

Roll No.

Total Pages : 03

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**

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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**

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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 θ . **12**