

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

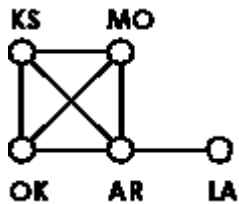
Represent the following with a graph.

1)

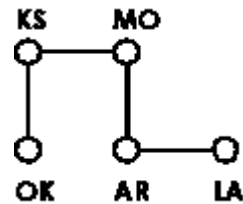
1) _____



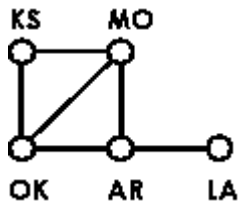
A)



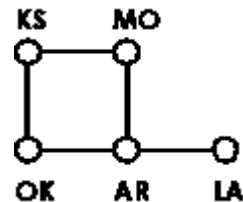
B)



C)

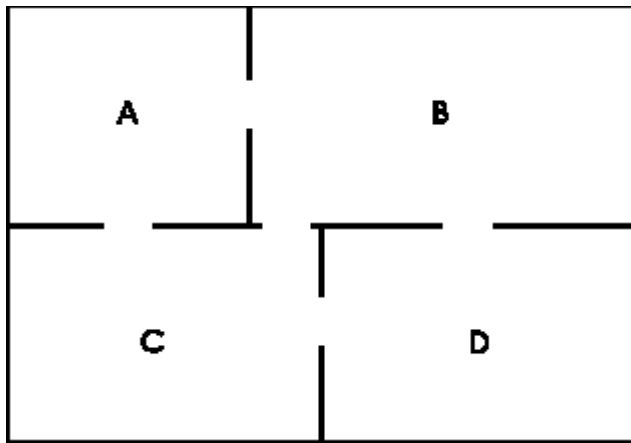


D)



2)

2) _____

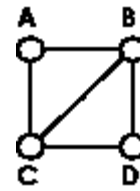
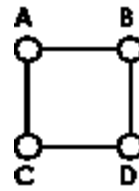
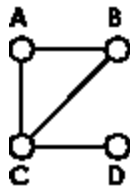
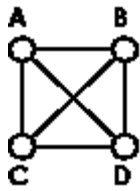


A)

B)

C)

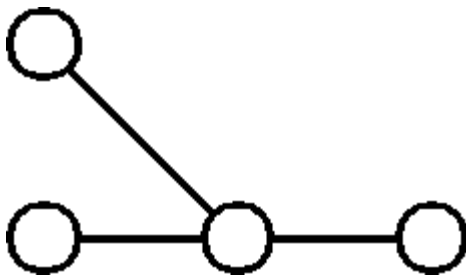
D)



Determine whether the graph is connected or disconnected.

3)

3) _____

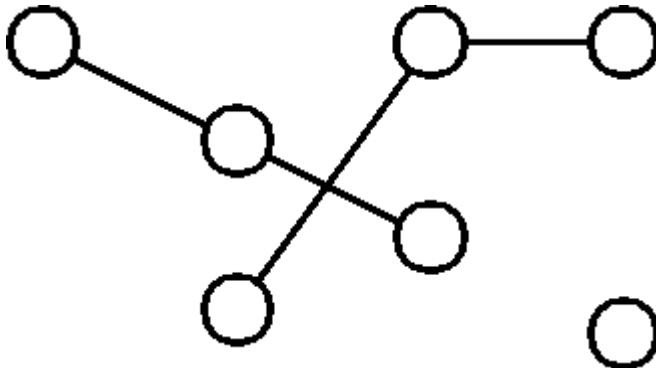


A) Disconnected

B) Connected

4)

4) _____



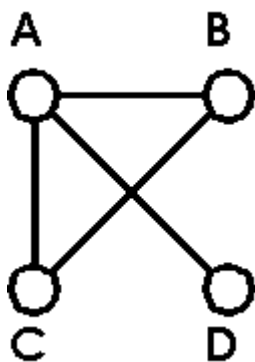
A) Connected

B) Disconnected

Identify any bridges in the graph or say there are none.

5)

5) _____



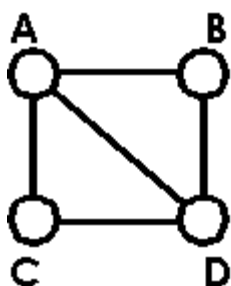
- A) AB, AC, AD, and BC
C) AD

- B) None
D) AB and AD

Give an appropriate answer.

6) Using the following graph, find an Euler path that starts with vertex A.

