

Started on	Saturday, 24 September 2022, 4:21 PM
State	Finished
Completed on	Saturday, 24 September 2022, 4:21 PM
Time taken	8 secs
Marks	0.00/29.00
Grade	0.00 out of 10.00 (0%)

Question 1

Not answered

Marked out of 1.00

In the adjacency matrix of a pseudograph, the sum of all entries in the row corresponding to the vertex v equals 4.
Given that there is one loop at v .
Find $\deg(v)$, the degree of v .

- ☐ a. 8
- ☐ b. 4
- ☐ c. 6
- ☐ d. 5
- ☐ e. None of these

Your answer is incorrect.

The correct answer is: 5

Question 2

Not answered

Marked out of 1.00

A simple graph G is called **self-complementary** if G and \overline{G} are isomorphic.

A **self-complementary** simple graph with five vertices has ____ edges.

- ☐ a. 10
- ☐ b. 6
- ☐ c. 8
- ☐ d. 7
- ☐ e. 5

Your answer is incorrect.

G and its complementary has the same number of edges.

K_5 has 10 edges.

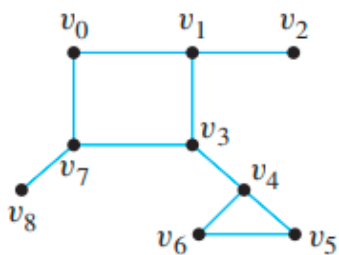
G and its complementary have 5 edges.

The correct answer is: 5

Question 3

Not answered

Marked out of 1.00



If we remove the edge $\{v_1, v_3\}$ from this graph, how many cut vertices does the resulting graph have?

- ☐ a. 6
- ☐ b. 5
- ☐ c. 4
- ☐ d. None of these
- ☐ e. 3

Your answer is incorrect.

The correct answer is: 5

Question 4

Not answered

Marked out of 1.00

For which values of m and n does the complete bipartite graph $K_{m,n}$ have a Hamilton circuit?

- ☐ a. All values of m and n
- ☐ b. $m = n = 2k$
- ☐ c. $m = n + 1$
- ☐ d. $m = n > 1$

Your answer is incorrect.

The correct answer is: $m = n > 1$

Question 5

Not answered

Marked out of 1.00

The **complementary graph** \overline{G} of a simple graph G has the same vertices as G . Two vertices are adjacent in \overline{G} if and only if they are not adjacent in G .

If G is a simple graph with degree sequence 5, 5, 4, 3, 3, 1, 1, 0.
How many edges does \overline{G} have?

- ☐ a. 8
- ☐ b. None of these
- ☐ c. 17
- ☐ d. 7
- ☐ e. 11

Your answer is incorrect.

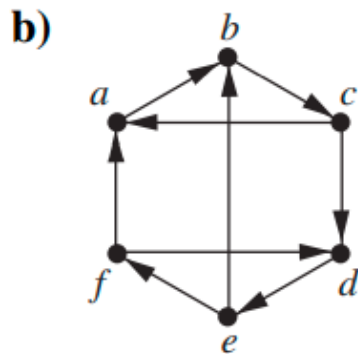
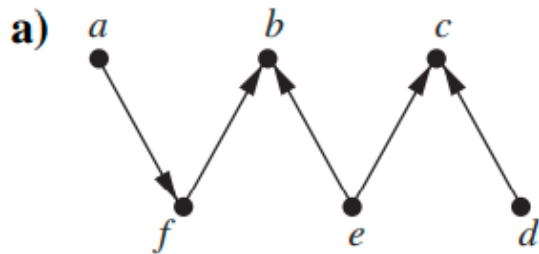
The correct answer is: 17

Question 6

Not answered

Marked out of 1.00

Determine whether each of these graphs is strongly connected and if not, whether it is weakly connected.



- ☐ a. a) weakly connected (not strongly connected), b) weakly connected (not strongly connected)
- ☐ b. a) strongly connected, b) strongly connected
- ☐ c. a) strongly connected, b) weakly connected (not strongly connected)
- ☐ d. a) weakly connected (not strongly connected), b) strongly connected

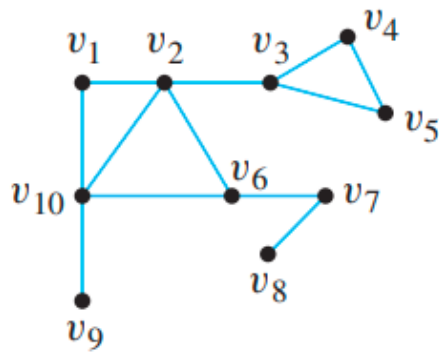
Your answer is incorrect.

