014
MCS-053 : COMPUTER GRAPHICS AND MULTIMEDIA

Time : 3 hours       Maximum Marks : 100

Note : Question no. 1 is compulsory. Attempt any three questions from the rest.

1. (a) Explain the working of Cathode Ray Tube (CRT). Also discuss benefits & limitations of plasma panel display over CRT.
       6
(b) Obtain the matrix that represents two dimensional \( xy \) shearing by factors \( a \) and \( b \) along \( x \) & \( y \) axis, respectively about the origin.
       5
(c) Differentiate between window and viewport in clipping.
       2
(d) Explain flood-fill method of polygon filling.
       6
(e) Differentiate between the following :

   (i) Zero Vs. Non- zero accelerations for simulating motion
       6
   (ii) GIF Vs. JPEG

(f) What is a homogenous coordinate system for 3D- transformation ?
    What are the advantages of using homogenous coordinate system ?
    6
(g) Derive an expression to show the combined effect of ambient and diffused reflection in the context of illumination model.
    6
(h) What is Hypermedia? How is it different from hypertext?

2. (a) Write DDA line drawing algorithm; use this algorithm draw a line between (0,0) and (6,6).
(b) Explain Prong Illumination model with the help of diagram.
(c) What is orthographic projection? Write a matrix for an orthographic projection for $Z=0$ plane.

3. (a) Explain Cohen Sutherland line clipping algorithm. State the merits and demerits of Cohen Sutherland algorithm over Cyrus-Beck line clipping algorithm.
(b) Derive a general 2D-transformation matrix of rotation of a point $P(x,y)$ though an angle $\theta$ in counterclockwise direction with respect to origin.
(c) Differentiate between Ray Tracing & Ray Casting.

4. (a) What is Bezier curve? Prove the following for Bezier curve:

$$\sum_{i=0}^{n} B_{n,i}(u) = 1$$

(b) What is digital video? Define Frame rate, and Frame dimensions in the context of digital video.
(c) Explain the scan line method for identifying visible surfaces.
(d) Explain the following in the context of multimedia:
   (i) Morphing
   (ii) Authoring tools
   (iii) Vector graphics
5. (a) The unit cube (Fig.1) is projected onto the \( xy \) plane. Note the position of the \( x \), \( y \) and \( z \) axes. Draw the projected image using perspective projection on the \( z=0 \) plane with the Centre Of Projection (COP) is \( E(0,0,-10) \)

(b) Explain the following terms :
(i) Z Buffer
(ii) Types of Animation
(iii) Aspect Ratio
(iv) Video Conferencing
(v) Parallel Projection
(vi) Specular Reflection
(vii) Ambient light.