6) _____

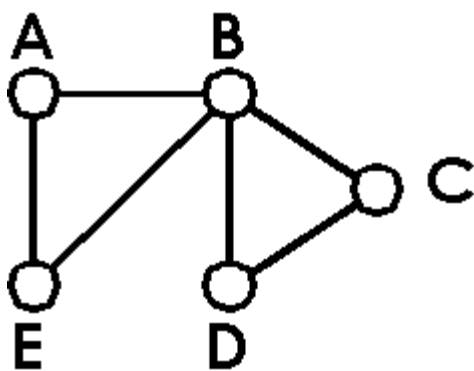


- A) $B \rightarrow A \rightarrow D \rightarrow C$
C) No Euler path exists.

- B) $A \rightarrow B \rightarrow D \rightarrow C$
D) $A \rightarrow C \rightarrow D \rightarrow A \rightarrow B \rightarrow D$

7) Using the following graph, find an Euler circuit that begins and ends with vertex A.

7) _____



- A) $A \rightarrow B \rightarrow C \rightarrow D \rightarrow B \rightarrow A$
C) $A \rightarrow B \rightarrow C \rightarrow D \rightarrow E \rightarrow A \rightarrow B$

- B) $A \rightarrow B \rightarrow C \rightarrow D \rightarrow B \rightarrow E \rightarrow A$
D) No Euler circuit exists.

Solve the problem.

- 8) The map shows the states Tennessee, Alabama, Georgia, and Mississippi. Is it possible to find a route that starts in Georgia and crosses each common state border exactly one time?

8) _____

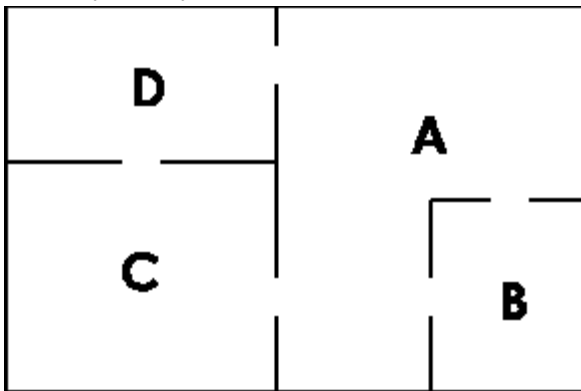


A) Yes

B) No

- 9) Using the following floor plan, find a path that begins and ends in room A and passes through each doorway exactly once.

9) _____



A) No such route exists.

C) A → D → C → A → B → D → A

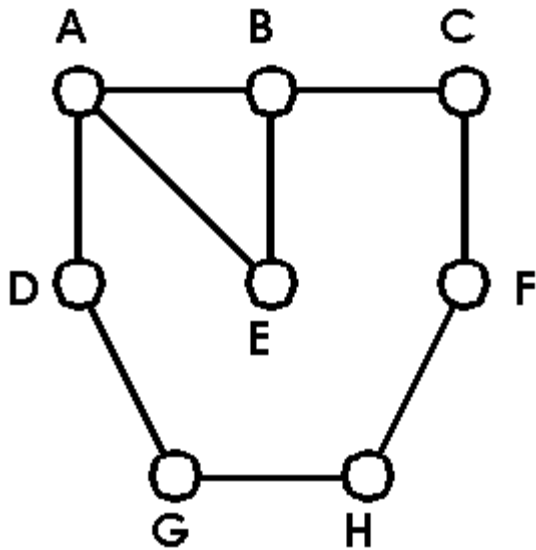
B) A → D → C → A → B

D) A → B → A → C → D → A

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

10) Use Fleury's algorithm to find an Euler path for the following graph.

10) _____

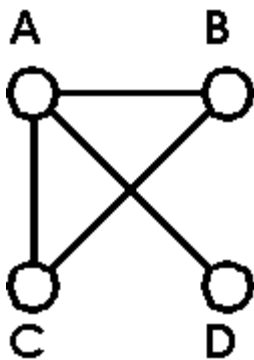


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find two different Hamilton paths for the given graph.

