

## SKNCOE\_COMP\_Unit Test 2\_Sem II\_21-22

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Sinhgad Technical Education Society's  
Smt. Kashibai Navale College Of Engineering Pune – 41  
Department of Computer Engineering

Unit Test-II(A.Y. 2021-22 Sem-II)



Sinhgad Institutes

Class : SE

Marks : 30

Your answer

**Subject: Data Structures & Algorithms**

Date: 02/05/2022  
30

Total Questions: 30

Time :45 Minutes

Total Marks:

1. Enter your name \*

SWAPNIL BABASAHEB BANKAR



2. Enter your roll number(e.g 21U101) \*

21U371

3. Enter PRN \*

72148633K

4. Select your division \*

- ☐ Division 1
- ☐ Division 2
- ☒ Division 3
- ☐ Division 4
- ☐ Division 5

1. A graph is a set of \_\_\_\_\_ and set of \_\_\_\_\_ \*

- ☐ variables, values
- ☒ vertices, edges
- ☐ vertices, distances
- ☐ variable, equation



2. What is the maximum number of possible non zero values in an adjacency matrix of a simple graph with n vertices? \*

- ☐  $(n * (n - 1))/2$
- ☐  $(n * (n + 1))/2$
- ☒  $n * (n - 1)$
- ☐  $n * (n + 1)$

3. Graph having every pair of vertices connected is called \_\_\_\_\_. \*

- ☐ Cycle graph
- ☒ Complete graph
- ☐ Peterson graph
- ☐ Negative graph

4. The operation of processing each element in the list is known as \_\_\_\_\_. \*

- ☐ sorting
- ☐ merging
- ☐ inserting
- ☒ traversal



5. A graph with  $n$  vertices will definitely have a parallel edge or self loop \*  
of the total number of edges are \_\_\_\_\_

- ☐ more than  $n$
- ☐ more than  $n + 1$
- ☐ more than  $(n + 1)/2$
- ☒ more than  $n(n - 1)/2$

6. How many undirected graphs (not necessarily connected) can be \*  
constructed out of a given set  $V = \{V_1, V_2, \dots, V_n\}$  of  $n$  vertices?

- ☐  $n(n - 1)/2$
- ☐  $2^n$
- ☐  $n!$
- ☒  $2^{n(n - 1)/2}$

7. Graphs are represented using \* \_\_\_\_\_

- ☐ Adjacency Tree
- ☐ Adjacency graph
- ☒ Adjacency list
- ☐ Adjacency Queue



8. Let  $G$  be a complete undirected graph on 6 vertices. If vertices of  $G$  are labelled, then the number of distinct cycles of length 4 in  $G$  is equal to \_\_\_\_\_ \*

- ☒ 15
- ☐ 30
- ☐ 90
- ☐ 160

9. Dijkstra's Algorithm is used to solve \_\_\_\_\_ problems. \*

- ☐ a) All pair shortest path
- ☒ b) Single source shortest path
- ☐ c) Network flow
- ☐ d) Sorting

10. Let  $G$  be an undirected graph. Consider a depth-first traversal of  $G$ , and let  $T$  be the resulting depth-first search tree. Let  $u$  be a vertex in  $G$  and let  $v$  be the first new (unvisited) vertex visited after visiting  $u$  in the traversal. Which of the following statements is always true? \*

- ☐  $\{u, v\}$  must be an edge in  $G$ , and  $u$  is a descendant of  $v$  in  $T$
- ☐  $\{u, v\}$  must be an edge in  $G$ , and  $v$  is a descendant of  $u$  in  $T$
- ☒ if  $\{u, v\}$  is not an edge in  $G$  then  $u$  is a leaf in  $T$
- ☐ if  $\{u, v\}$  is not an edge in  $G$  then  $u$  and  $v$  must have the same parent in  $T$



11. State True , False. \*

- (i) Network is a graph that has weights or costs associated with it. (ii) An undirected graph which contains no cycles is called forest.
- (iii) A graph is said to be complete if there is no edge between every pair of vertices.

