NAME : _____

Exam 1, Version A, Exam 1 Version A

31 January, 2013

Instructor: Ken McLaughlin

Instructions:

- This is a closed book, closed notes exam.
- You are not to give or receive help from any outside source during the exam.
- Calculators are permitted, but only for calculations, NOT FOR STORING FORMULAE OR OTHER INFORMATION.
- You have **75 minutes**.
- The exam is MULTIPLE CHOICE. Please use the scantron sheet which has been provided.

1. If a graph has a bridge it is connected.

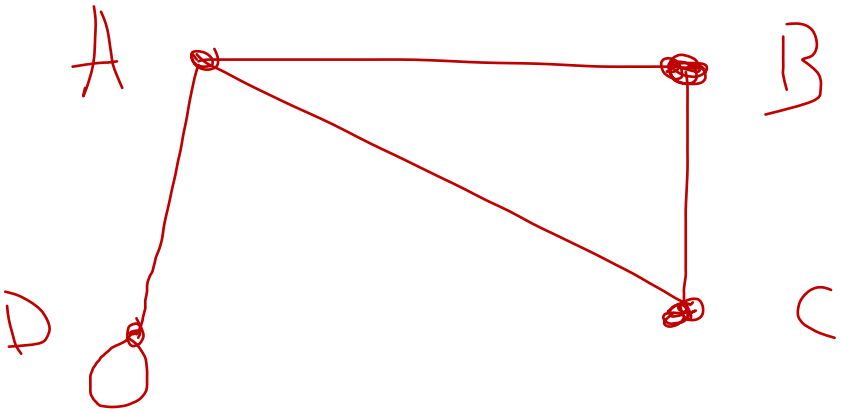
A. True B. False

2. If a graph has an Euler circuit it has no bridges.

A. True B. False

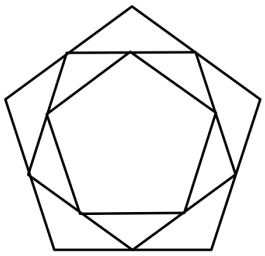
3. A graph has the vertex set $\{A, B, C, D\}$ and edge set $\{AB, AC, AD, BC, DD\}$. Find all bridges.

A. AB **B**. AC **C**. AD **D**. DD **E**. There are no bridges

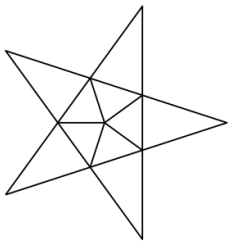


For the next 2 questions, consider the following three graphs. Choose all correct answers.

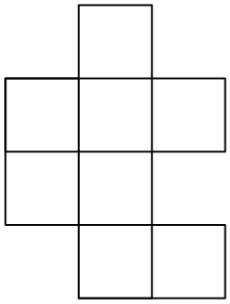
A.



B.



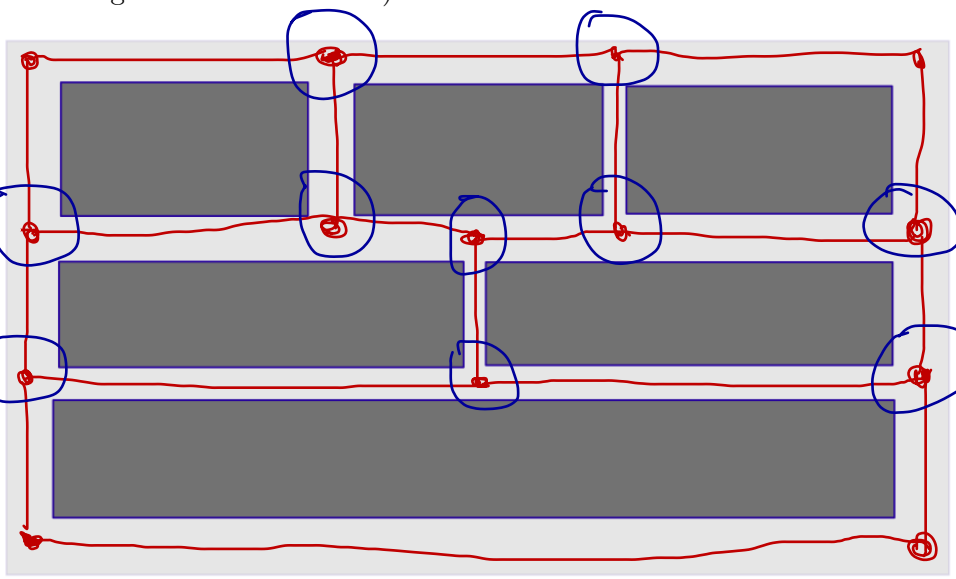
C.



