

(3 Hours)

[Total Marks: 80]

- N.B.:** 1) Question No.1 is **compulsory**.  
2) Attempt any **three** from the remaining **five** questions.

Q. 1. Attempt **any four** :- 20

- (a) Different between Raster-Scan System and Random-Scan Systems
- (b) Explain even-odd test to determine whether point is inside or outside of a polygon
- (c) What will be the effect of scaling factor  $S_x = 1/2$  and  $S_y = 1/3$  on a given triangle ABC? Whose coordinate are A[4, 1], B[5, 2], C[4, 3].
- (d) Explain the digital image representation?
- (e) What is importance of homogeneous coordinates?

Q. 2. (a) What is transformation? Develop a 2D rotation and scaling transformation matrices with respect to a fixed point P( $X_p, Y_p$ ). (10)

(b) What is filling algorithm? Explain the Boundary fill algorithms and Flood fill algorithms with pseudo code. (10)

Q. 3. (a) Equalize the given histogram (10)

Grey Level	0	1	2	3	4	5	6	7
No. of Pixels	0	50	0	50	0	50	0	50

(b) Discuss the types of projections in computer graphics. (10)

Q. 4. (a) What is line clipping? Use Liang - Barsky line clipping algorithm to find the visible portion of line P1(-10, 50) to P2(30, 80) against a window ( $X_{wmin} = -3, Y_{wmin}=10$ ) and ( $X_{wmax}=20, Y_{wmax}=60$ ). (10)

(b) What is fractal? What are different types of fractals? Explain Koch Curves. (10)

Q. 5. (a) What is rasterization? Derive and write DDA line drawing algorithm. (10)

- (b) For the following eight bit image perform the following operations. (10)
1. Threshold,  $T=150$
  2. Image negative

120	135	215	220	125
135	20	187	50	80

250	115	55	120	45
30	180	200	46	20
60	119	120	255	135

- Q. 6. (a) What are the fundamental steps in digital Image Processing? (10)
- (b) Write an algorithm for a midpoint circle generation and plot a circle centered at (10, 5) having a radius of 15 units. (10)

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