Summary in Graph

Exam Summary (GO Classes Test Series 2024 | Discrete Mathematics | Test 5)

Qs. Attempted:	**11** 5 + 6	**Correct Marks:**	**13** 5 + 8
Correct Attempts:	**9** 5 + 4	**Penalty Marks:**	**0.67** 0 + 0.67
Incorrect Attempts:	**2** 0 + 2	**Resultant Marks:**	**12.33** 5 + 7.33

Total Questions:	**15** 5 + 10
Total Marks:	**25** 5 + 20
Exam Duration:	**45 Minutes**
Time Taken:	**45 Minutes**

EXAM RESPONSE | EXAM STATS | FEEDBACK

Technical

Q #1 Numerical Type | Award: 1 | Penalty: 0 | Graph Theory

What is the smallest value of n such that the complement of a cycle graph on n vertices has an Eulerian circuit (and is connected)?

Your Answer: 5 | **Correct Answer: 5** | Correct | Discuss

Q #2 Numerical Type | Award: 1 | Penalty: 0 | Graph Theory

Let $\mathrm{K}_{\mathrm{A},\mathrm{B}}$ be the complete bipartite graph with A, B being the two parts, and let $|\mathrm{A}| = 10, |\mathrm{B}| = 17$. Let $u, v \in \mathrm{A}$ be two different vertices. We obtain a new graph G by adding an edge between u, v. The chromatic number of G is _____

Your Answer: 3 | **Correct Answer: 3** | Correct | Discuss

Q #3 Numerical Type | Award: 1 | Penalty: 0 | Graph Theory

A certain tree of order 40 (i.e. tree with 40 vertices) contains only vertices of degree 1 and degree 3. How

many degree-3 vertices does the tree have?

Your Answer: 19 **Correct Answer: 19** Correct Discuss

Q #4 Numerical Type Award: 1 Penalty: 0 Graph Theory

$\mathrm{G}(\mathrm{V}, \mathrm{E})$ is a simple undirected graph with 8 vertices. The edges of G are decided by tossing a fair coin for each two vertex combination. Edge is added between any two vertices iff head is turned up. Expected number of edges in the graph $\mathrm{G}(\mathrm{V}, \mathrm{E})$?

Your Answer: 14 **Correct Answer: 14** Correct Discuss

Q #5 Multiple Select Type Award: 1 Penalty: 0 Graph Theory

In each of the following problems information about the degree sequence of a graph is given. In which case, a simple undirected graph satisfying the specified conditions exists?

A. A simple graph Q with degree sequence $(1, 1, 2, 3, 3, 5)$
B. A simple graph Q with degree sequence $(3, 3, 3, 3)$
C. A simple graph Q with degree sequence $(1, 2, 3, 4, 5, 7)$
D. A simple graph Q with degree sequence $(3, 3, 3, 5)$

Your Answer: B **Correct Answer: B** Correct Discuss

Q #6 Numerical Type Award: 2 Penalty: 0 Graph Theory

A tree is a connected undirected graph with no cycles. How many non-isomorphic trees with 5 vertices exist?

Your Answer: 3 **Correct Answer: 3** Correct Discuss

Q #7 Numerical Type Award: 2 Penalty: 0 Graph Theory

Let G be a graph on 10 vertices. We delete one vertex from G. Since we have 10 vertices, hence we get 10 different subgraphs depending on which vertex we have deleted. Suppose that the number of edges in the vertex-deleted subgraphs of graph G are

$$12, 12, 12, 12, 11, 11, 11, 11, 10, 10.$$

How many edges are there in G?

Your Answer: 14 **Correct Answer: 14** Correct Discuss

Q #8 Numerical Type Award: 2 Penalty: 0 Graph Theory

Let $n = 100$. What is the least number of edges possible in a connected non-planar simple graph which has n vertices?

Your Answer: **Correct Answer: 103** Not Attempted Discuss

Q #9 | Multiple Select Type | Award: 2 | Penalty: 0 | Graph Theory

Consider the following properties of an undirected simple graph G with n vertices.

a. G is connected.
b. G is acyclic.
c. G has $n-1$ edges.
d. Every two different vertices in G are connected by a unique path.

Which of the following is correct?

