

University B.T. & Evening College

CLASS - B.Sc. 4th Sem

Sub – Mathematics(MATH44SE-II)

Time:

Full Marks: 50

Name:-.....

College Roll No.:-..... Regn. No.:-.....

Date:-.....

Mark obtained:-.....

ASSIGNMENT- 1

TOPIC: GRAPH THEORY

Attempt all questions. All questions carry equal marks.

1*50=50

1. If any vertex degree value is zero, the graph is not connected and hence it
 - a) cannot have Euler path
 - b) cannot have Euler circuit
 - c) both a and b
 - d) has Euler graph

2. Number of all possible binary trees with three nodes is.....
 - a) 3
 - b) 2
 - c) 5
 - d) None of these

3. Circle has.....
 - a) No vertices
 - b) Only 1 vertex
 - c) ∞ vertices
 - d) 2

4. The graph $K_{3,4}$ has.....
 - a) 3 edges
 - b) 12 edges
 - c) 7 vertices
 - d) Both b and c

5. Identify the given graph.....



- a) Hamiltonian
- b) Euler
- c) both a and b
- d) none of these

6. The adjacency matrix of an undirected graph is.....

- a) unit
- b) symmetric
- c) asymmetric
- d) None of these

7. Identify the given graph.....



- a) Complete
- b) Regular
- c) Euler
- d) All of the above

8. If G is a tree with 50 vertices then the chromatic number of G is.....

- a) 50
- b) 100
- c) 150
- d) None of these

9. Let $G = (V, E)$ be a connected simple planar graph with 5 vertices ($v \geq 3$), 4 edges, and no circuits of length 3 then

- a) edges ≤ 6
- b) edges ≤ 5
- c) vertices=5
- d) edges=4

10. The complexity of Dijkstra algorithm is.....

- a) $O(n)$
- b) $O(n^2)$
- c) $O(1)$
- d) None of these

11. Dijkstra algorithm performs.....

- a) Non-negative edge weights
- b) Negative edge weights
- c) Both a and b

d) None of these

12. If G is a simple graph with n vertices with $n \geq 3$ such that the degree of every vertex in G is at least $n/2$ then G has a Hamilton circuit.

- a) DIRAC'S Theorem
- b) ORE'S Theorem
- c) Both a and b
- d) None of these

13. If G is a simple graph with n vertices with $n \geq 3$ such that $\deg(u) + \deg(v) \geq n$ for every pair of nonadjacent vertices u and v in G , then G has a Hamilton circuit.

- a) DIRAC'S Theorem
- b) ORE'S Theorem
- c) Both a and b
- d) None of these

14. A graph of the vertices of a dodecahedron. Is it.....graph.

- a) Hamiltonian
- b) Euler
- c) both a and b
- d) None of these

15. A graph that contains a Hamiltonian path is called agraph.

- a) Hamiltonian
- b) Traceable
- c) both a and b
- d) none of these

16. The clique number of a bipartite graph $K_{m,n}$ is:.....

- a) 2
- b) 1
- c) 3
- d) 4

17. A connected planar graph has 5 edges and 2 regions. The number of vertices of the graph is...

- a) 2
- b) 5
- c) 3
- d) 4

18. The total number of spanning tree that can be drawn using five vertices.....

- a) 125
- b) 64
- c) 32
- d) 16

19. The complete graph with four vertices has k edges where k is.....
- a) 6
 - b) 5
 - c) 3
 - d) 4
20. The number of colours required to properly colour the vertices of every planar graph is....
- a) 2
 - b) 5
 - c) 3
 - d) 4
21. If the incidence matrix of a graph has five identical columns the G has.....
- a) Five loops
 - b) Five isolated vertices
 - c) Five parallel edges
 - d) Five edges in series
22. In a graph G has 7 vertices and 9 edges then size of the incidence matrix.....
- a) $7*7$
 - b) $7*9$
 - c) $9*7$
 - d) $9*9$
23. Floyd Warshall's Algorithm is used for solving
- a) All pair shortest path problems
 - b) Single Source shortest path problems
 - c) Network flow problems
 - d) Sorting problems
24. Floyd Warshall's Algorithm can be applied on
- a) Undirected and unweighted graphs
 - b) Undirected graphs
 - c) Directed graphs
 - d) Acyclic graphs
25. Floyd Warshall Algorithm can be used for finding.....
- a) Single source shortest path
 - b) Topological sort
 - c) Minimum spanning tree
 - d) Transitive closure
26. What procedure is being followed in Floyd Warshall Algorithm?
- a) Top down
 - b) Bottom up