The correct answer is: a) weakly connected (not strongly connected), b) strongly connected

Question 7

Not answered

Marked out of 1.00



If we remove the edge $\{v_3, v_4\}$ from this graph, how many **bridges** does the resulting graph have?

- ☐ a. 4
- ☐ b. 6
- ☐ c. 3
- ☐ d. 5
- ☐ e. None of these

Your answer is incorrect.

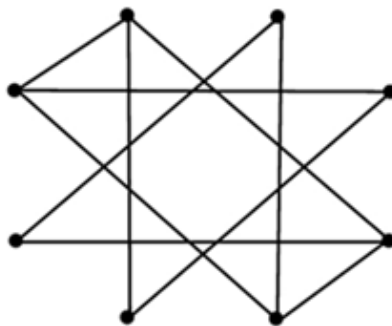
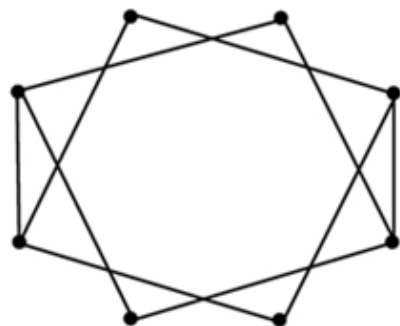
The correct answer is: 6

Question 8

Not answered

Marked out of 1.00

Are these two graphs isomorphic? If not, what is the reason?



- ☐ a. No, they are not isomorphic because they do not have the same number of vertices of degree 3
- ☐ b. No, they are not isomorphic because the vertices of degree 3 of the graph on the right form a circuit, and the graph on the left does not have that property.
- ☐ c. Yes, they are isomorphic
- ☐ d. None of these
- ☐ e. No, they are not isomorphic because the graph on the left is connected, and the graph on the right is not.

Your answer is incorrect.

The correct answer is: No, they are not isomorphic because the vertices of degree 3 of the graph on the right form a circuit, and the graph on the left does not have that property.

Question 9

Not answered

Marked out of 1.00

Given the adjacency matrix of a digraph.

$$\begin{array}{c}
 \begin{array}{ccccc}
 & \mathbf{a} & \mathbf{b} & \mathbf{c} & \mathbf{d} \\
 \mathbf{a} & 0 & 1 & 1 & 1 \\
 \mathbf{b} & 1 & 1 & 0 & 2 \\
 \mathbf{c} & 0 & 1 & 0 & 1 \\
 \mathbf{d} & 2 & 1 & 0 & 1
 \end{array}
 \end{array}$$

How many **paths of length 4** from the vertex c to the vertex b?

- ☐ a. 14
☐ b. 18
☐ c. 29
☐ d. 28
☐ e. None of these

Your answer is incorrect.

$$\begin{array}{ccccc}
 & \mathbf{a} & \mathbf{b} & \mathbf{c} & \mathbf{d} \\
 \mathbf{a} & 36 & 37 & 11 & 47 \\
 \mathbf{b} & 53 & 53 & 14 & 68 \\
 \mathbf{c} & 28 & 29 & 8 & 37 \\
 \mathbf{d} & 50 & 49 & 14 & 63
 \end{array}$$

The correct answer is: 29

Question **10**

Not answered

Marked out of 1.00

The **complementary graph** \overline{G} of a simple graph G has the same vertices as G . Two vertices are adjacent in \overline{G} if and only if they are not adjacent in G .

If G is a simple graph with 15 edges and \overline{G} has 13 edges, how many vertices does G have?

- ☐ a. 6
- ☐ b. 8
- ☐ c. 7
- ☐ d. 9

Your answer is incorrect.

The correct answer is: 8

Question 11

Not answered

Marked out of 1.00

A graph H is **isomorphic** to a simple graph with degree sequence 5, 4, 3, 2, 2, 1, 1.

How many edges does H have?

- ☐ a. No such a graph
- ☐ b. 9
- ☐ c. 17
- ☐ d. 10
- ☐ e. 18

Your answer is incorrect.

The correct answer is: 9

Question 12

Not answered

Marked out of 1.00

Given the adjacency matrix of a graph.

$$\begin{bmatrix} 0 & 1 & 3 & 0 & 4 \\ 1 & 2 & 1 & 3 & 0 \\ 3 & 1 & 1 & 0 & 1 \\ 0 & 3 & 0 & 0 & 2 \\ 4 & 0 & 1 & 2 & 3 \end{bmatrix}$$

How many **edges** does this graph have?