A. if G satisfies properties (a) and (b), then G satisfies property (c)
B. if G satisfies properties (a) and (c), then G satisfies property (b)
C. if G satisfies properties (b) and (c), then G satisfies property (a)
D. if G satisfies properties (d), then G satisfies property (a), (b), (c)

Your Answer: A;D | Correct Answer: A;B;C;D | Incorrect | Discuss

Q #10 | Numerical Type | Award: 2 | Penalty: 0 | Graph Theory

A simple graph is an undirected graph in which each edge connects two different vertices and no two edges connect the same pair of vertices. An "oriented simple graph" is a simple graph which has been converted to a digraph by assigning an orientation to each edge. The orientation of $\{u, v\}$ can be thought of as a mapping of it to either (u, v) or (v, u) but not to both. Note that if u and v are different vertices then the orientation of $\{u, v\}$ is a mapping of it to either (u, v) or (v, u) but not to both. So, the following digraph is Not a oriented simple graph : $\mathrm{V} = \{u, v\}$ and $\mathrm{E} = \{(u, v), (v, u)\}$ What is the number of oriented simple graphs on 5 vertices?

Your Answer: | Correct Answer: 59049 | Not Attempted | Discuss

Q #11 | Multiple Select Type | Award: 2 | Penalty: 0 | Graph Theory

Let G be a simple graph, then G' represents the complement of G.

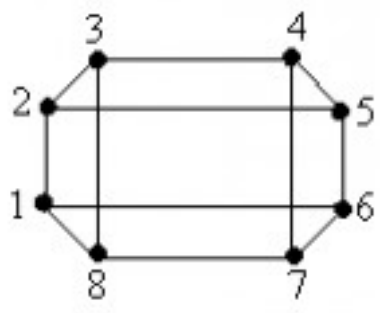
Which of the following is/are true if all the graphs that are considered are simple graphs?

A. The size of the maximum independent set in G is same as the size of maximum clique on G'
B. The size of minimum vertex cover in G is the same as the size of maximum clique on G'(complement of G)
C. The size of minimum vertex cover in G is the same as the size of maximum clique on G.
D. The size of the maximum independent set in G is same as the size of maximum clique on G.

Your Answer: A | Correct Answer: A | Correct | Discuss

Q #12 | Multiple Select Type | Award: 2 | Penalty: 0 | Graph Theory

Consider the following graph G :



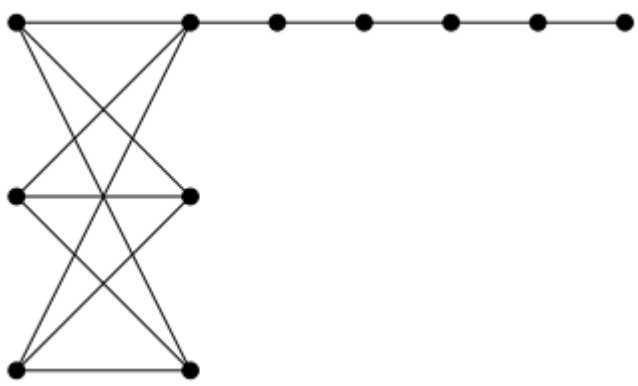
Which of the following is/are true for this graph G?

A. Matching number of $\mathrm{G} = 4$
B. Chromatic number of $\mathrm{G} = 2$
C. G is a planar graph
D. G is a bipartite graph.

Your Answer: A;B;C;D **Correct Answer: A;B;C;D** Correct Discuss

Q #13 Multiple Select Type Award: 2 Penalty: 0 Graph Theory

Consider the following graph G :



Which of the following are true for this graph G?

A. G is bipartite.
B. G is planar
C. Diameter of G is 6.
D. G is 3-colorable.

Your Answer: **Correct Answer: A;D** Not Attempted Discuss

Q #14 Multiple Choice Type Award: 2 Penalty: 0.67 Graph Theory

Let T denote a nonempty binary tree in which every node either is a leaf or has two children. Then $n(\mathrm{T})$ denotes the number of non-leaf nodes of T (where $n(\mathrm{T}) = 0$, if T is a leaf), $h(\mathrm{T})$ denotes the height of T (where $h(\mathrm{T}) = 0$, if T is a leaf), $\mathrm{T_L}$ denotes the left subtree of T, and $\mathrm{T_R}$ denotes the right subtree of T. If F is a function defined by

$$\mathrm{F(T)} = \begin{cases} 0 \ \text{ if T is a leaf} \\ \mathrm{F}\left(\mathrm{T_L}\right) + \mathrm{F}\left(\mathrm{T_R}\right) + \min\left(h\left(\mathrm{T_L}\right), h\left(\mathrm{T_R}\right)\right) \ \text{otherwise,} \end{cases}$$