- c) Big bang
- d) Sandwich

27. The Floyd-Warshall algorithm for all-pair shortest paths computation is based on.....

- a) Greedy paradigm
- b) Divide-and-Conquer paradigm
- c) Dynamic Programming paradigm
- d) neither Greedy nor Divide-and-Conquer nor Dynamic Programming paradigm

28. Floyd-Warshall algorithm was proposed by.....

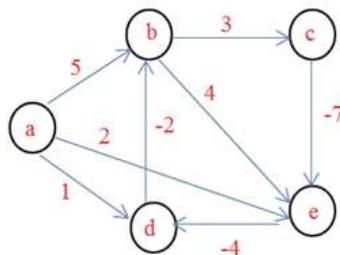
- a) Robert Floyd and Stephen Warshall
- b) Stephen Floyd and Robert Warshall
- c) Bernad Floyd and Robert Warshall
- d) Robert Floyd and Bernad Warshall

29. If G is connected with 5 vertices then the rank of incidence matrix is.....

- a) 0
- b) 2
- c) 4
- d) 5

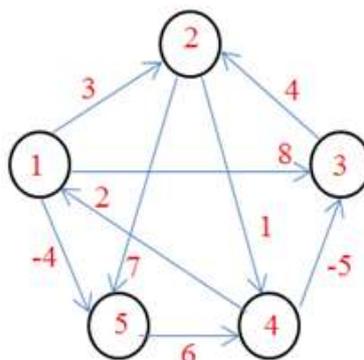
30. How many intermediate vertices are required to travel from node a to node e at a minimum cost using Warshall Algorithm.

- a) 2
- b) 0
- c) 1
- d) 3



31. What is the minimum cost to travel from vertex 1 to vertex 3 using Warshall algorithm.....

- a) 3
- b) 2
- c) -3



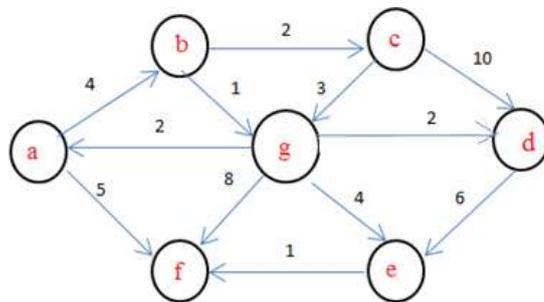
d) 10

32. In incidence matrix a row with a single unit is called.....

- a) Pendant vertex
- b) Isolated vertex
- c) Null vertex
- d) None of these

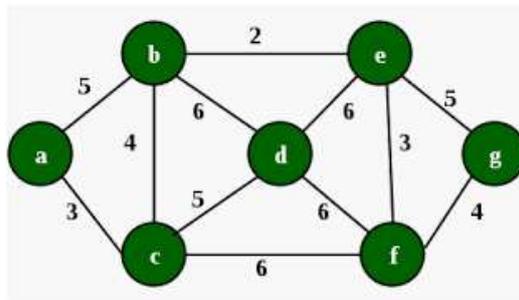
33. If b is the source vertex, what is the minimum cost to reach f vertex using the Dijkstra's algorithm?

- a) 6
- b) 4
- c) 2 6
- d) None of these



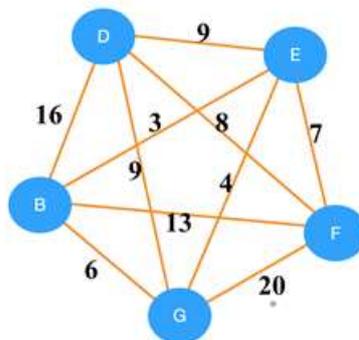
34. What is the weight of the minimum spanning tree using the Dijkstra's algorithm?

