



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

| WINTER-2025 | |
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| Exam Seat No.: | |
| Academic Year:2025-2026 | Semester:III |
| Class:SY | Program:B.Tech |
| Branch Code:COM/CSD | Pattern:2023 |
| Name of Course:Computer Graphics | Course Code:2301203 |
| Max. Marks:60 | Duration:2.30 Hrs. |

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

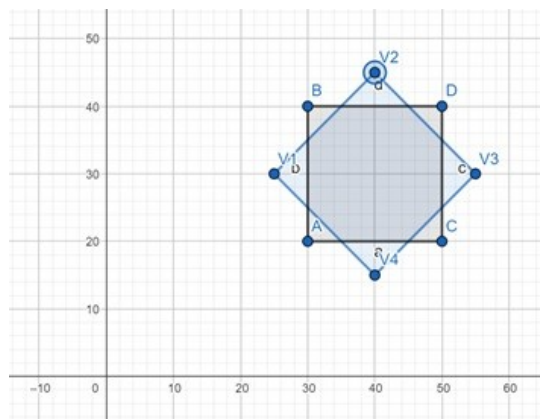
Marks CO

Question No. 1

- 1 Apply the DDA Line Drawing Algorithm to plot the line between points (12, 10) and (4, 4). List all intermediate points generated. (6) CO1

Question No. 2

- 2 Using Sutherland-Hodgman Polygon Clipping algorithm, clip the above polygon and list the final set of vertices generated. (6) CO2



Question No. 3

- 3.a) Describe the process of performing a 2D rotation about any arbitrary point. Explain the transformation steps involved and illustrate with an example. (6) CO3

OR

- 3.b) Explain scaling and translation transformations in 3D graphics. Explain how each transformation modifies the coordinates of a 3D object. (6) CO3
- 3.c) Translate an object ABC, where the coordinates are A (0,3,6), B (4,5,9), C (3,4,8) and translation factors are $T_x=3$, $T_y=2$, $T_z=4$. (5) CO3

OR

- 3.d) Given a 3D object with coordinate points P(2, 1, 4), Q(5, 2, 3), R(4, 0, 6), and S(1, 2, 1). Apply the scaling parameter 2 towards Xaxis, 3 towards Yaxis and 3 towards Zaxis and obtain the new coordinates of the object. (5) CO3
- 3.e) What is parallel projection? Explain in brief about each type of parallel projections. (5) CO3

OR

- 3.f) Explain the following terms with respect to projection (5) CO3
- i) Projection
 - ii) View- Plane
 - iii) Projector
 - iv) Diametric Projection
 - v) Centre of Projection

Question No. 4

- 4.a) State the fundamental properties of light and list the commonly used color models in computer graphics. Explain the purpose of each color model and where it is typically applied. (6) CO4

OR

- 4.b) What is the need of hidden surface algorithm? Which algorithm is considered the most effective, and why? Provide a brief justification. (6) CO4
- 4.c) What is a color? Explain 3 properties of a color. (5) CO4

OR

- 4.d) Explain RGB color model in detail. (5) CO4
- 4.e) Explain Back Face detection and removal algorithm with suitable example. (5) CO4

OR

- 4.f) Explain Area subdivision (Warnocks) algorithm with suitable example. (5) CO4

Question No. 5

- 5.a) Describe how a snowflake (Koch Snowflake) is generated step-by-step and illustrate the construction process using suitable diagrams. (6) CO5

OR

- 5.b) What are the different types of Bézier curves used in computer graphics, and how is each type illustrated with an example? (6) CO5
- 5.c) Define fractals and describe the construction of the Hilbert space-filling curve. List any two practical applications of this curve. (5) CO5

OR

- 5.d) Compare Bézier curves and B-spline curves by highlighting their major differences in terms of control points, flexibility, and curve behavior. (5) CO5
- 5.e) Define interpolation and approximation in the context of curve and surface generation. How do these two techniques differ in shaping geometric models? (5) CO5

OR

- 5.f) Explain the general process of generating curves in computer graphics using control points. How does the choice of control points influence the final curve shape? (5) CO5

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