11)

11) _____

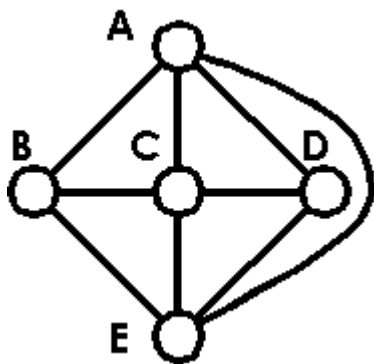


- A) The graph does not have two different Hamilton paths.
- B) $A \rightarrow B \rightarrow C \rightarrow A \rightarrow D$; $A \rightarrow C \rightarrow B \rightarrow A \rightarrow D$
- C) $D \rightarrow A \rightarrow C \rightarrow B$; $D \rightarrow A \rightarrow B \rightarrow C$
- D) $C \rightarrow B \rightarrow A \rightarrow D$; $D \rightarrow B \rightarrow A \rightarrow C$

Find two different Hamilton circuits for the given graph.

12)

12) _____



- A) The graph does not have two different Hamilton circuits.
 B) $A \rightarrow B \rightarrow E \rightarrow D \rightarrow C \rightarrow A$; $A \rightarrow E \rightarrow D \rightarrow C \rightarrow B \rightarrow A$
 C) $A \rightarrow B \rightarrow E \rightarrow D \rightarrow C \rightarrow A$; $A \rightarrow C \rightarrow D \rightarrow E \rightarrow A \rightarrow B$
 D) $A \rightarrow B \rightarrow E \rightarrow D \rightarrow A$; $A \rightarrow C \rightarrow E \rightarrow B \rightarrow C \rightarrow D \rightarrow A$

Solve the problem.

- 13) Sarah Katerinov is a high school student in Chicago. She will be going to college next year and is planning to visit the following campuses: University of Wisconsin at Madison, Harvard, and Ohio State University. How many different ways can she visit each of these schools and return to her starting point in Chicago?

13) _____

- A) 5 B) 6 C) 12 D) 24

- 14) The costs of one-way flights between several U.S. cities are listed below:

14) _____

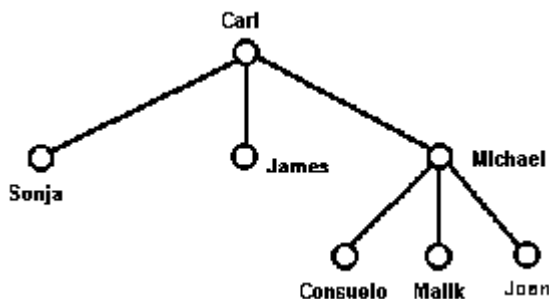
	St. Louis	Kansas City	Ok. City	Des Moines	Little Rock
St. Louis	-	\$50	\$70	\$445	\$64
Kansas City	\$50	-	\$64	\$195	\$83
Ok. City	\$70	\$64	-	\$409	\$96
Des Moines	\$445	\$195	\$409	-	\$352
Little Rock	\$64	\$83	\$96	\$352	-

Using the Nearest Neighbor algorithm, estimate the minimum cost for a trip that starts in Des Moines, travels to all the other cities once, and then returns to Des Moines.

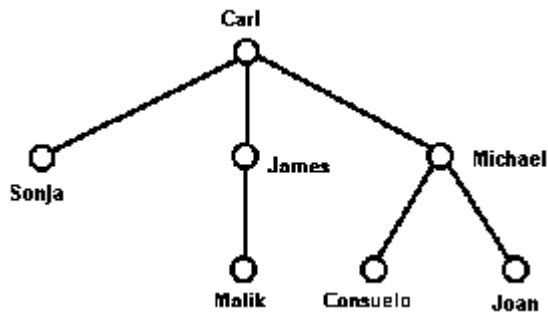
- A) \$814 B) \$718 C) \$1070 D) \$764

- 15) Use a tree to show the parent-child relationships in the following family. Carl has three children: Sonja, James, and Michael. James has one child: Malik. Michael has two children: Consuelo and Joan. Sonja has no children.

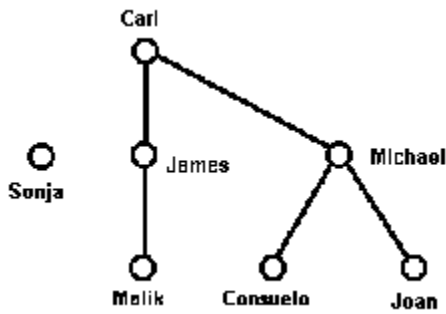
15) _____



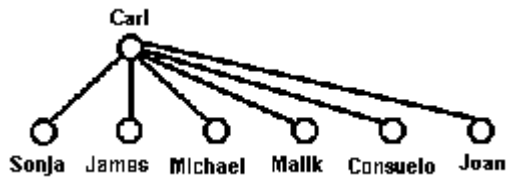
B)



C)



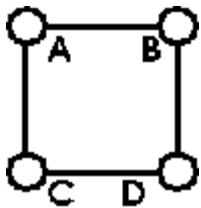
D)



SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find two different spanning trees for the graph.