- ☐ a. 21
- ☐ b. 42
- ☐ c. None of these
- ☐ d. 27
- ☐ e. 36

Your answer is incorrect.

The correct answer is: 21

Question **13**

Not answered

Marked out of 1.00

Which one is true?

(i) $K_{4,5}$ has Hamilton circuit(ii) $K_{5,5}$ has Hamilton circuit

- ☐ a. Neither
- ☐ b. Only (i)
- ☐ c. Both
- ☐ d. Only (ii)

Your answer is incorrect.

The correct answer is: Only (ii)

Question **14**

Not answered

Marked out of 1.00

The graph K_{20} has ___ edges.

- ☐ a. None of these
- ☐ b. $19!$
- ☐ c. $20!$
- ☐ d. 380
- ☐ e. 190

Your answer is incorrect.

The correct answer is: 190

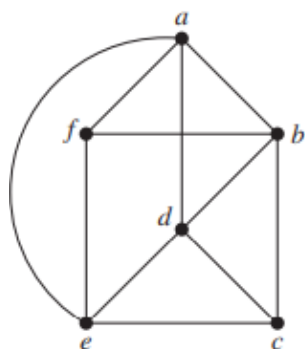
Question 15

Not answered

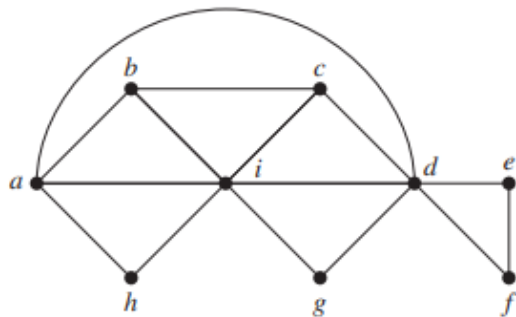
Marked out of 1.00

Which graphs have Hamilton circuits?

(i)



(ii)



- ☐ a. (ii)
- ☐ b. Both
- ☐ c. Neither
- ☐

d. (i)

Your answer is incorrect.

The correct answer is: (i)

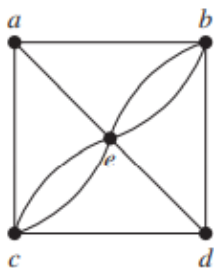
Question **16**

Not answered

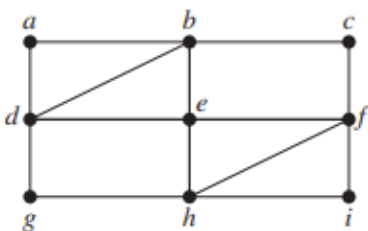
Marked out of 1.00

Which graphs have Hamilton circuits?

(i)



(ii)



- ☐ a. Neither
- ☐ b. (i)
- ☐ c. (ii)
- ☐ d. Both

Your answer is incorrect.

The correct answer is: (i)

Question **17**

Not answered

Marked out of 1.00

Given the adjacency matrix of a digraph.

	a	b	c	d
a	0	1	1	1
b	1	1	0	2
c	0	1	0	1
d	2	1	0	1

Does it have Euler circuits?

- ☐ a. No. The in-degree of c is not equal to the out-degree of c
- ☐ b. No. The in-degree of a is not equal to the out-degree of a
- ☐ c. No. The in-degree of b is not equal to the out-degree of b
- ☐ d. Yes

Your answer is incorrect.

The correct answer is: No. The in-degree of c is not equal to the out-degree of c

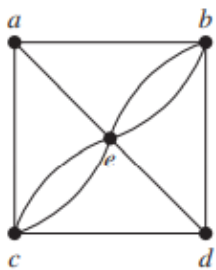
Question **18**

Not answered

Marked out of 1.00

Which graphs are simple graphs?

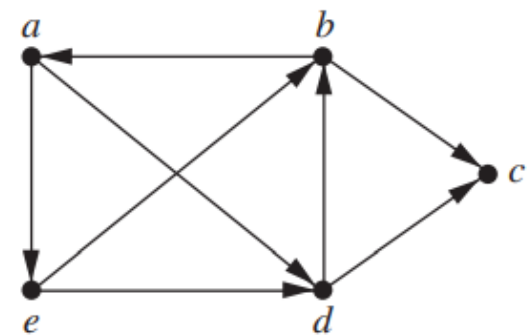
(i)



(ii)



(iii)

☐ a. (ii)☐

- ☒ b. (i) and (ii)
- ☐ c. None of these
- ☐ d. (i)
- ☐ e. (iii)

Your answer is incorrect.

