

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2026

B.Tech-V<sup>th</sup> Semester (CSE/IT)

COURSE CODE (CREDITS):18B11CI515(3)

MAX MARKS: 25

COURSE NAME: Computer Graphics

COURSE INSTRUCTOR: Dr. Saurabh Sharma

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is not allowed

Q.No	Question	CO	Marks
Q1	Consider a 2D rectangle ABCD where A=(0,0), B=(2,0) and D = (0,1). We want to apply 2D transformation to this rectangle which makes it a parallelogram AB EF where E =(3,1) and F =(1,1). (a) What kind of 2D-transformation is this? Explain. (b) Mention the 3x3 transformation matrix M to achieve the given transformation.	CO3	2 + 3
Q2	(a) Suppose, different line orientations relative to clipping window are mentioned. Specify, number of arithmetic operations are performed by NLN algorithm in comparison to Liang Barsky and Cohen Sutherland algorithms. Discuss in detail. (b) Describe the situation in which you will not perform completely inside and outside test for clipping of line. Justify your statement with proper proof.	CO4	3 + 2
Q3	(a) Justify the statement such that two successive reflections about any line in the XY plane which intersects the coordinate origin is equivalent to a rotation in the XY plane about the origin. (b) What do you understand by rigid body transformation? Describe it with transformation matrix and also specify a situation for rigid motion transformation.	CO4	3 + 2
Q4	Consider the triangle ABC with coordinates A (0, 0), B (2, 2) and C (10, 4). You are required to magnify the triangle four times its original size using the following conditions: i. Magnify the triangle with respect to the origin. ii. Magnify the triangle, while keeping point C (10, 4) fixed. Show the step-by-step calculation and write new vertices of triangle.	CO5	2 + 3
Q5	Consider the concave polygon having vertices are given as: V1 (2, 2), V2 (6, 3), V3 (5, 5), V4 (3, 6), V5 (4, 4) and its edges are represented as E1, E2, E3, E4, E5. Using the vector method, determine the point at which the polygon should be split to convert it into two convex sub-polygons. Explain the steps involved in identifying the concave vertex and the method of drawing the diving line.	CO5	5