16)



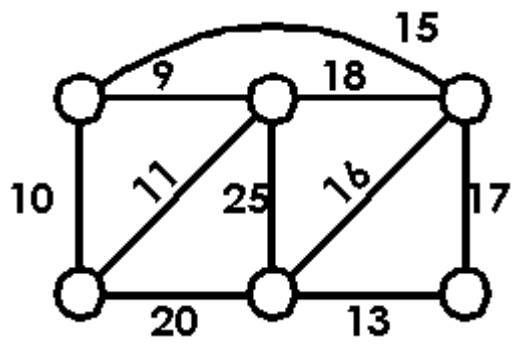
16) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

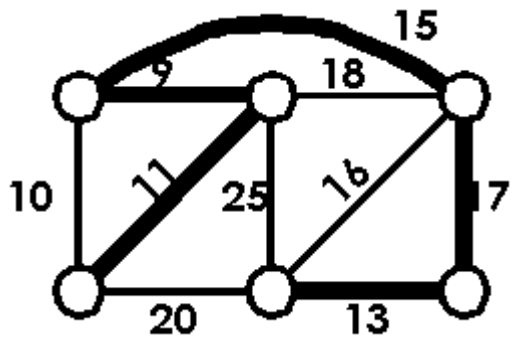
Find the minimum-cost spanning tree for the graph.

17)

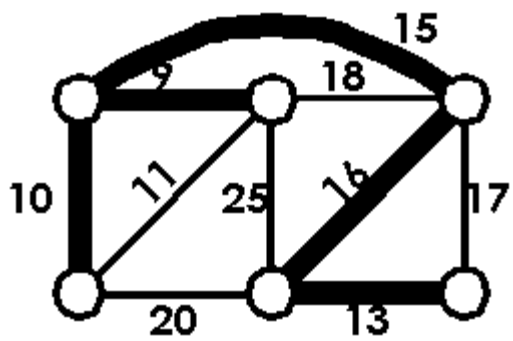
17) _____



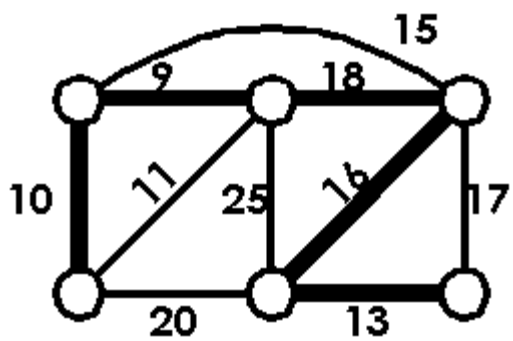
A)



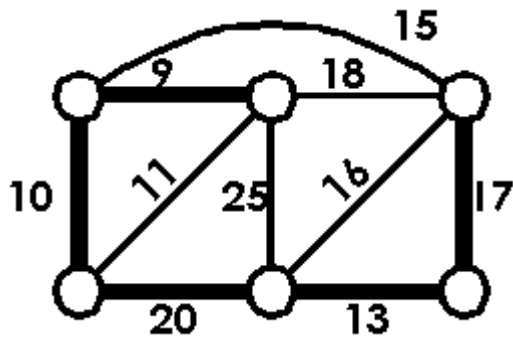
B)



C)



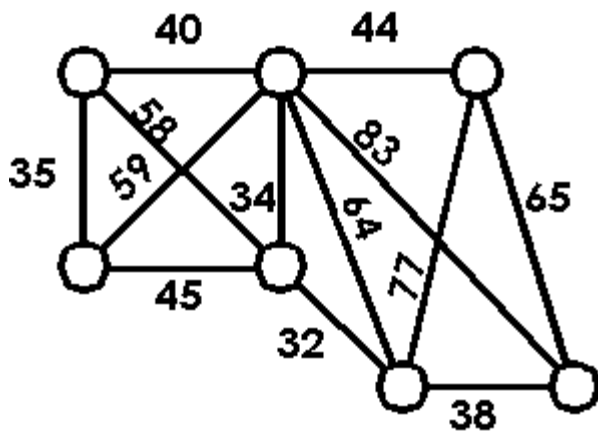
D)



SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

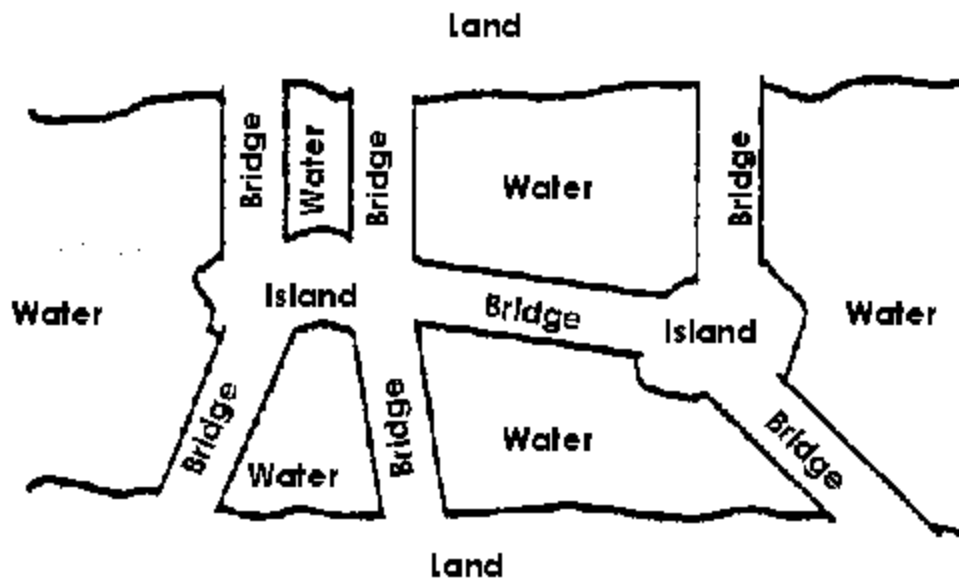
- 18) A summer camp consists of several lodges, dining rooms and bath houses, represented by the vertices on the graph below. These buildings are linked by gravel pathways whose lengths in yards are also indicated on the graph. The gravel paths become very muddy when it rains, so the camp owners wish to pave certain paths so that it is possible to walk between any two buildings without having to walk on a gravel path. Use Kruskal's algorithm to determine which paths should be covered in order to minimize the total length of paved paths. Also, determine the minimum total length of pathways that must be paved. 18) _____



Answer the question.

- 19) In the Königsberg bridge problem, the islands are joined to the mainland by several bridges. Are these bridges really "bridges" in the graph theory sense? Explain.

19) _____



Create a graph with the given properties.

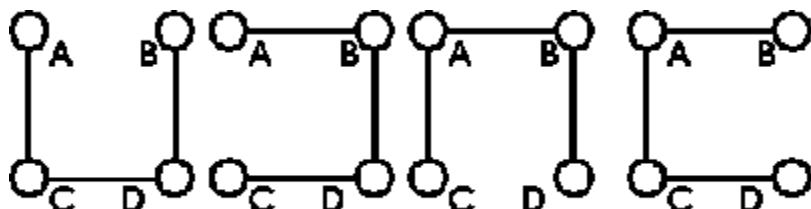
- 20) Five even vertices

20) _____

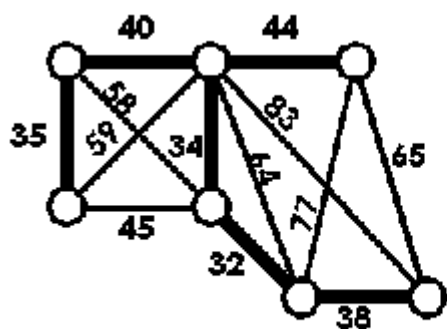
Answer Key

Testname: CHAPTER11TEST

- 1) C
- 2) D
- 3) B
- 4) B
- 5) C
- 6) D
- 7) B
- 8) B
- 9) D
- 10) Answers may vary. One possibility is: A → B → C → F → H → G → D → A → E → B
- 11) C
- 12) B
- 13) B
- 14) A
- 15) B
- 16) Answers will vary. The possible answers are:



- 17) B
- 18)



$$35 + 40 + 44 + 34 + 32 + 38 = 223 \text{ yards total}$$

- 19) No. A bridge in the graph theory sense is an edge that, if removed, disconnects the graph. None of the physical bridges in the Königsberg bridge problem meet this criterion.

Answer Key

Testname: CHAPTER11TEST

20) Answers will vary. One possibility is:

