

# Unit 9 - Week 7

## Course outline

How does an NPTEL online course work?

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Week 2

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Week 7

Friendship - an interesting property

Connectedness through Connecting people

Traversing the bridges

Three utilities problem

Coloring the India map

Definition of a Graph

Degree and degree sequence

Relation between number of edges and degrees

Relation between number of edges and degrees - Proof

Hand shaking lemma - Corollary

Problems based on Hand shaking lemma

Havel Hakimi theorem - Part 1

Havel Hakimi theorem - Part 2

Havel Hakimi theorem - Part 3

Havel Hakimi theorem - Part 4

Havel Hakimi theorem - Part 5

Regular graph and irregular graph

Walk

Trail

Path and closed path

Definitions revisited

Examples of walk, trail and path

Cycle and circuit

Example of cycle and circuit

Relation between walk and path

Relation between walk and path - An induction proof

Subgraph

Spanning and induced subgraph

Spanning and induced subgraph - A result

Introduction to Tree

Connected and Disconnected graphs

Property of a cycle

Edge condition for connectivity

Connecting connectedness and path

Connecting connectedness and path - An illustration

Cut vertex

Cut edge

Illustration of cut vertices and cut edges

NetworkX - Need of the hour

Introduction to Python - Installation

Introduction to Python - Basics

Introduction to NetworkX

Story so far - Using NetworkX

Quiz : Assignment 7

Week 7 Feedback

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## Assignment 7

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-03-18, 23:59 IST.

1) Which of the following graphs has a cut vertex?

1 point

- $K_n$   
  $C_n$   
  $P_n$ , path on  $n$  vertices  
 None of the above

No, the answer is incorrect. Score: 0

Accepted Answers:  $P_n$ , path on  $n$  vertices

2) Which of the following degree sequence is NOT graphic for simple graphs?

1 point

- $\langle 2, 2, 2, 1, 1 \rangle$   
  $\langle 4, 2, 2, 2, 2 \rangle$   
  $\langle 7, 1, 1, 1, 1, 1, 1, 1 \rangle$   
  $\langle 5, 2, 1, 1, 1, 1 \rangle$

No, the answer is incorrect. Score: 0

Accepted Answers:  $\langle 5, 2, 1, 1, 1, 1 \rangle$

3) Which of the following statements is true?

1 point

- $P_n$  is an induced subgraph of  $C_n$ .  
  $P_n$  is a spanning subgraph of  $C_n$ .  
  $C_n$  is a induced subgraph of  $K_n$ .  
 None of the above

No, the answer is incorrect. Score: 0

Accepted Answers:  $P_n$  is a spanning subgraph of  $C_n$ .

4) Let  $T$  be a tree having  $n$  vertices. Let  $v_1, v_2 \in V(T)$ . How many distinct paths are there from  $v_1$  to  $v_2$  in  $T$ ?

1 point

- $n - 1$   
 1  
 2  
 None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: 1

5) The number of components in  $K_n$  is :

1 point

- 1  
 0  
  $n - 1$   
  $n$

No, the answer is incorrect. Score: 0

Accepted Answers: 1

6) What is the maximum number of edges a simple, undirected graph on  $n$  vertices can have?

1 point

- $\frac{n(n-1)}{2}$   
  $n$   
  $\frac{n(n+1)}{2}$   
  $n - 1$

No, the answer is incorrect. Score: 0

Accepted Answers:  $\frac{n(n-1)}{2}$

7) Let  $G'$  be a spanning and induced subgraph of  $G$ , then  $G = G'$ .

1 point

- True  
 False

No, the answer is incorrect. Score: 0

Accepted Answers: True

8) Let  $T = (V, E)$  be a tree, where  $V$  is the vertex set and  $E$  is the edge set. If  $|E| = 32$ , then  $|V|$  is

1 point

- 31  
 16  
 32  
 33

No, the answer is incorrect. Score: 0

Accepted Answers: 33

9) Which of the following statements are true?

1 point

- Every path is a trail
- Every walk is a trail

- Only 1 is true.  
 1 and 2 are true.  
 2 is true, 1 is false.  
 Both are false.

No, the answer is incorrect. Score: 0

Accepted Answers: Only 1 is true.

10) Let  $G$  be simple, connected graph such that every vertex in  $G$  has degree 4. And  $|E| = 16$ . Then  $|V|$  is

1 point

- 2  
 8  
 9  
 16

No, the answer is incorrect. Score: 0

Accepted Answers: 8