MCS-053

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   6
        (CRT). Also discuss benefits & limitations
        of plasma panel display over CRT.

    (b) Obtain the matrix that represents two   5
        dimensional *xy* shearing by factors a and b
        along *x* & *y* axis, respectively about the
        origin.

    (c) Differentiate between window and   2
        viewport in clipping.

    (d) Explain flood-fill method of polygon filling.   6

    (e) Differentiate between the following :   6
        (i) Zero Vs. Non- zero accelerations for
             simulating motion
        (ii) GIF Vs. JPEG

    (f) What is a homogenous coordinate system   6
        for 3D- transformation ?
        What are the advantages of using
        homogenous coordinate system ?

    (g) Derive an expression to show the combined   6
        effect of ambient and diffused reflection in
        the context of illumination model.

(h) What is Hypermedia ? How is it different from hypertext ? **3**

2. (a) Write DDA line drawing algorithm; use this algorithm draw a to line between (0,0) and (6,6). **8**

(b) Explain Prong Illumination model with the help of diagram. **6**

(c) What is orthographic projection ? Write a matrix for an orthographic projection for $Z = 0$ plane. **6**

3. (a) Explain Cohen Sutherland line clipping algorithm. State the merits and demerits of Cohen Sutherland algorithm over Cyrus-Beck line clipping algorithm. **5+5**

(b) Derive a general 2D-transformation matrix of rotation of a point $P(x,y)$ though an angle θ in counterclockwise direction with respect to origin. **5**

(c) Differentiate between Ray Tracing & Ray Casting. **5**

4. (a) What is Bezier curve ? Prove the following for Bezier curve : **5**

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

(b) What is digital video ? Define Frame rate, and Frame dimensions in the context of digital video. **4**

(c) Explain the scan line method for identifying visible surfaces. **5**

(d) Explain the following in the context of multimedia : **6**
(i) Morphing
(ii) Authoring tools
(iii) Vector graphics

5. (a) The unit cube (Fig.1) is projected onto the   6
        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
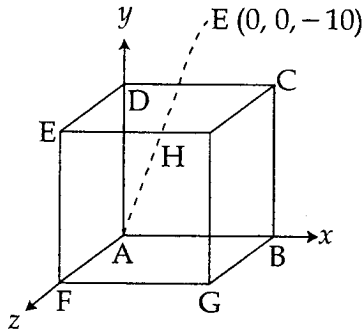 $E(0,0,-10)$

Fig. 1

    (b) Explain the following terms :   7x2=14
        (i)   Z Buffer
        (ii)   Types of Animation
        (iii) Aspect Ratio
        (iv)   Video Conferencing
        (v)   Parallel Projection
        (vi)   Specular Reflection
        (vii) Ambient light.

———————