

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 × 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} |

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- 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) $X_L \leq x \leq X_R$ and $Y_B \leq y \leq Y_T$
 - b) $X_L \leq x \leq X_R$ and $Y_B \geq y \geq Y_T$
 - c) $X_L \geq x \geq X_R$ and $Y_B \leq y \leq Y_T$
 - d) $X_L \geq x \geq X_R$ and $Y_B \geq y \geq Y_T$.

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- 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. $7 + 5 + 3$

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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.