Week 9 Assignment

The due date for submitting this assignment has passed.

Due on 2021-03-24, 23:59 IST.

As per our records you have not submitted this assignment.

Euler Path and Euler Circuit, Fleury's Algorithm, Hamiltonian Circuit, Dirac's and Ore's theorems, Vertex coloring and edge coloring

1) Select the correct option(s): *1 point*

- [ ] Every connected graph where all nodes have even degree will have an Euler circuit
- [ ] An Euler circuit exists in a connected graph where each of its nodes have an even degree
- [ ] An Euler circuit exists in a connected graph as long as it has an even number of nodes having odd degree
- [ ] None of the given statements are correct

No, the answer is incorrect.
Score: 0

Accepted Answers:
Every connected graph where all nodes have even degree will have an Euler circuit
An Euler circuit exists in a connected graph where each of its nodes have an even degree

2) A simple graph G with n vertices has a Hamiltonian cycle if it has minimum number of edges equal to *1 point*

- [ ] $\frac{n^2-2n+4}{2}$
- [ ] $\frac{n^2-3n+6}{2}$
- [ ] $\frac{(n-2)^2}{2}+2$
- [ ] $\frac{(n-2)(n-1)}{2}+2$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{n^2-3n+6}{2}$
$\frac{(n-2)(n-1)}{2}+2$

3) The number of distinct Hamiltonian cycles in a labeled complete graph of 5 nodes is : *1 point*

- ( ) 1
- ( ) 5
- ( ) 12
- ( ) 24

No, the answer is incorrect.
Score: 0

Accepted Answers:
12

4) Select the correct option (s) : *1 point*

- ( ) A Hamiltonian graph can have a degree sequence (4, 4, 4, 3, 3, 2)
- ( ) An undirected graph with degree sequence (2, 2, 2, 2, 2, 2) can be a Hamiltonian graph
- ( ) In every Hamiltonian graph both Dirac's theorem and Ore's theorem hold true
- ( ) None of the given statements are true

No, the answer is incorrect.
Score: 0

Accepted Answers:
An undirected graph with degree sequence (2, 2, 2, 2, 2, 2) can be a Hamiltonian graph

5) Select the correct option (s) : *1 point*

- [ ] Every wheel graph has a Hamiltonian cycle
- [ ] The vertex chromatic number of a complete graph of n nodes is n-1
- [ ] The edge chromatic number of a cycle graph with 4 or more nodes is always 2
- [ ] All the above answers (a) (b) (c) are correct

No, the answer is incorrect.
Score: 0

Accepted Answers:
Every wheel graph has a Hamiltonian cycle

6) What is the vertex chromatic number of an n-vertex simple connected graph which does not contain any odd length cycle assuming n ≥2? *1 point*

- ( ) 3
- ( ) 2
- ( ) n-1
- ( ) n

No, the answer is incorrect.
Score: 0

Accepted Answers:
2

7) Graph G is obtained by adding vertex v to $K_{3,4}$ and making v adjacent to every vertex of $K_{3,4}$. The minimum number of colors required to edge-color G is *1 point*

- ( ) 3
- ( ) 7
- ( ) 8
- ( ) 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
7

8) A mouse eats its way through a 3 ×3 ×3 cube of cheese by eating all the 1 ×1 ×1 subcubes. If it starts at a corner subcube and always moves on to an adjacent subcube (sharing a face area of 1), can it do this and eat the center subcube last? *1 point*

- ( ) Yes, the mouse can always eat the center subcube last irrespective of the path it follows
- ( ) Yes, there exists exactly one path from each corner which allows the mouse to eat the center subcube last
- ( ) No, there is no path which allows the mouse to eat the center subcube last
- ( ) None of the given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
No, there is no path which allows the mouse to eat the center subcube last

9) Choose the correct option(s) from the following *1 point*

- ( ) A graph having zero odd degree vertices will have an Euler circuit
- ( ) Removing the center vertex from the Wheel graph (W_n) results in vertex-chromatic-number (χ_0 (G)) of 2
- ( ) A graph is bipartite if and only if its vertex-chromatic-number (χ_0 (G)) = 2
- ( ) None of the given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
A graph is bipartite if and only if its vertex-chromatic-number (χ_0 (G)) = 2

10) Which of the following statement(s) are incorrect? *1 point*

- [ ] Adding an edge between the odd degree vertices in a connected multi-graph having an Euler path will result in an Euler circuit
- [ ] A graph has Hamiltonian cycle if it has a Hamiltonian path
- [ ] A graph G having n vertices with $\chi_0(G) = m$ has at most $\frac{m(m-1)}{2}$ edges
- [ ] None of the given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
A graph has Hamiltonian cycle if it has a Hamiltonian path
A graph G having n vertices with $\chi_0(G) = m$ has at most $\frac{m(m-1)}{2}$ edges