Review of Chapter 9 – Graphs

Concept review-Check yourself.

- **In an undirected graph, two vertices are called ___ if, and only if, there is an edge connects these vertices. // adjacent, incident, degree, isomorphic**
- **A path in a graph not pass through an edge more than once is called a ___ path. // simple, Euler, Hamilton**
- **A vertex on which no edges are incident is called ___. // pendant, isolated, adjacent, loop**
- **The ___ of a vertex in a simple graph is the number of edges which are incident to this vertex. // vertex, loop, degree, length**
- **The total degree of a undirected graph is equal to two times of the number of ___ in this graph. // vertices, edges, loops, circuits**
- **In the adjacency matrix for a directed graph, the entry in the i^{th} row and j^{th} column is the number of ___ from the vertex ___ to the vertex ___.**
- **A graph is connected if, and only if, there is a ___ between every pair of distinct ___ of the graph. // path, circuit, loop, length, vertices, edges**
- **A path an Euler circuit in a connected graph is a ___ circuit passing every ___ of this graph. //simple, loop, vertex, edge Euler, Hamilton**
- **A Hamiltonian circuit in a graph is a ___ passing through every ___ of the graph. //path, circuit, simple path, simple circuit, vertex, edge**

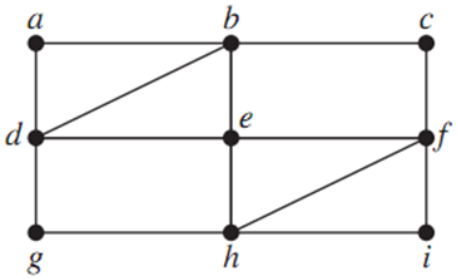
1. The **longest simple circuit** in the graph K_{13} is the path of length ___

A. 26
B. 78
C. 12
D. 54
E. None of these

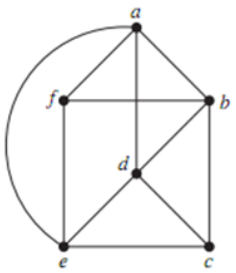
2. Which graphs have no an **Euler path**?

A. W_{15}
B. K_{15}
C. $K_{2,13}$
D. C_{15}
E. None of these

3. Which graphs have a **Hamilton circuit**, but have no an **Euler circuit**?



G



H

A. G only
B. H only
C. Both
D. None

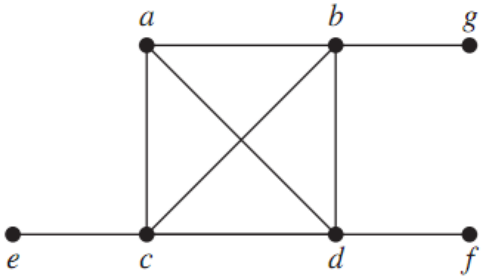
4. Given an undirected graph whose **adjacency matrix** is

$$\begin{pmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 0 & 1 & 2 \end{pmatrix}$$

How many paths of length 2 from the vertex of **degree 3** to the vertex of **degree 4**?

A. 3
B. 4
C. 12
D. 2
E. None of these

5. The graph below has ___ **cut vertices**, and ___ **bridges**.



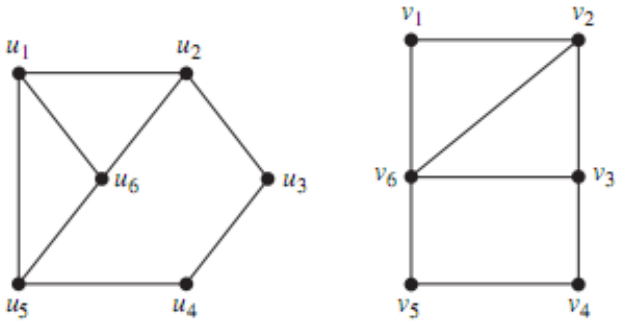
A. 3, 3
B. 2, 3
C. 3, 2
D. 2, 2
E. None of these

6. Suppose a graph G and the graph Q_4 are **isomorphic**, which one is true?

(i) G has 8 edges
(ii) G has a Hamilton circuit.

A. (i) only
B. (ii) only
C. Both
D. None

7. Are two graphs isomorphic? Explain.



A. Yes, they have the same number of vertices and edges.
B. No, they have different shapes.
C. No, one of them has a vertex of degree 4, the other doesn't have the same property.

KEY: 1B 2A 3B 4D 5A 6B 7C