Assignment-2

The due date for submitting this assignment has passed.

Submitted assignment

1) For an n-vertex graph G (with \( n \geq 1 \)), the following are equivalent (and characterize the trees with \( n \) vertices)

\( I \) G is connected and has no cycles

\( II \) G is connected and has \( n-1 \) edges

\( III \) G has \( n-1 \) edges and no cycles

\( IV \) G has no loops and has, for each \( u, v \in V(G) \), more than one \( u, v \)-path

Which one is true?

- I and II are true
- I, II and III are true
- Only IV is true
- All are true

No, the answer is incorrect.
Score: 0
Accepted Answers:
- I, II and III are true

2) True or False?

If \( T \) is a tree with \( k \) edges and \( G \) is a simple graph with \( \chi(G) \geq k \), then \( T \) is a subgraph of \( G \).

- True
- False

No, the answer is incorrect.
Score: 0
Accepted Answers:
- True

3) Match the correct pairs:

1-R, 2-P , 3-Q,4-S
1-S, 2-R, 3-P ,4-Q
1-P , 2-Q, 3-R,4-R
1-Q, 2-P , 3-S,4-R

No, the answer is incorrect.
Score: 0
Accepted Answers:
- 1-Q, 2-P , 3-S,4-R

4) If \( T, T' \) are spanning trees of a connected graph \( G \) and \( e \in E(T) - E(T') \), then there is an edge \( e' \in E(T') - E(T) \) such that \___________\ is a spanning tree of \( G \).

- \( T - e \)
- \( T - e + 1 \)
- \( T + e - e' \)
- \( T + e' - e \)

No, the answer is incorrect.
Statement 2: Adding one edge to a tree forms exactly one cycle
Statement 3: Every connected graph contains a spanning tree

- Only statement 1 is true
- Statement 1 and 2 are true
- Only statement 3 is true
- All are true

No, the answer is incorrect.
Score: 0
Accepted Answers:
All are true

6) Cayley's formula tells us how many different trees we can construct on n vertices. These are called spanning trees on n vertices. There are __________ trees on a vertex set V of n elements.

- n^n
- n^n−1
- n^n−2
- n^n−3

No, the answer is incorrect.
Score: 0
Accepted Answers:
n^n−2

7) A leaf (or pendant vertex) is a vertex of degree__________

- 0
- 1
- 2
- None of the mentioned

No, the answer is incorrect.
Score: 0
Accepted Answers:

8) Which of the following sequences can not be the degree sequence of any graph?

- I. 7, 6, 5, 4, 4, 3, 2, 1
- II. 6, 6, 6, 3, 3, 2, 2
- III. 7, 6, 6, 4, 4, 3, 2, 2
- IV. 8, 7, 6, 4, 2, 1, 1

I and II
- III and IV
- IV only
- II and IV

No, the answer is incorrect.
Score: 0
Accepted Answers:
I and IV

9) Let \( \tau(G) \) denote the number of spanning trees of a graph \( G \). If \( e \in E(G) \) is not a loop,

- \( \tau(G) = \tau(G - e) \)
- \( \tau(G) = \tau(G + e) + \tau(G - e) \)
- \( \tau(G) = \tau(G - e) \cdot \tau(G + e) \)
- \( \tau(G) = \tau(G - e) + \tau(G - e) \)

No, the answer is incorrect.
Score: 0
Accepted Answers:

10) The nonnegative integers \( d_1, \ldots, d_n \) are the vertex degrees of some graph if and only if \( \sum d_i \) is odd.

- True
- False

No, the answer is incorrect.
Score: 0
Accepted Answers:
11) Find the diameter and the radius of the given graph?

No, the answer is incorrect.
Score: 0
Accepted Answers:
- diameter: 4, radius: 2
- diameter: 3, radius: 4
- diameter: 5, radius: 2
- diameter: 3, radius: 3

12) Find the Prüfer sequence $S$ for the given labelled tree $T$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
- $S = (1, 7, 6, 6, 1)$
- $S = (1, 7, 6, 6, 4, 5)$
- $S = (1, 7, 6, 6, 4)$