

Started on	Monday, 12 July 2021, 9:10 PM
State	Finished
Completed on	Monday, 12 July 2021, 9:28 PM
Time taken	17 mins 38 secs
Grade	5.00 out of 10.00 (50%)

Question 1

Incorrect

Mark 0.00 out of 1.00

How many 1-entries are there in the incidence matrix of the graph with degree sequence 5, 5, 4, 4, 4, 1, 1, 0?

- ☐ a. 24
- ☐ b. 48
- ☐ c. 12
- ☒ d. None of these
- ☐ e. 8



Your answer is incorrect.

The correct answer is:

24

Question **2**

Incorrect

Mark 0.00 out of 1.00

Every **Euler circuit** in the graph $K_{4,6}$ has length ____.

- ☐ a. 45
- ☒ b. $9!$
- ☐ c. 10
- ☐ d. 48
- ☐ e. 24



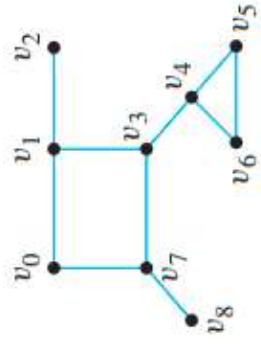
Your answer is incorrect.

The correct answer is: 24

Question **3**

Correct

Mark 1.00 out of 1.00



If m is the number of **cut vertices** and n is the number of **cut edges** in the graph above, what is the value of $m + n$?

- ☐ a. 4
☐ b. 6
☒ c. 7
☐ d. 3
☐ e. 5



Your answer is correct.

Cut vertices: v_7, v_1, v_3, v_4

Cut edges: v_7v_8, v_3v_4, v_1v_2

The correct answer is: 7

Question **4**

Incorrect

Mark 0.00 out of 1.00

The number of Hamilton circuits in the graph K_{10} is ____.

- ☐ a. $10!$
- ☐ b. 10
- ☒ c. $9!$
- ☐ d. None of the others
- ☐ e. $10!/2$



Your answer is incorrect.

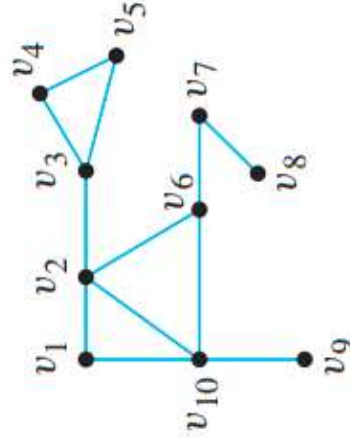
The correct answer is: $10!$

Question **5**

Correct

Mark 1.00 out of 1.00

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



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



Your answer is correct.

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

The correct answer is: 4

Question **6**

Correct

Mark 1.00 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

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

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



Your answer is correct.

	a	b	c	d
a	36	37	11	47
b	53	53	14	68
A ⁴ = c	28	29	8	37
d	50	49	14	63

The correct answer is: 29

Question **7**

Incorrect

Mark 0.00 out of 1.00

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

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



Your answer is incorrect.

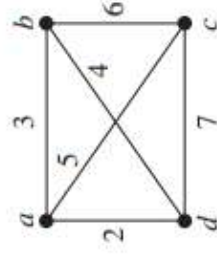
The correct answer is: $m = n > 1$

Question **8**

Correct

Mark 1.00 out of 1.00

Solve the traveling salesperson problem for this graph by finding the total weight of all Hamilton circuits and determining a circuit with minimum total weight.



What is the minimum total weight?

- ☒ a. 17
- ☐ b. 18
- ☐ c. 20
- ☐ d. 19
- ☐ e. 16



Your answer is correct.

a b c d a: $3 + 6 + 7 + 2 = 18$

a b d c a: $3 + 4 + 7 + 5 = 19$

a c b d a: $5 + 6 + 4 + 2 = 17$

a c d b a: $5 + 7 + 4 = 3 = 19$

a d b c a: $2 + 4 + 6 + 5 = 17$

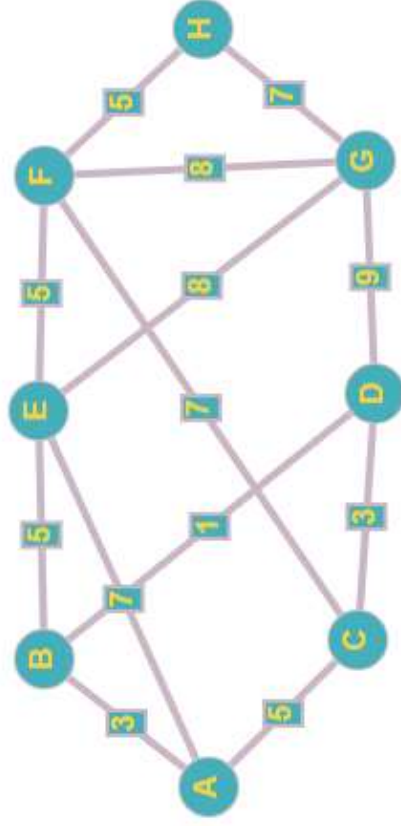
a d c b a: $2 + 7 + 6 + 3 = 18$

The correct answer is: 17

Question 9

Incorrect

Mark 0.00 out of 1.00



Apply Dijkstra's algorithm to find the shortest path from a to h.

What is the 3rd vertex added to the set S?

- ☐ a. e
- ☒ b. None of these
- ☐ c. c
- ☐ d. b
- ☐ e. d

✗

Your answer is incorrect.

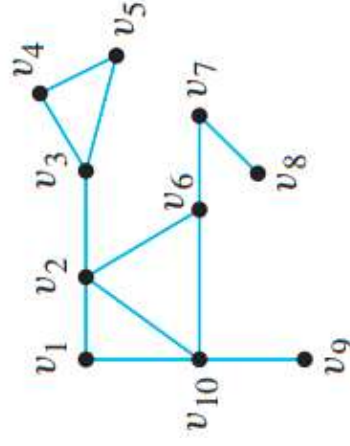
The correct answer is: d

Question **10**

Correct

Mark 1.00 out of 1.00

How many **cut vertices** does the graph have?



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



Your answer is correct.

Cut vertices: v10, v6, v7, v2, v3

The correct answer is: 5

