Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/MCA/SEM-4/MCA-402/2011

2011

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 the following : $10 \times 1 = 10$

   i) Refreshing on raster scan displays is carried out at the rate of

      a) 60 to 80 frames per sec

      b) 40 to 60 frames per sec

      c) 30 to 60 frames per sec

      d) none of these.

   ii) The maximum number of points that can be displayed without overlap on a CRT is referred to as

      a) Resolution b) Persistence

      c) Attenuation d) None of these.

iii) Dragging in computer graphics can be achieved through which of the following transformations ?

a) Translation b) Rotation

c) Scaling d) Mirror reflection.

iv) GIF supports

a) 256 colours b) 512 colours

c) 1024 colours d) 16 million colours.

v) How many matrices are required to rotate an object about a point (x, y) ?

a) 2 b) 3

c) 4 d) 5.

vi) Which of the following techniques is used in Midpoint subdivision algorithm ?

a) Binary search b) Bubble sort

c) Linear search d) Sequential search.

vii) The total number of pixels put on for the line starting at (1, 1) and ending at (12, 7) would be

a) 7 b) 11

c) 12 d) more than 12.

viii) DDA stands for

a) Digital Differential Analyzer

b) Digital Data Analyzer

c) Digital Distributed Analyzer

d) None of these.

ix) The format of storing digital audio in multimedia application is

a) JPEG b) TIFF

c) WAV d) BMP.

x) A line with end point codes 0000 and 0100 is

a) partially invisible

b) completely invisible

c) completely visible

d) cannot be determined.

GROUP – B

(Short Answer Type Questions)

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

2. Suppose an RGB raster system is to be designed using an 8 inch × 10 inch screen with a resolution of 100 pixels per inch in each direction. If we want to store 6 bit per pixel in the frame buffer, how much storage in bytes do we need for the frame buffer ? Also find out the Aspect-ratio of the raster system.

3. a) What is Nyquist criteria ? What effect is produced if it is violated ?

   b) Explain why a digital sound wave is regarded as a degraded version of the original analog wave, using the concept of quantization error. $2\frac{1}{2} + 2\frac{1}{2}$

4. What is scan conversion ? Explain the principle of Bresenham's line drawing algorithm mathematically. 1 + 4

5. Prove that two scaling transformations commute *i.e.*, S1 S2 = S2 S1 and two 2D rotations about origin also commute *i.e.*, R1 R2 = R2 R1. $2\frac{1}{2} + 2\frac{1}{2}$

6. Explain key frames and twinning with examples. What are the advantages of computer assisted animation ?

GROUP – C

(Long Answer Type Questions)

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

7. a) What is composite transformation ?

   b) Generate matrix for rotating an angle θ about an arbitrary point (h, k) in 2D plane.

   c) Perform the 45° rotation of triangle A (0, 0), B (1, 1), C (5, 2) : about point p (– 1, – 1)

   d) Show that a composite 2D transformation is necessarily of the form

$$\begin{pmatrix} a & b & c \\ d & e & f \\ 0 & 0 & 1 \end{pmatrix}$$

$1 + 5 + 4 + 5$

8. a) Write down the Cohen-Sutherland subdivision line clipping algorithm (A short discussion about the binary region codes assigned to line endpoints must precede the algorithm).

   b) What are the advantages / disadvantages (if any) of the above algorithm ?

   c) What do you understand by Homogeneous Coordinate ?

   d) Distinguish between Raster-Scan display & Random Scan display. 7 + 3 + 3 + 2

9. a) How are superscript and subscript formatted in HTML document ? How can you use style sheet to define your own formatted subscript and superscript ?

   b) Describe the use of < FRAMESET > tag with example.

   c) Write an HTML script for refreshing a topic within the webpage with example.

   d) Write down two attributes of < BODY > tag. Explain their utility with suitable example. 4 + 3 + 5 + 3

10. a) Describe the scan line Z-buffer algorithm.

    b) What is Phong shading ?

    c) What are interior and exterior clippings ? What are their applications ?

    d) What is the difference between windowing and viewing ? Explain it with an example. 5 + 3 + 4 + 3

11. Explain the principle of operation of different types of synthesizers. What is meant by MIDI ?

    Discuss the format of MIDI messages. How is a channel message different from a system message ?

    How is the MIDI file format different from the WAV format ?

    4 + 1 + 2 + 4 + 4