- ☐ (a) True, False, True
- ☒ (b) True, True, False
- ☐ (c) True, True, True
- ☐ (d) False, True, True

12. Which of the following properties does a simple graph not hold? \*

- ☒ Must be connected
- ☐ Must be unweighted
- ☐ Must have no loops or multiple edges
- ☐ Must have no multiple edges

13. In a graph if  $E=(u,v)$  means \_\_\_\_\_ \*

- ☐ a) u is adjacent to v but v is not adjacent to u
- ☐ b) e begins at u and ends at v
- ☐ c) u is processor and v is successor
- ☒ both (b) and (c)



14. Which of the following is true? \*

- ☐ A graph may contain no edges and many vertices
- ☒ A graph may contain many edge and no vertices
- ☐ A graph may contain no edges and no vertices
- ☐ A graph may contain no vertices and many edges

15. In Breadth First Search of Graph, which of the following data structure is used ? \*

- ☐ Stack
- ☒ Queue
- ☐ Linked List
- ☐ Stack or Linked List

16. The spanning tree of connected graph with 10 vertices contains\_\_\_\_\_ \*

- ☒ 9 edges
- ☐ 10edges
- ☐ 11 edges
- ☐ 8 vertices



17. Let  $w$  be the minimum weight among all edge weights in an undirected connected graph. Let  $e$  be a specific edge of weight  $w$ . Which of the following is FALSE ? \*

- ☐ There is a minimum spanning tree containing  $e$ .
- ☐ If  $e$  is not in a minimum spanning tree  $T$ , then in the cycle formed by adding  $e$  to  $T$ , all edges have the same weight.
- ☐ Every minimum spanning tree has an edge of weight  $w$
- ☒  $e$  is present in every minimum spanning tree.

18. Which of the following algorithms solves the all-pair shortest path problem? \*

- ☐ Prim's algorithm
- ☐ Kruskal's algorithm
- ☐ Dijkstra's algorithm
- ☒ Floyd Warshall algorithm

19. In an unweighted, undirected connected graph, the shortest path from a node  $S$  to every other node is computed most efficiently, in terms of time complexity by \_\_\_\_\_ \*

- ☐ Dijkstra's algorithm starting from  $S$ .
- ☐ Warshall's algorithm
- ☐ Performing a DFS starting from  $S$ .
- ☒ Performing a BFS starting from  $S$ .



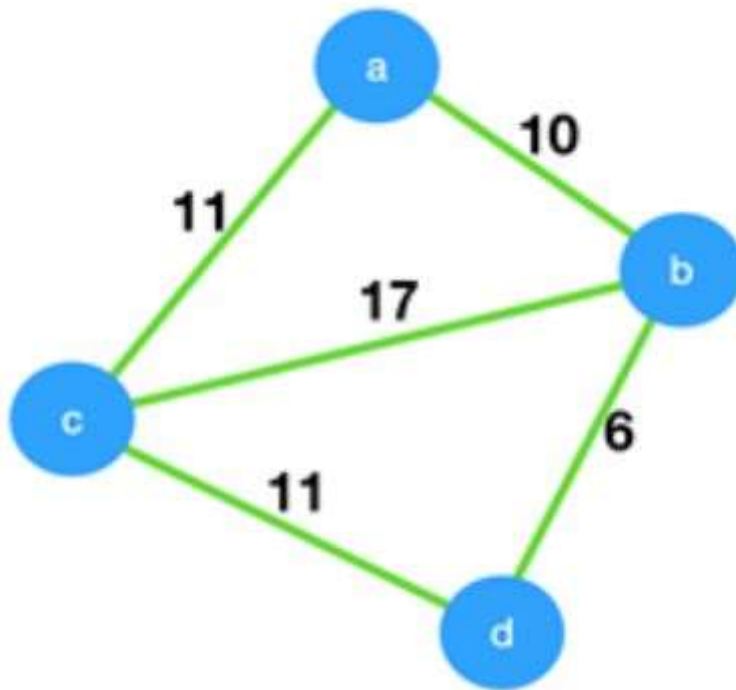


20. Given an adjacency matrix  $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ , The total no. of ways in which every vertex can walk to itself using 2 edges is \_\_\_\_\_

\*

☐ 2☒ 6☐ 4☐ 8

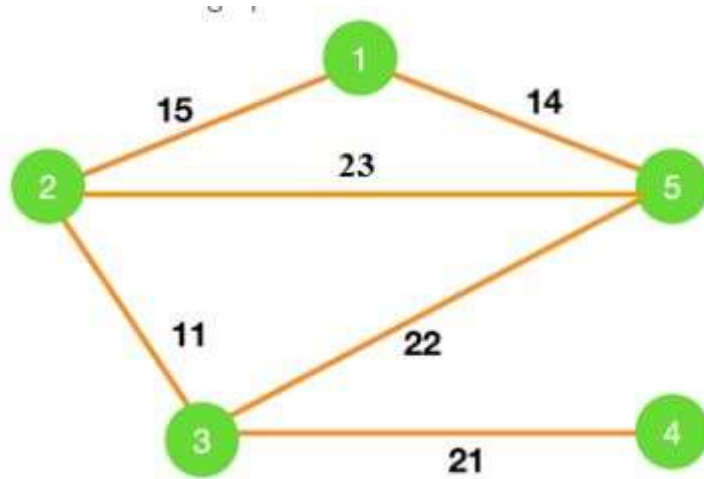
21. Consider the given graph. What is the weight of the minimum spanning tree <sup>\*</sup> using the Prim's algorithm, starting from vertex a ?



