Total No. of Questions : **10**]     [Total No. of Printed Pages : **7**

**(2040)**

## B.C.A. (CBCS) RUSA VIth Semester Examination

# 3841

## COMPUTER GRAPHICS

Paper : BCA–0604

Time : 3 Hours]                    [Maximum Marks : 70

*Note* :– Attempt *six* questions in all. Part A is compulsory. Attempt any *four* questions, selecting *one* question each form Parts B, C, D and E.

### Part–A

### (Compulsory Question)

1.  Attempt all questions :

    (i)    Which of the following is the basic unit of drawing in a random scan system ?

         (a)   Lines                    (b)   Pixels

         (c)   Points                    (d)   Vectors

(ii) Which of the following methods is used to produce color CRT monitors for a raster scan system ?

    (a) Beam penetration

    (b) Shadow masking

    (c) Shadow penetration

    (d) Beam masking

(iii) Which of the following is an analog input device ?

    (a) Keyboard

    (b) Optical mouse

    (c) Image scanner

    (d) Trackball

(iv) Any standard algorithm for drawing a line is derived for slope $m$ such that :

    (a) $0 < m < 1$

    (b) $0 < m \leq 1$

    (c) $0 \leq m < 1$

    (d) $0 \leq m \leq 1$

(v) Which of the following algorithms is best for generating an ellipse ?

   (a) Direct

   • (b) Mid-point

   (c) Bresenham

   (d) Polar domain

(vi) Which of the following transformation is used to change the shape of an object ?

   (a) Translation

   (b) Scaling

   (c) Rotation

   (d) Shearing

(vii) The acronym DDA stands for :

   (a) Digital differential algorithm

   • (b) Digital differential analyzer

   (c) Digital difference analyzer

   (d) Differential digital algorithm

**CA–697**

Turn Over

(viii) Which of the following co-ordinate system supports the matrix representation of a transformation ?

    (a) Polar

    (b) Left handed Certesian

    ‣(c) Homogeneous

    (d) Right handed Cartesian

(ix) Which of the following algorithms is NOT used for line clipping ?

    (a) **Nicholl-Lee-Nicholl**

    (b) **Cohen-Sutherland**

    (c) **Liang-Barsky**

    ʾ(d) **Weiler-Atherton**

(x) Which of the following is a polygon clipping algorithm ?

    ·(a) Sutherland-Hodgeman

    (b) Cohen-Sutherland

    (c) Liang-Barsky

    (d) Nicholl-Lee-Nicholl           $1 \times 10 = 10$

2. Attempt the following questions in **25–50** words each :

   (i) What is the application of computer graphics in the area of scientific and business analysis ?

   (ii) Explain the working of Liquid crystal displays.

   (iii) How characters can be generated using an outline method ? Give an example.

   (iv) Define rotation. Write the equations and homogeneous matrix representation for rotation.

   (v) Briefly explain various types of string clipping methods.                           4×5=20

## Part–B

### (Unit–I)

3. Give the architecture of random scan system and differentiate it from a raster scan system.        10

4. Explain the following input devices :

   (i) Image scanner

   (ii) Voice entry system

   (iii) Digitizer

   (iv) Mouse                           2½×4=10

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5. Write the procedural steps for Bresnham line algorithm for the line with $\Delta x > 0$, $\Delta y > 0$ and $\Delta x > \Delta y$. Generalize it for all line types and trace the algorithm for line with end points (10, 13) to (5, 23).

6. Write the procedural steps for mid-point circle algorithm and evaluate the raster locations generated by the algorithm for a circle with radius 5.

**Part–D**

**(Unit–III)**        10×1=10

7. Find the 2D transformation $S_{sx,\ sy,(h,k)}$ that scales an object about the fixed point $(h,\ k)$ by factors $sx$ and $sy$ along $x$-axis and $y$-axis, respectively. Also find the coordinates of the triangle ABC where A(0, 0), B(5, 2) and C(2, 3) after scaling it twice uniformly about point C.

8. Derive viewing transformation matrix V that maps window defined from $(W_{x\ min},\ W_{y\ min})$ to $(W_{x\ max},\ W_{y\ max})$ onto the View-port defined from $(v_{x\ min},\ v_{y\ min})$ to $(v_{x\ max},\ v_{y\ max})$. Also, map window defined from (0, 0) to (4, 5) onto view port of size (4, 5) to (12, 20).

**CA–697**       

10×1=10

9. Explain Cohen-Sutherland Line Clipping technique and demonstrate its working by clipping the line segment AB where A↔(8, 9) and B↔(–4, 3) against the window defined from (–4, –5) to (5, 4).

*Or*

10. What are the various polygon clipping algorithms ? Explain the working of Weiler-Atherton algorithm with the help of suitable example.