

11. (a) Explain data structure and applications of quad trees.
 (b) What is simplex range searching ? What is the role of simplex range searching in geometry ? 7

OR

12. (a) What is partition tree ? How is it used in range searching ? 7
 (b) What is visibility ? Discuss algorithm for weak and strong visibility. 7

Faculty of Engineering & Technology
Seventh Semester B.E. (C.S.E.) (C.B.S.) Examination
Elective—II : COMPUTATIONAL GEOMETRY

Time—Three Hours]

[Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

- (1) All questions carry marks as indicated.
 - (2) Solve Question No. **1 OR** Question No. **2**.
 - (3) Solve Question No. **3 OR** Question No. **4**.
 - (4) Solve Question No. **5 OR** Question No. **6**.
 - (5) Solve Question No. **7 OR** Question No. **8**.
 - (6) Solve Question No. **9 OR** Question No. **10**.
 - (7) Solve Question No. **11 OR** Question No. **12**.
 - (8) Assume suitable data wherever necessary.
1. (a) Discuss two fields of application of computational geometry highlighting why classical geometry can't be applied in such field. 7
 (b) What is triangulation ? Describe the following :
 (i) Angular triangulation
 (ii) Point-set triangulation. 7

OR

2. (a) Explain with suitable example the impact of model of computation on complexity of geometric operation. 7
- (b) Differentiate between :
- (i) Classical and computational geometry
- (ii) Plane and 3-D line
- (iii) Convex and concave in context of computational geometry. 7
3. (a) Explain higher dimensional range searching with example. 7
- (b) Discuss linear programming with prune and search in detail. 6

OR

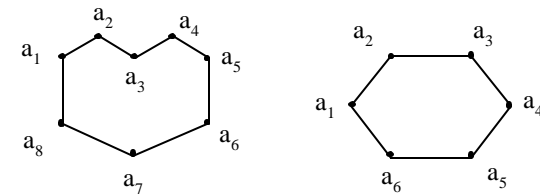
4. (a) Discuss the half plane intersection in view of computational geometry. 7
- (b) What is orthogonal range searching how is it different than linear searching ? 6
5. (a) Describe voronoi diagram. What do you understand by duality of voronoi diagram ? 7
- (b) Explain application of randomized incremental algorithm. 6

OR

6. (a) What do you understand by divide and conquer ? 4
- (b) Define and explain voronoi diagrams. What are its basic properties ? 9
7. (a) Define delaunay triangulations. Explain the computations of delaunay triangulation. 7
- (b) Explain the data structure for priority search trees used in geometric functions. 6

OR

8. (a) Explain data structure and application of internal trees and segment trees. 8
- (b) Write a short note on triangulation of planar point sets. 5
9. (a) Define convex hull ? Determine convex hull, if any for the following figures. Justify your answer :



- (b) Discuss any two applications of convex hull. 6

OR

10. (a) Define binary space partition trees. Explain with suitable example. 7
- (b) Explain painter's algorithm in computational geometry. 6