- ☐ 28
- ☒ 27
- ☐ 34
- ☐ 38
- ☐ Other:



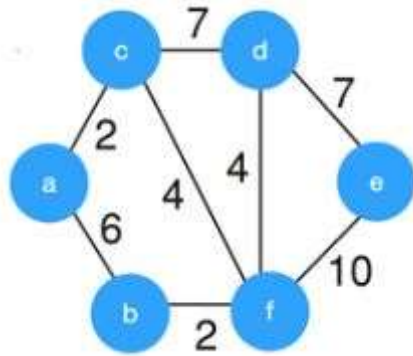
22. Which of the following edges form the MST of the given graph using Prim's algorithm, starting from vertex 4. \*



- ☐ a) (4-3)(5-3)(2-3)(1-2)
- ☐ b) (4-3)(3-5)(5-1)(1-2)
- ☐ c) (4-3)(3-5)(5-2)(1-5)
- ☒ d) (4-3)(3-2)(2-1)(1-5)



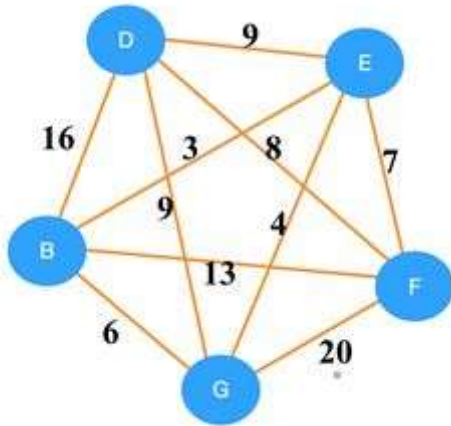
23. Consider the given graph. What is the weight of the minimum spanning tree \* using the Kruskal's algorithm?



- ☐ 23
- ☐ 28
- ☒ 19
- ☐ 17



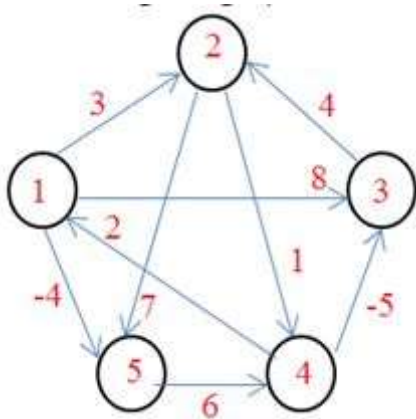
24. Which of the following edges form minimum spanning tree on the graph using Kruskal's algorithm? \*



- ☐ a) (B-E)(G-E)(E-F)(D-F)(D-G)
- ☐ b) (B-E)(G-E)(E-F)(B-G)(D-F)
- ☐ c) (B-E)(G-E)(E-F)(D-E)
- ☒ d) (B-E)(G-E)(E-F)(D-F)



25. In the given graph, what is the minimum cost to travel from vertex 1 to vertex 3? Solve by Floyd-Warshall Algorithm \*



- ☐ 3
- ☐ 2
- ☒ -3
- ☐ 10

26. A AVL is traversed in the following order recursively: Right, root, left The output sequence will be in\_\_\_\_\_ \*

- ☐ Ascending order
- ☒ Descending order
- ☐ Level-wise order
- ☐ No specific order



27. A binary search tree whose left subtree and right subtree differ in height by \*  
at most 1 unit is called\_\_\_\_\_

- ☐ Red-Black Tree
- ☐ Game Tree
- ☒ AVL Tree
- ☐ Heap Tree

28. Insertion in AVL tree takes place at \*

- ☐ At nay place in tree
- ☐ At the root node of the tree
- ☒ At leaf nodes
- ☐ At the intermediate levels

29. What is an AVL tree? \*

- ☒ tree which is balanced and is a height balanced tree
- ☐ a tree which is unbalanced and is a height balanced tree
- ☐ a tree with three children
- ☐ a tree with atmost 3 children



30. AVL trees have faster\_\_\_\_\_ \*

- ☐ Insertion
- ☐ Deletion
- ☐ Updation
- ☒ Retrieval

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