Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (CSE)/SEM-6/CS-603/2010

2010

COMPUTER GRAPHICS AND MULTIMEDIA

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.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) If blue is represented as 001 the yellow is represented as

a) 001 b) 010

c) 101 d) 110.

ii) A 24-bit plane colour frame buffer with three 10-bit wide colour look up tables can have ..... number of colours.

a) 2^{24} b) 2^{8}

c) 2^{48} d) 2^{30}.

iii) DAC means

a) direct access coding

b) digitally activated compression

c) direct area clipping

d) digital to analog converter.

iv) ..... acts as anode in CRT.

a) The phosphorous coating

b) The glass panel

c) The deflectors

d) None of these.

v) Slope of the line joining the points (1, 2) and (3, 4) is

a) 0 b) 1

c) 2 d) 3.

vi) In Bresenham's circle generating algorithms, if (x, y) is the current pixel position then the x-value of the next pixel position is

a) x b) $x - 1$

c) $x + 1$ d) $x + 2$.

vii) Run length coding is used for

a) image smoothening b) image compression

c) image colouring d) image dithering.

viii) If X_L, X_R, Y_B, Y_T represent the four parameter of x-left, x-right, y-bottom and y-top of the clipping window and (x, y) is a point inside the window then

a) $X_L \le x \le X_R$ and $Y_B \le y \le Y_T$

b) $X_L \le x \le X_R$ and $Y_B \ge y \ge Y_T$

c) $X_L \ge x \ge X_R$ and $Y_B \le y \le Y_T$

d) $X_L \ge x \ge X_R$ and $Y_B \ge y \ge Y_T$.

ix) A line with end point codes as 0000 and 0000 is
   a) partially invisible b) completely visible
   c) trivially visible d) completely invisible.

x) Which device is used to grasp a 'virtual object' ?
   a) Space ball b) Data glove
   c) Digitizer d) Touch panels.

xi) How many channels are specified by MIDI standard ?
   a) 16 b) 24
   c) 32 d) None of these.

xii) Lossy image simplification is based on ..... operation.
   a) DCT b) CCIT
   c) ISO d) DMS.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Write the properties of *B*-spline. In what respect it differs from Bezier curve ? 3 + 2
3. Write boundary-fill algorithm for region filling. Compare and contrast the boundary-fill algorithm and flood fill algorithm. 3 + 2
4. Explain Liang-Barsky algorithm for line clipping.
5. What do you mean by MIDI ? Write down the components of MIDI. 2 + 3
6. Define projection and mention its importance. Derive the transformation matrix for a perspective projection. 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Derive Mid point circle drawing algorithm.
   b) Using Mid point circle drawing algorithm draw a circle with radius 10 unit.
   c) Define random and raster scanning. 7 + 5 + 3

8. a) Derive the transformation matrix for rotation about any axis.

   b) Explain the reflection of a 2D figure on $y = mx + c$. Derive its component matrix.

   c) What is homogeneous co-ordinate ? Why is a homogeneous co-ordinate system needed in transformation matrix ? 5 + 7 + 3

9. a) Derive the transformation matrix for perspective projection.

   b) Suppose a window has its lowest left line corner at (– 3, – 2) and its upper right corner at (4, 2). Find the visible portion of the line joining points (– 4, 2) and (3, 5) using Cohen Sutherland line clipping algorithm.

   c) Write and explain Sutherland-Hodgeman algorithm to clip a polygon. 5 + 6 + 4

10. a) Define morphing and masking.

    b) Write down the basic step of JPEG.

    c) What do you mean by key frame and tweening ?

    d) Write few audio file formats. Explain the advantages and disadvantages of MIDI over digital audio.

    2 + 2 + 5 + 2 + 1 + 3

11. Write short notes on any *three* of the following : 3 × 5

    a) MPEG

    b) Shading model

    c) Virtual reality

    d) Cohen Sutherland line clipping algorithm

    e) CRT.