

END SEMESTER EXAMINATION, MAY/JUNE - 2019**BCA SIXTH SEMESTER****COURSE CODE: BCA307****COURSE TITLE: COMPUTER GRAPHICS****[Time allotted: Three hours]****[Max. Marks: 100]****Note:** Attempt all Sections & Questions.**Section (A)****Q.1. Attempt all questions.****(2 x 10 = 20)**

- a.
- b. What is polygon?
- c. What is morphing?
- d. What is segment?
- e. What is frame buffer?
- f. Explain picket fence problem.
- g. What is winding number method?
- h. Explain display file structure with example.
- i. Write the matrix of 3-D rotation about y-axis.
- j. Write the matrix of scaling in 3-D transformation.
- k. What is the difference between DDA and Bresenham's line drawing algorithm?

Section (B)**Q.2. Attempt any 5 questions.****(7 x 5 = 35)**

- a. What is computer graphics? What are the different applications of computer graphics?
- b. Explain Random scan and Raster scan with suitable diagram.
- c. What do you understand by polygon filling algorithm? Explain any one method of polygon filling.
- d. Explain convex and concave polygon with example. And also explain positive & negative aligned convex and concave polygon with example.
- e. What is a graphic engine?
- f. Can we deploy more than one camera in a single virtual world? Explain in details.
- g. What are the differences between Bresenham's and DDA ?

Section (C)**Attempt any 3 questions.****(15 x 3 = 45)**

- Q.3. a. Explain segment table. Write down the algorithm for creating a segment, deleting a segment, renaming a segment, closing a segment. 10
b. Explain Sutherland-Hodgeman polygon clipping algorithm with suitable example. 5
- Q.4. a. What is transformation? Explain geometric & coordinate transformation. Find the transformation matrix that transforms a given square ABCD to half its size with center still remaining at the same position. The coordinates of the square are A (1, 1), B (3, 1), C (3, 3), D (1, 3) Centre at (2, 2). 7.5
b. Write a 2 X 2 transformation matrix for each of the following scaling transformation: 7.5
 - i) The entire picture three times as large.
 - ii) The entire picture one-third times as large.
 - iii) The x direction four times as large, the y direction unchanged.
 - iv) The y length reduced to two-third their original value, the x lengths unchanged.
 - v) The x direction reduced to three-fourth the original and y direction increased by a factor of seven-fifths.
- Q.5. a. Write down the generalized Bresenham's line drawing algorithm using this algorithm draw a line from (-6, -6) to (6, 6). 8
b. What is clipping? Explain different methods for line clipping with diagram. 7
- Q.6. a. Perform a 45° rotation of triangle A (0, 0), B (1, 1), C (5, 2). 8
 - i) About the origin
 - ii) About the point P (-1, -1).
b. What is hidden surface removal? Explain different methods of hidden surface with suitable example. 7
- Q.7. a. Magnify the triangle with vertices A (0, 0), B (+2, +2) and C (-2, 2) to twice its size while keeping C (-2, 2) fixed. 7
b. Explain mirror reflection? Write down the matrix of mirror reflection (about x-axis, y-axis). Reflect the polygon whose vertices are A (2, 2), B (6, 2) and C (3, 5) about x-axis followed by y-axis. 8