- a) 35
- b) 40
- c) 52
- d) None of these



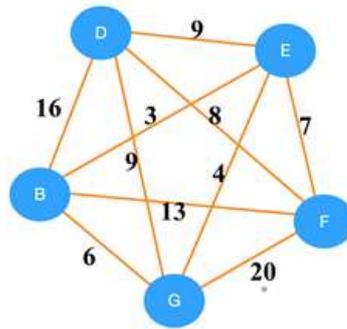
35. Consider the following graph. Using Kruskal's algorithm, which edge will be selected first?

- a) BE
- b) BD
- c) EG
- d) GF



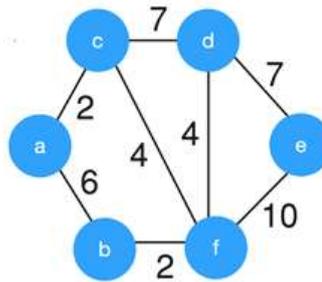
36. What is the weight of the minimum spanning tree using the Prim's algorithm?

- a) 90
- b) 102
- c) 82
- d) None of these



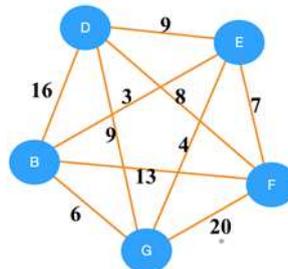
37. Consider the following graph. Using Kruskal's algorithm, which edge will be selected first?

- a) ac
- b) bf
- c) ac or bf
- d) cd



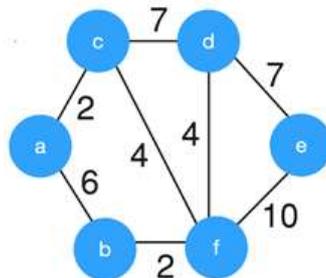
38. What is the weight of the minimum spanning tree using the Kruskal's algorithm?

- a) 65
- b) 42
- c) 24
- d) None of these



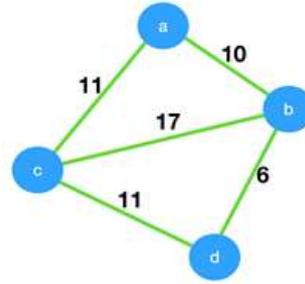
39. What is the weight of the minimum spanning tree using the Kruskal's algorithm?

- a) 24
- b) 19
- c) 23
- d) None of these



40. What is the weight of the minimum spanning tree using the Prim's algorithm starting from vertex a?

- a) 23
- b) 27
- c) 28
- d) None of these



41. A graph has 20 vertices. The maximum number of edges it can have is? (Given it is bipartite).

- a) 100
- b) 20
- c) 10
- d) none of these

42. The travelling salesman problem can be solved using

- a) A spanning tree
- b) A minimum spanning tree
- c) Bellman – Ford algorithm
- d) none of these

43. Every graph has only one minimum spanning tree.

- a) true
- b) depends on graph
- c) false
- d) none of these

44. Which of the following is true?

- a) Prim's algorithm initialises with a vertex
- b) Prim's algorithm initialises with a edge
- c) Prim's algorithm initialises with a vertex which has smallest edge
- d) Prim's algorithm initialises with a forest

45. Dijkstra's Algorithm is used to solve _____ problems.

- a) All pair shortest path
- b) Single source shortest path
- c) Network flow

d) none of these

46. Dijkstra's Algorithm cannot be applied on.....

- a) Directed and weighted graphs
- b) Graphs having negative weight function
- c) Unweighted graphs
- d) Undirected and unweighted graphs

47. Dijkstra's Algorithm is the prime example for

- a) Greedy paradigm
- b) Divide-and-Conquer paradigm
- c) Dynamic Programming paradigm
- d) neither Greedy nor Divide-and-Conquer nor Dynamic Programming paradigm

48. A graph is found to be 2 colorable. What can be said about that graph?

- a) The given graph is eulerian
- b) The given graph is bipartite
- c) The given graph is hamiltonian
- d) None of these

49. Kruskal's algorithm is used to.....

- a) find minimum spanning tree
- b) find single source shortest path
- c) find all pair shortest path algorithm
- d) All of these

50. Kruskal's algorithm is a

- a) divide and conquer algorithm
- b) dynamic programming algorithm
- c) greedy algorithm
- d) None of these

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