

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

1. (1 pt.)

- **Read all material carefully.**
- *If in doubt whether something is allowed, ask, don't assume.*
- You may refer to your books, papers, and notes during this test.
- E-books may be used *subject to the restrictions* noted in class.
- No computer or network access of any kind is allowed (or needed).
- Write, and draw, carefully. Ambiguous or cryptic answers receive zero credit.
- Use class and textbook conventions for notation, algorithmic options, etc.

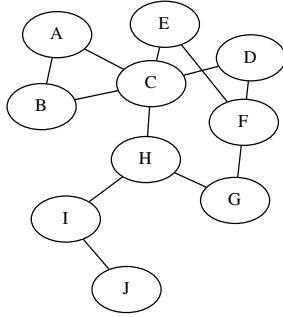
Write your name in the space provided above.

2. (3 pts.) Define the *derangements* of a sequence. List all derangements of the sequence: 1, 2, 3.

3. (2 pts.) Recall the main problem in Homework 3. How many triples of poles satisfy the problem's requirements when there are five available poles, all of length 5? Justify your answer.

4. (4 pts.) Define each of the following terms briefly. Also list the value of each for the graph on the next page.

- (a) order:
- (b) size:
- (c) diameter:
- (d) maximum degree:



5. (10 pts.) Trace the execution of the BFS algorithm on above graph with starting vertex A. Assume that vertices are listed alphabetically in the adjacency list representation of the graph.

Depict the state of the FIFO queue after each iteration of the main while loop in the textbook's pseudocode. Write the distances below each queue item.

Depict the corresponding BFS tree.