Roll No…….. **Total No. of Printed Pages: 1**
Total No. of Questions: [09]

BCA (Semester – 6th)
COMPUTER GRAPHICS
Subject Code: BCAP1627
Paper ID: [160127]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:
a) Define aspect ratio?
b) What are graphics primitives? Give two examples.
c) List and briefly describe four key application areas of computer graphics.
d) What are the limitations of using the direct line equation method for line drawing?
e) What is the concept of Mid-Point in Mid-Point Circle Algorithm?
f) What is the difference between the Boundary Fill and Flood Fill algorithms?
g) What are homogeneous coordinates, and why are they used in transformations?
h) What are composite transformations?
i) What is the viewing coordinate reference frame in 2D viewing?
j) Define the terms window and viewport in 2D viewing.

Section – B **(5 marks each)**

Q2. Explain the concept of raster-scan systems. Also compare Raster Scan and Random Scan displays?
Q3. Write and explain the steps involved in Bresenham's line drawing algorithm. Also, discuss its advantages and limitations.
Q4. Perform a 45-degree rotation of a triangle with vertices A (0, 0), B (1, 1), C (5, 2). About (a) the origin (b) about point P (-1, -1).
Q5. What is filling? Write down the code for 8-connected boundary_fill method.
Q6. What is viewing pipeline? Drive the equations and matrix for 2-D viewing transformation?

Section – C **(10 marks each)**

Q7. What are video-display devices? Explain the working of Cathode Ray Tubes in detail.
Q8. Describe the mathematical representations of translation, scaling, rotation, reflection, and shear transformations in 2D computer graphics. How these transformations are represented using 3x3 matrices?
Q9. Explain the concept of Cohen Sutherland line clipping algorithm in computer graphics. Provide a step-by-step explanation of how the algorithm works.