The correct answer is: (ii)

Question 19

Not answered

Marked out of 1.00

Given the adjacency matrix of a digraph.

	a	b	c	d	e
a	0	1	1	0	2
b	1	0	1	2	0
c	1	0	1	1	2
d	1	1	0	1	1
e	2	0	1	1	0

Find the in-degree of the vertex c.

- ☐ a. 5
- ☐ b. None of these
- ☐ c. 3
- ☐ d. 6
- ☐ e. 4

Your answer is incorrect.

The correct answer is: 4

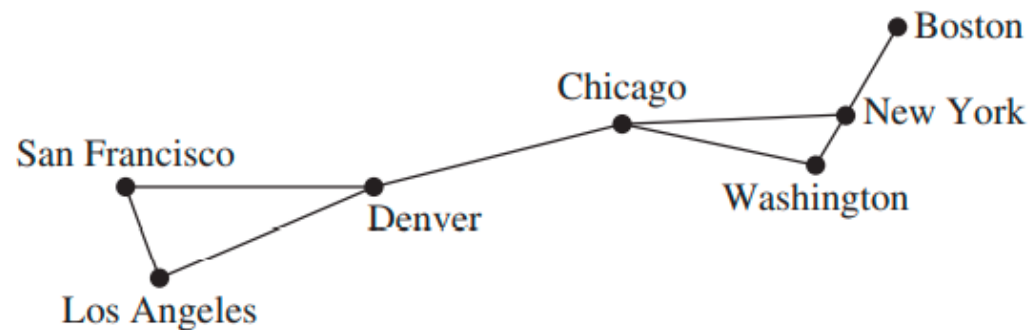
Question 20

Not answered

Marked out of 1.00

A communications link in a network should be provided with a backup link if its failure makes it impossible for some message to be sent.

How many links that should be backed up?



- ☐ a. None of these
- ☐ b. 2
- ☐ c. 1
- ☐ d. 0
- ☐ e. 3

Your answer is incorrect.

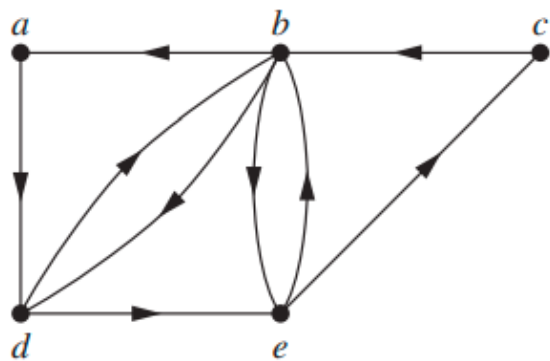
The correct answer is:

2

Question **21**

Not answered

Marked out of 1.00



Which of the following is NOT a path from the vertex a to the vertex e?

- ☐ a. a, d, b, d, e
- ☐ b. a, d, e, b, e
- ☐ c. a, d, b, c, e
- ☐ d. a, d, b, e

Your answer is incorrect.

The correct answer is: a, d, b, c, e

Question **22**

Not answered

Marked out of 1.00

The degree sequence of a multigraph G is 5, 4, 3, 2, 1, 1, 0.

How many 1-entries are there in the incidence matrix for this graph?

- ☐ a. 16
- ☐ b. 32
- ☐ c. None of these
- ☐ d. 15
- ☐ e. 8

Your answer is incorrect.

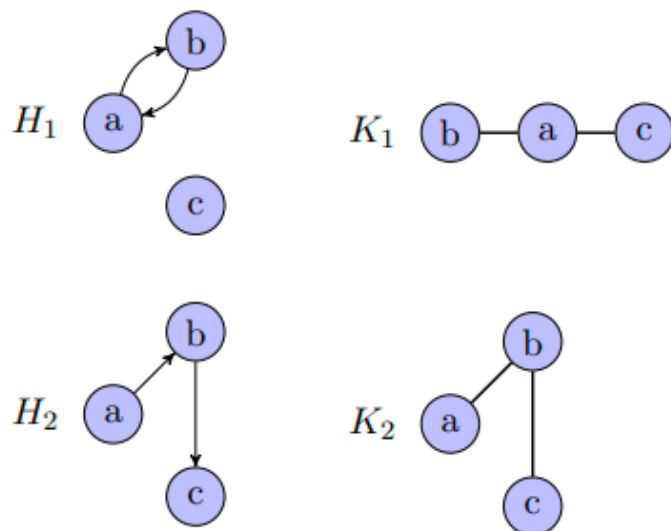
The correct answer is:

16

Question **23**

Not answered

Marked out of 1.00



State true or false.

