

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

B.Tech-V Semester (CSE)

COURSE CODE (CREDITS): 18B11CI515 (3)

MAX. MARKS: 35

COURSE NAME: Computer Graphics

COURSE INSTRUCTORS: ATA, PTK, SMA, RVS

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) Calculator is allowed

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

Q.No	Question	CO	Marks
Q1	a) What are graphics primitives? List some basic graphics primitives used in computer graphics. b) Describe the working principle of a cathode ray tube (CRT) and its role in computer graphics displays.	CO1	(1.5*2)
Q2	a) A circle with a radius = 7 is centered at (5, 5). Clip the circle to a rectangular window defined by (x min = 3, y min = 3, x max = 6, y max = 6). Use the Midpoint Circle Algorithm to compute the points of intersection and describe the clipped portion. b) What is the purpose of the decision variable in Bresenham's Line Drawing Algorithm?	CO2	(3+1)
Q3	Apply following 2D transformations on polygon A (10, 10), B (10, 40), C (30, 10) using homogeneous coordinates matrix. i. Translation 10 units towards origin in X direction and 20 units away from origin in Y direction. ii. Rotate 45 degrees about the origin in clockwise direction. iii. Reflect polygon about Y-axis. iv. Write Window- to-Viewport 2D-Transformations Mapping the Clipping Window into a Normalized Window equation.	CO3	(1+1+1+2)
Q4	a) Use the Cohen Sutherland algorithm to clip two lines P1(40,15)-P2(75,45) and P3(70,20)-P4(100,10) against a window A (50,10), B (80,10),C(80,40),D(50,40). b) Write Liang-Barsky Line clipping parametric equation of p and q where inequalities expressed as $up_k \leq q_k$ $k = 1, 2, 3, 4$	CO2	(2+1)

Q5	Derive matrix form for 3 D rotation about an arbitrary axis in space. Explain each and every step in detail.	CO4	(6)
Q6	Elaborate: a. Vanishing Point Types b. Perspective Projection c. Oblique Projection d. Axonometric Projection	CO4	(1.5*4)
Q7	Define solid modeling. Explain with the help of an example how constructive solid geometry (CSG) performs solid modeling?	CO5	(1*2)
Q8	Construct quad trees for the two images given below that represent two different 3-D objects. Perform union operation on the constructed quad trees to form the new quad tree. Draw the resultant quad tree thus obtained. <p style="text-align: center;">Object A Object B</p>	CO5	(5)

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