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**Elective - II : Computational Geometry**

P. Pages : 1

Time : Three Hours

**NRT/KS/19/3577**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.

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|-----------|----|---|----|
| 1.        | a) | What is computational geometry? Explain line segment intersection.  | 7  |
|           | b) | What is Boolean expression? Explain different Boolean operation.  | 7  |
| <b>OR</b> |    |   |    |
| 2.        | a) | What is triangulations? How triangulations are applied on polygon?  | 7  |
|           | b) | Explain doubly connected edge list.   | 7  |
| 3.        | a) | Contrast chain and slab methods for location of a point in a plane subdivision highlighting data structure employed and computational complexity. | 7  |
|           | b) | What is geometric searching? Discuss point location and fractional cascading in detail.   | 6  |
| <b>OR</b> |    |   |    |
| 4.        | a) | What is trees? Explain higher dimensional range trees.  | 7  |
|           | b) | What is orthogonal range searching? How it is different than linear searching?  | 6  |
| 5.        | a) | Discuss hidden line problem and an algorithm for tracing hidden line.   | 7  |
|           | b) | Describe min-max angle properties in detail.  | 6  |
| <b>OR</b> |    |   |    |
| 6.        |    | Explain flip and incremental algorithm in detail.   | 13 |
| 7.        | a) | Write short note on triangulation of planner point sets.  | 7  |
|           | b) | Differentiate between data structure and geometric data structure.  | 6  |
| <b>OR</b> |    |   |    |
| 8.        | a) | Define Delaunay triangulation explain computation involved in it.   | 7  |
|           | b) | Explain priority search tree with example.  | 6  |
| 9.        | a) | What is convex hulls? How to compute complexity of convex hulls in 3 – space.   | 7  |
|           | b) | Discuss quick hull technique with help of a suitable example.   | 6  |
| <b>OR</b> |    |   |    |
| 10.       | a) | Explain painter's algorithm in computational geometry.  | 7  |
|           | b) | Discuss advantages and dis-advantages of BSP trees over kd-trees.   | 6  |
| 11.       | a) | Explain multilevel partition tree.  | 7  |
|           | b) | Compare and contrast between uniform meshes and non – uniform meshes.   | 7  |
| <b>OR</b> |    |   |    |
| 12.       | a) | Write short note on Quadtrees.  | 7  |
|           | b) | Explain in brief simplex Range searching.   | 7  |

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**The secret of getting ahead is getting started.**

**~ Mark Twain**