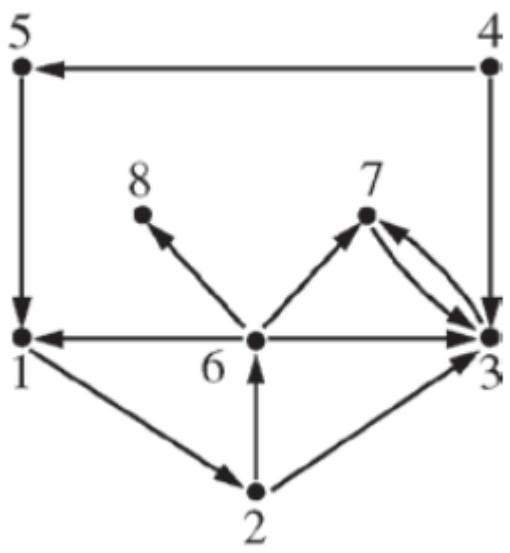
Then $\mathrm{F(T)} =$

A. $n(\mathrm{T}) + h(\mathrm{T}) - 1$
B. $n(\mathrm{T}) + h(\mathrm{T})$
C. $n(\mathrm{T}) - h(\mathrm{T}) - 1$
D. $n(\mathrm{T}) - h(\mathrm{T})$

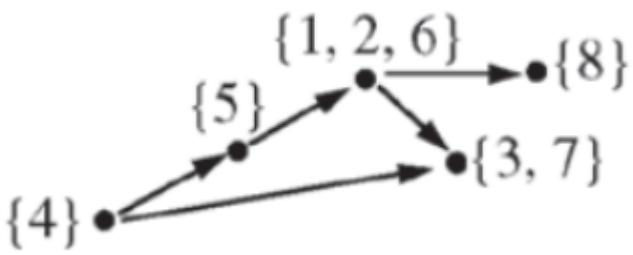
Your Answer: C | Correct Answer: D | Incorrect | Discuss

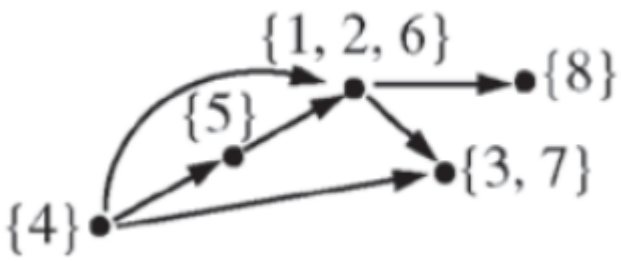
Q #15 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Graph Theory

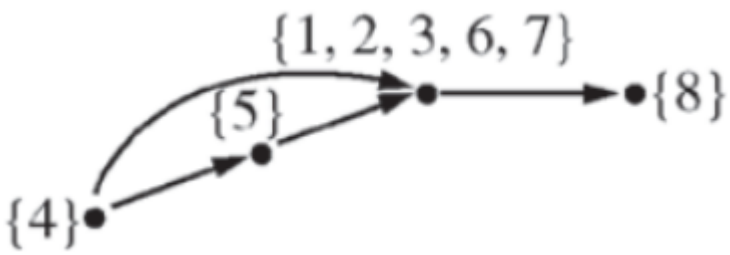
Given a directed graph $\mathrm{G} = (\mathrm{V},\mathrm{E})$, it is convenient to represent the connectivity properties of G using an associated directed acyclic graph $\mathrm{G}' = (\mathrm{V}', \mathrm{E}')$, where the vertices in V' are the strongly connected components of G and for S, $\mathrm{T} \in \mathrm{V}'$, directed edge (S,T) is in E' if and only if there exist $u \in \mathrm{S}$ and $v \in \mathrm{T}$ such that $(u, v) \in \mathrm{E}$. Let G be the graph shown below.

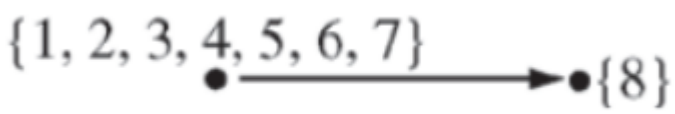


Which of the following is its associated directed acyclic graph G'?

A. 

B. 

C. 

D. 

Your Answer: | Correct Answer: A | Not Attempted | Discuss

You're doing good, you can target above 70 percentage!

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