4. Which have an Euler path? C

5. Which have no Euler paths and no Euler Circuits? B

The questions on this page are are related to the map of a neighborhood shown below (the streets are shaded lighter than the blocks).



10 vertices with degree 3.
4 " " " 2.

add all degrees: 38.
Number of edges: 38 ÷ 2 = 19.

6. How many edges in the graph model of this neighborhood?

A. 17 **B**. 19 **C**. 14 **D**. 18 **E**. None of these

7. A security guard wants to walk through the neighborhood, but does not want to walk any more than necessary. Can the guard cover the entire neighborhood and walk through each block once? (Note: the guard may start and end at different locations.)

A. Yes. B. No. C. Cannot determine from the information given.

8. If the security guard parks his car (and so must return to his car at the end of the patrol) what is the the minimum number of blocks that must be recrossed?

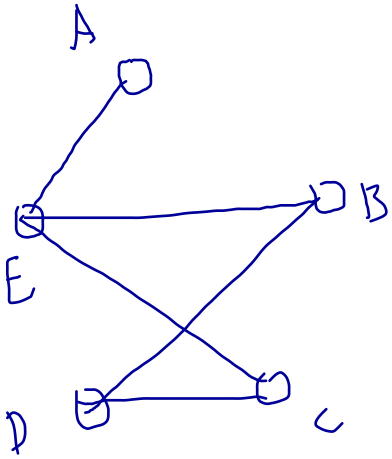
A. 3 **B**. 4 **C**. 5 **D**. 10 **E**. None of these

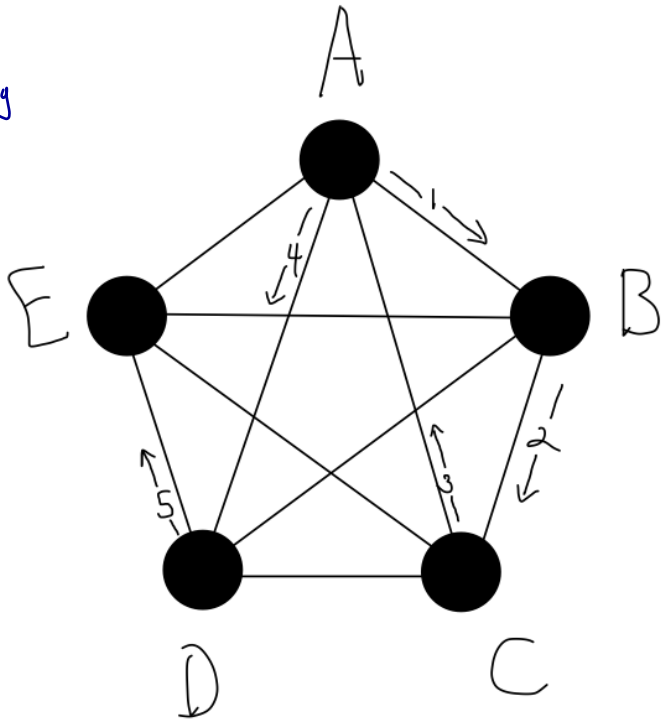
9. How many edges in K_7?

A. 7 **B**. 15 **C**. 21 **D**. 60 **E**. None of these

10.

The graph after removing all used edges:

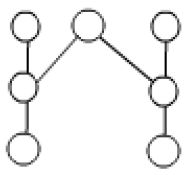


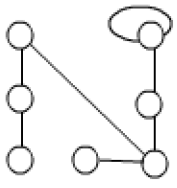


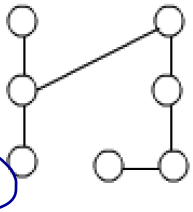
For the above graph, the first 5 steps in of an Euler circuit have been drawn, following Fleury's algorithm. Which of the following edges may be used next?

