B.E.Eighth Semester (Computer Technology) (C.B.S.)
Elective - IV : Computational Geometry

P. Pages : 2

Time : Three Hours

NKT/KS/17/7603

Max. Marks : 80

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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.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Discuss two fields of computational geometry highlighting why classical geometry can't be applied in such field. **7**

   b) Explain line segment intersection in light of computational geometry. **6**

OR

2. a) What is convex hulls? Discuss Orientation & limitation of convex hull in detail. **7**

   b) Describe the following : **6**
   a) The Doubly-connected Edge list.   b)   Boolean operations.

3. a) What is half plane intersection. Explain with example. **6**

   b) Differentiate between Incremental and Randomized Linear Programming with example. **7**

OR

4. a) Prove that any polygon admits triangulation, even if it has holes. **7**

   b) Explain the intersection of n-half planes according to the divide & conquer based algorithm. **6**

5. a) What is randomized incremental algorithm? How it is used to construct the Trapezoidal Map. **8**

   b) Explain the algorithm to insert and delete points from a kd-Trees. **6**

OR

6. a) Write note on Range Trees. **5**

   b) Describe min-max angle properties in brief. **6**

   c) Explain 1-Dimensional range searching. **3**

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7.	a)	Describe properties of Post-office problem.	6
	b)	What is ray tracing? Explain the arrangements and Duality super-sampling in Ray Tracing.	7

OR

8.	a)	What is Voronoi diagram? How it is used to determine whether the new branch of super market will attract customers or not.	8
	b)	What is visibility? Discuss algorithms for weak and strong visibility.	5
9.	a)	Explain priority search trees. What is its advantages over range trees.	6
	b)	Describe angular triangulation and its application.	7

OR

10.	a)	Explain in detail A framework for Randomized Algorithms.	7
	b)	What is windowing? Explain in detail.	6
11.	a)	What is convex hull? Discuss the orientation & limitation of convex hull. Determine convex hull for the following figures if any.	10

a_1 a_3 a_2

a_7 a_2 a_4 a_1 a_3

a_6 a_5 a_5 a_4
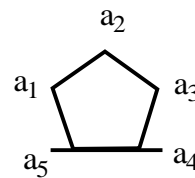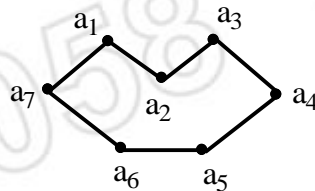
	b)	Explain Painter's algorithm.	4

OR

12.	a)	Define BSP trees. Write algorithm to construct BSP trees.	8
	b)	Explain how size of BSP tree is calculated in 3-space.	6

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