- (1) H_1 and H_2 are isomorphic
 (2) K_1 and K_2 are isomorphic

- ☐ a. (1) True, (2) False
☐ b. (1) True, (2) True
☐ c. (1) False, (2) True
☐ d. (1) False, (2) False

Your answer is incorrect.

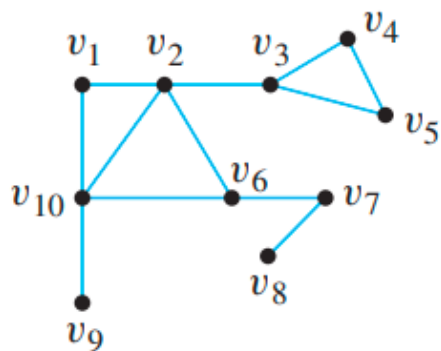
The correct answer is: (1) False, (2) True

Question 24

Not answered

Marked out of 1.00

How many **bridges** does the graph have?



- ☐ a. 3
- ☐ b. 2
- ☐ c. 4
- ☐ d. 1
- ☐ e. 5

Your answer is incorrect.

Bridges or cut edges: v_2v_3 , v_6v_7 , v_7v_8 , v_9v_{10}

The correct answer is: 4

Question 25

Not answered

Marked out of 1.00

Given the adjacency matrix of a digraph.

	a	b	c	d	e
a	0	1	1	0	2
b	1	0	1	2	0
c	1	0	1	1	2
d	1	1	0	1	1
e	2	0	1	1	0

How many **paths of length 2** from the vertex d to the vertex c?

- ☐ a. 2
- ☐ b. 4
- ☐ c. None of these
- ☐ d. 3
- ☐ e. 5

Your answer is incorrect.

The correct answer is: 3

Question **26**

Not answered

Marked out of 1.00

Every **Euler circuit** in the graph $K_{2,9}$ has length ____.

- ☐ a. 9
- ☐ b. 11
- ☐ c. 17
- ☐ d. It has no Euler circuits.
- ☐ e. 18

Your answer is incorrect.

The correct answer is:
It has no Euler circuits.

Question **27**

Not answered

Marked out of 1.00

Let G be multigraph with degree sequence 2, 2, 2, 2.
Which of the following is TRUE?

- (i) G must have an Euler circuit
- (ii) G must have a Hamilton circuit

- ☐ a. (i)
- ☐ b. Neither
- ☐ c. Both
- ☐ d. (ii)

Your answer is incorrect.

The correct answer is: Neither

Question **28**

Not answered

Marked out of 1.00

How many 1-entries are there in the incidence matrix of the graph with degree sequence 7, 7, 3, 3, 2, 2, 1, 1, 0?

- ☐ a. 25
- ☐ b. None of these
- ☐ c. 26
- ☐ d. 52
- ☐ e. 13

Your answer is incorrect.

The correct answer is:

26

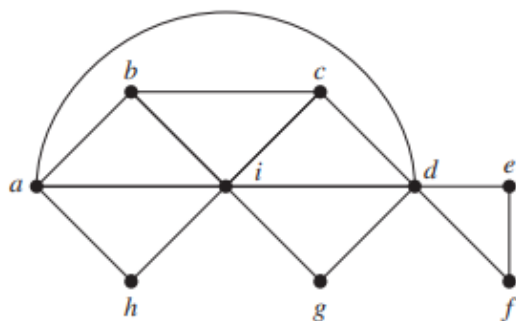
Question 29

Not answered

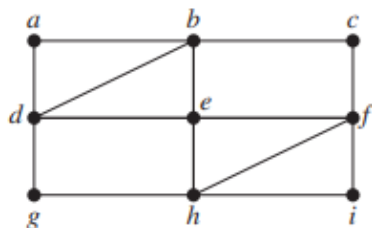
Marked out of 1.00

Which graphs have Euler paths, but no Euler circuits?

(i)



(ii)



- ☐ a. (ii)
- ☐ b. (i)
- ☐ c. Both
- ☐ d. Neither

Your answer is incorrect.

The correct answer is: (i)



