

## B4.4-R4: COMPUTER GRAPHICS & MULTIMEDIA

### NOTE:

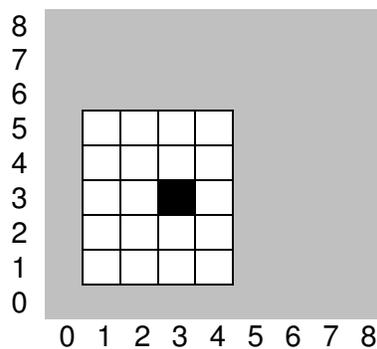
1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.

- a) Write a short note on "Liquid Crystal Display".
- b) Define geometric and co-ordinate transformations.
- c) Consider the block of size 9x9. How would a flood-fill algorithm fill the region shown in below given figure if seed is given at point (3,3)?



- d) Explain Phong Shading. What is the limitation of Phong Shading?
- e) Give the transformation matrix for rotation of an object by 30 degree about the origin? What are the new co-ordinates of the point P(2,-4) after the rotation?
- f) Define Multimedia. What is the difference between linear and non-linear multimedia?
- g) Define Animation. What are the basic rules of any animation?

(7x4)

2.

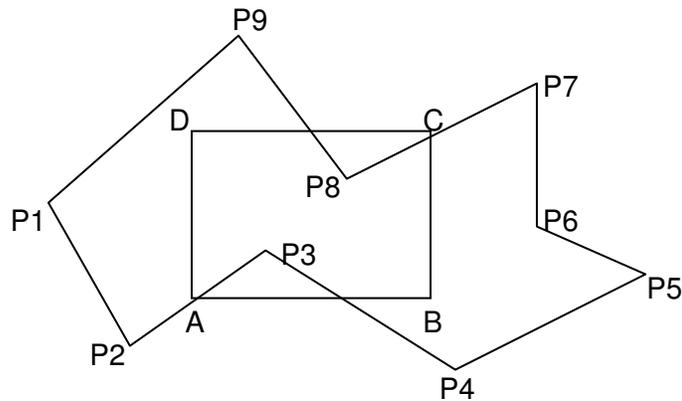
- a) A matrix A is decompressed as  $A = LU$ . All elements of L above diagonal are zero and all elements of U below diagonal are zero. Find  $|A|$ .
- b) Which raster locations would be chosen by Bresenham's algorithm when scan converting a line from screen co-ordinate (1, 1) to screen co-ordinate (8, 5)?
- c) Define World coordinate system and device coordinate system. What is the need to introduce normalized device coordinate system?

(4+10+4)

3.

- a) Describe Mid-point Subdivision Method for line clipping.
- b) Write short note on GIF compression?

- c) Clip the given polygon P1, P2, ..., P9 against the window ABCD; using Sutherland-Hodgeman algorithm, starting from point P1.



(4+5+9)

- 4.
- Show that 2-D reflection through X-axis followed by 2-D reflection through the line  $Y=-X$  is equivalent to a pure rotation about the origin.
  - In 3-dimension tilting is defined as rotation about the x-axis followed by rotation about y-axis. Find the tilting matrix. If rotation about y-axis is performed before the rotation about x-axis then does the answer vary?
  - What do you mean by shear transformation? A unit square  $(0, 0) (0, 1) (1, 0) (1, 1)$  sheared along X-Axis with shear coefficient = 2. What are the new-co-ordinates?

(6+6+6)

- 5.
- Given  $P_0[2,2]$ ,  $P_1[4,6]$ ,  $P_2[8,6]$  and  $P_3[6,2]$ , the vertices of of a Bezier polygon, determine seven points of Bezier curve.
  - Find the cubic polynomial that passes through the four points  $(1,2)$ ,  $(3/2, 31/16)$ ,  $(5/2, 11/16)$  and  $(3,1)$  and satisfies
 
$$P(1) = 2$$

$$P(3/2) = 31/16$$

$$P(5/2) = 11/16$$

$$P(3) = 1$$

(9+9)

- 6.
- Write a short note on MPEG-7.
  - Describe Lossy and Lossless Compression.
  - Draw a block diagram of Raster Scan Display Processor.

(9+6+3)

- 7.
- Animation control mechanisms range from full explicit control, to the highly automated control provided by knowledge-based systems. Describe methods to control the animation.
  - What are the four major adverse effects of scan conversion?
  - What do you mean by White noise and Black noise?
  - Explain CMYK color model.

(6+4+4+4)