Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/MCA/SEM-4/MCA-402/2012

2012

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) In direct coding of RGB values with 4-bits per primary colour, how many colours are possible for each pixel ?

   a) 1024 b) 2048

   c) 4096 d) 256.

   ii) On compressing a string using Run Length Encoding, it becomes 432462. What is the original (uncompressed) string ?

   a) 333344222222 b) 444222266

   c) 432462 d) either (a) or (b).

iii) Dragging in computer graphics can be achieved through

a) Translation b) Rotation

c) Scaling d) Mirror reflection.

iv) If P_0 , P_1 , P_2 be the control points (in sequential ordering) then the Bezier curve must pass through

a) P_0 and P_1

b) P_1 and P_2

c) P_2 and P_0

d) points close to P_0 , P_1 and P_2.

v) Which of the following is incorrect ?

a) Successive Rotations and Scaling are Additive, while Successive Translations are Multiplicative

b) Successive Translations & Rotations are Additive, while Successive Scaling is Multiplicative

c) Successive Translations & Scaling are Additive, while Successive Rotations are Multiplicative

d) None of these.

vi) Bresenham line algorithm is better than DDA algorithm because it is based on

a) floating point arithmetic

b) integer arithmetic

c) slope is between 0 and 1

d) none of these.

vii) Which of the following techniques is used in Midpoint Subdivision algorithm ?

a) Binary Search b) Bubble sort

c) Linear Search d) Sequential search.

viii) To draw two smoothly joining Quadratic Bezier curves, one needs

a) 5 control points b) 10 control points

c) 9 control points d) 8 control points.

ix) Aspect ratio means

a) ratio of vertical point by horizontal points

b) ratio of horizontal points by vertical point

c) both of these

d) none of these.

x) Morphing means

a) Changing position

b) Changing shapes

c) Changing colours

d) Scaling up & down.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. a) Deduce Bresenham's Line Drawing Algorithm, showing clearly the mathematical calculations involved.

   b) "Bresenham's Line Drawing Algorithm is much faster than the DDA Line Drawing Algorithm." Justify. 4 + 1

3. What is an offline Transformation ? Obtain a transformation that reduces a rectangle *ABCD*, with the coordinates *A* (0, 0), *B* (5, 0), *C* (5, 4) and *D* (0, 4), to half its size, keeping the point *D* fixed.

4. What is the difference between window and viewport ? What do you mean by clipping ? 3 + 2

5. What is an applet ? How will you use java applets in HTML file ? 2 + 3

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

GROUP – C

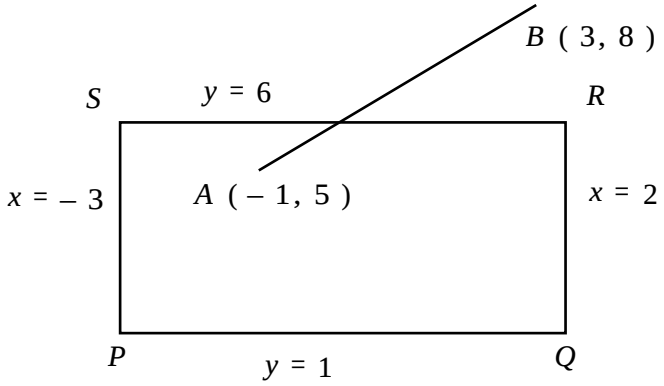
(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) What is a Viewport ?

b) Obtain the overall transformation matrix for a 2-D viewing transformation from a WINDOW with coordinates of its corners at (xw_{min} , yw_{min}) and (xw_{max} , yw_{max}) to a VIEWPORT with corner coordinates at (xv_{min} , yv_{min}) & (xv_{max} , yv_{max}).

c) Clip the line segment *AB* (figure below) against the clipping window *PQRS* using Mid-point subdivision algorithm.



d) Write and explain the Warnock Algorithm.

1 + 5 + 5 + 4

8. a) What are Hypertext and Hypermedia ?

   b) How is HTML different from DHTML ?

   c) Which tag in HTML is used to insert horizontal rule in a web-page ? Describe its atributes.

   d) Describe the <frameset> tag used in HTML.

   e) How can we format subscripts and superscripts in HTML ?

   f) Describe briefly any two of the following file-formats :

      i) bmp

      ii) tiff

      iii) gif. 2 + 2 + 3 + 2 + 2 + 4

9. a) Prove that scaling is always commutative with rotation.

   b) Derive the composite matrix when reflection is taken with respect to $x = a$ straight line where a is constant.

   c) Prove that inverse rotation matrix is equal to inverse of the rotation matrix. 6 + 6 + 3

10. a) Write the scan line polygon filling algorithm and explain associated data structure.

    b) Generate the seed fill algorithm for polygon filling.

    c) What is Aliasing ? How can we reduce the Aliasing ?

    7 + 5 + 3

11. Write short notes any *three* : 3 × 5

a) Cohen-Sutherland Line Clipping

b) B-Spline curves

c) Shadow masking

d) GKS

e) JPEG Compression Technique.