

Name: \_\_\_\_\_

Question:	1	2	3	4	5	6	7	8	9	10	11	Total
Points:	10	5	5	5	5	5	10	10	15	15	15	100
Score:												

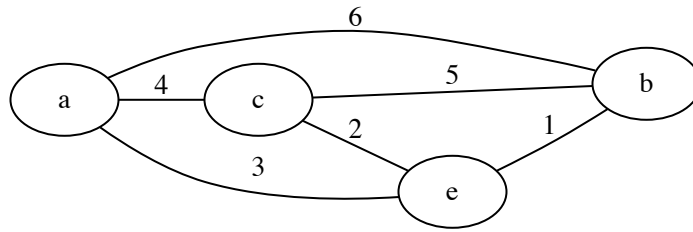
1. (10 points) Sort the following functions on ascending order of growth

- $f_1 = 2n^2$
- $f_2 = 2^n$
- $f_2 = n \cdot \log n^2$
- $f_2 = 5^n$
- $f_2 = n^{1.1}$

Answer: \_\_\_\_\_

2. (5 points) A \_\_\_\_\_ is a connected undirected graph with no cycles
3. (5 points) The best sorting algorithms that uses comparisons, runs in  $O(\text{_____})$  time.
4. (5 points) The worst case for insertion in a hash table runs in  $O(\text{_____})$  time.
5. (5 points) The adjacency matrix representation of a graph requires  $O(\text{_____})$  memory
6. (5 points) Given  $T(n) \leq 2 \cdot T(\frac{n}{2}) + c \cdot n$  then  $T(n) \in O(\text{_____})$

7. (10 points) Given the following graph, calculate the shortest route from a to every node



8. (10 points) Given the graph above, provide a Minimum Spanning Tree (give the edges that would be included)

9. (15 points) Describe an algorithm to find the connected components of a graph

10. (15 points) Name and briefly describe one of the optimal algorithms for finding an MST

11. (15 points) Name and briefly describe one of the divide and conquer algorithms we studied

Total questions: 11 Total points: 100