**BCA/M-20**                     **1901**
COMPUTER GRAPHICS
BCA-363

Time : Three Hours]                    [Maximum Marks : 80

**Note** : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) Differentiate between interactive and passive computer graphics.

   (b) Define affine transformation.

   (c) What is Clipping ? What is the relationship between clipping and windowing ?

   (d) Name different Cartesian co-ordinate reference frames.

   (e) Name some common problems associated with scan conversion of elementary objects.

   (f) What do you mean by color palette ?

   (g) Define Point Clipping.

   (h) Write a short note on Rubber-Band techniques.   **8×2**

## Unit I

2. List the operating characteristics for the following display technologies :

   (a) Raster refresh system

   (b) Vector refresh system

   (c) Plasma panels

   (d) LCDs.

   Also write some applications appropriate for each of these display technologies. **10,6**

3. (a) Explain various popular graphics input devices.

   (b) Explain the various applications areas of computer graphics. **8,8**

## Unit II

4. Write an algorithm to plot a line using Bresenham's method. How is it better than DDA ? **10,6**

5. Explain scan conversion of an ellipse. Compare polynomial method and trigonometric method of scan conversion of an ellipse. **4,12**

## Unit III

**6.** Derive clockwise and anticlockwise transformation matrices about the origin. Give a transformation matrix to rotate an object by 45° in anticlockwise direction and then to scale it in the horizontal direction by one-third of the original. **10,6**

**7.** (a) Define homogeneous coordinates. What are the advantages of homogeneous coordinates ? **6**

    (b) What is Shearing ? Is it possible to shear an object by scaling and rotation only ? Describe. **5**

    (c) What is raster transformation ? Where is raster transformation used ? **5**

## Unit IV

**8.** Can a line clipping algorithm be used for clipping a polygon ? Justify your answer.
Explain the Sutherland-Hodgman polygon clipping algorithm. **6,10**

**9.** (a) Explain composite transformation with reference to 3-D coordinate system. **4**

    (b) Derive rotation transformation matrix to rotate a 3-dimensional object about an arbitrary axis with angle $\theta$. **12**