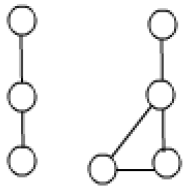
A. EC **B**. BD **C**. EA **D**. DC **E**. None of these

11.

A. 

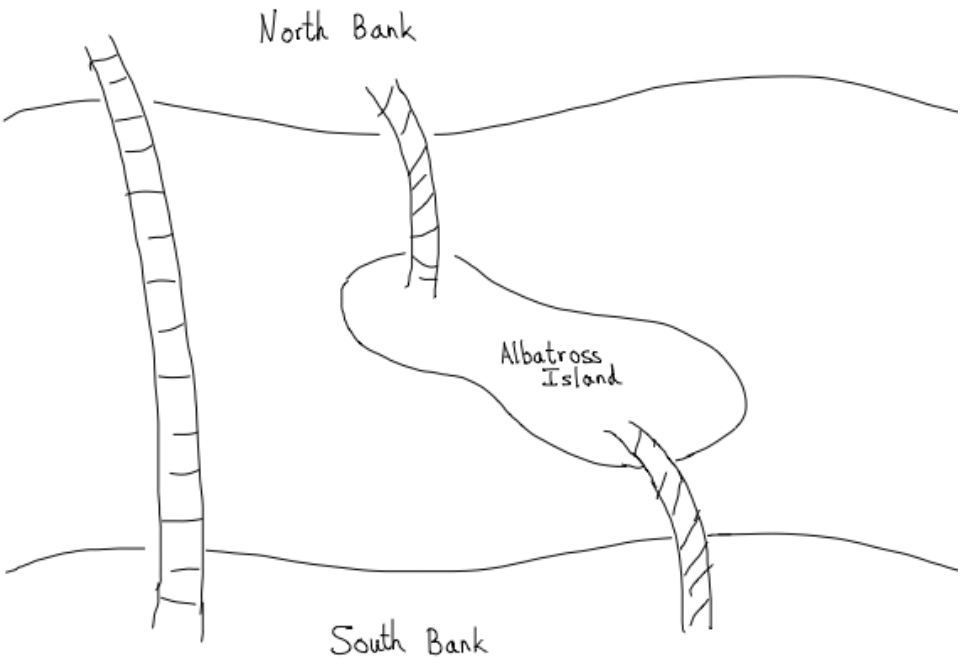
B. 

C. 

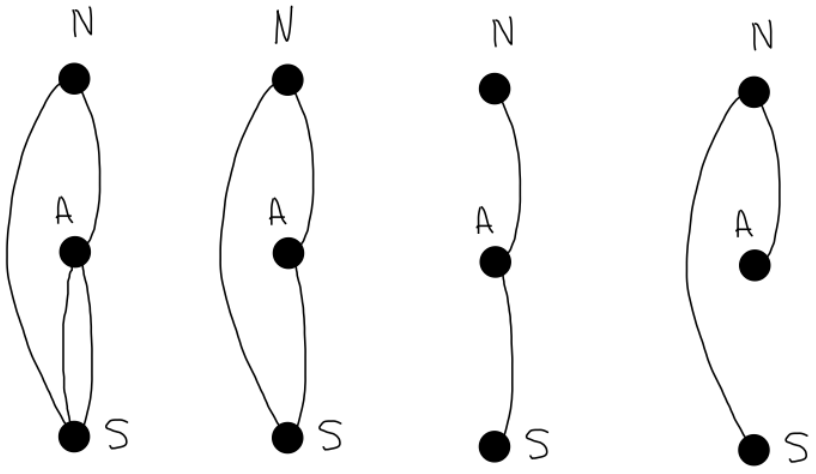
D. 

Which of the above is an example of a graph with 7 vertices such that each edge is a bridge, and exactly 3 vertices are of degree 1?

12. The layout of a village with a single island is shown in the figure below.



which of the following graphs models the layout of the city?



A. B. C. D.