

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.
- Computers are not permitted, except when used strictly as ebooks.
- Network access of any kind (cell, voice, text, data, ...) is not permitted.
- 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.

WAIT UNTIL INSTRUCTED TO CONTINUE TO REMAINING QUESTIONS.

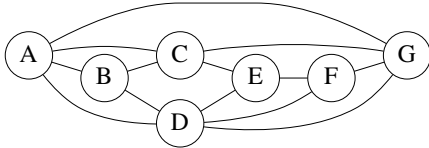
Do not write in the following table.

Q	Full Score
1	1
2	14
3	20
total	35

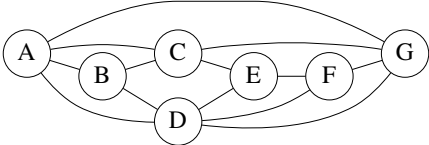
2. (14 pts.) Trace the operation of BFS, with initial vertex A, on the following graph using the conventions of Figure 22.3 in the textbook. In particular, **for each iteration** of the while loop:

- Depict the state of the **graph** and the **queue**.
- Annotate each vertex with its color: **W** for white, **G** for gray, **B** for black.
- Write the value **u.d** next to each vertex.
- Highlight **tree edges** using double lines.

You may abbreviate as long as the result is unambiguous.

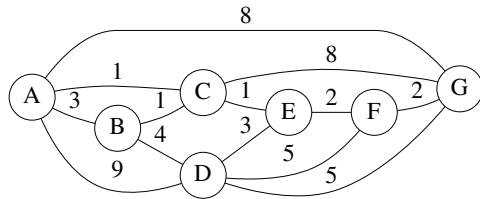


[additional space for answering the earlier question]



3. (20 pts.) Trace the operation of MST-KRUSKAL on the following graph using the conventions of Figure 23.4 (p. 632) of the textbook. In particular, after **each iteration** of the second for loop:

- highlight **edges belonging to the forest A** using double-lines; and
- draw an arrow pointing to the **edge under consideration**.



[additional space for answering the earlier question]

