1. In a 7-node directed cyclic graph, the number of Hamiltonian cycle is to be \_\_\_\_\_\_ [ C ]

a) 728

b) 450

c) 360

d) 260

2) If each and every vertex in G has degree at most 23 then G can have a vertex colouring of \_\_\_\_[ A ]

a) 24

b) 23

c) 176

d) 54

3) In a \_\_\_\_\_\_ the vertex set and the edge set are finite sets.[ B ]  
a) finite graph  
b) bipartite graph  
c) infinite graph  
d) connected graph

4) The number of edges in a regular graph of degree 46 and 8 vertices is \_\_\_\_\_\_\_\_\_[ C ]  
a) 347  
b) 230  
c) 184  
d) 186

5) Any subset of edges that connects all the vertices and has minimum total weight, if all the edge weights of an undirected graph are positive is called \_\_\_\_\_\_\_[ B ]

a) subgraph  
b) tree  
c) hamiltonian cycle  
d) grid

6)  G is a simple undirected graph and some vertices of G are of odd degree. Add a node n to G and make it adjacent to each odd degree vertex of G. The resultant graph is \_\_\_\_\_\_[ D ]  
a) Complete bipartite graph  
b) Hamiltonian cycle  
c) Regular graph  
d) Euler graph

7) \_\_\_\_\_\_ is the maximum number of edges in an acyclic undirected graph with k vertices. [ A ]  
a) k-1  
b) k2  
c) 2k+3  
d) k3+4

8) The minimum number of edges in a connected cyclic graph on n vertices is \_\_\_\_\_\_\_\_\_[ B ]  
a) n – 1  
b) n  
c) 2n+3  
d) n+1

9) A graph which has the same number of edges as its complement must have number of vertices congruent to \_\_\_\_\_\_ or \_\_\_\_\_\_\_ modulo 4(for integral values of number of edges). [ C ]  
a) 6k, 6k-1   
b) 4k, 4k+1  
c) k, k+2  
d) 2k+1, k

10) Every Isomorphic graph must have \_\_\_\_\_\_\_\_ representation.[ D ]  
a) cyclic  
b) adjacency list  
c) tree  
d) adjacency matrix

11) A cycle on n vertices is isomorphic to its complement. What is the value of n? [ A ]  
a) 5  
b) 32  
c) 17  
d) 8

12) A complete n-node graph Kn is planar if and only if \_\_\_\_\_\_\_\_\_\_\_\_[ C ]  
a) n ≥ 6  
b) n2 = n + 1  
c) n ≤ 4  
d) n + 3

13) A graph is \_\_\_\_\_\_ if and only if it does not contain a subgraph homeomorphic to k5 or k3,3.[ B ]  
a) bipartite graph  
b) planar graph  
c) line graph  
d) euler subgraph

14)  What is the grade of a planar graph consisting of 8 vertices and 15 edges? [ A ]  
a) 30  
b) 15  
c) 45  
d) 106

15) Every Isomorphic graph must have \_\_\_\_\_\_\_\_ representation.[ D ]  
a) cyclic  
b) adjacency list  
c) tree  
d) adjacency matrix

16)  The \_\_\_\_\_\_\_ of a graph G consists of all vertices and edges of G.[ D ]

a) edge graph  
b) line graph  
c) path complement graph  
d) eulerian circuit

17) A \_\_\_\_\_\_ in a graph G is a circuit which consists of every vertex (except first/last vertex) of G exactly once. [ B ]  
a) Euler path  
b) Hamiltonian path  
c) Planar graph  
d) Path complement graph

18) A walk has Closed property if \_\_\_\_\_\_\_\_\_\_\_\_[ A ]  
a) v0=vk  
b) v0>=vk  
c) v < 0  
d) vk > 1

19) A trail in a graph can be described as \_\_\_\_\_\_\_\_\_\_\_\_\_\_[ A ]  
a) a walk without repeated edges  
b) a cycle with repeated edges  
c) a walk with repeated edges  
d) a line graph with one or more vertices

20) The sum of an n-node graph and its complement graph produces a graph called \_\_\_\_\_\_\_ [ A ]  
a) complete graph  
b) bipartite graph  
c) star graph  
d) path-complement graph

21)  The graph representing universal relation is called \_\_\_\_\_\_\_[ A ]  
a) complete digraph  
b) partial digraph  
c) empty graph  
d) partial subgraph

22) What is a complete digraph? [ D ]  
a) connection of nodes without containing any cycle  
b) connecting nodes to make at least three complete cycles  
c) start node and end node in a graph are same having a cycle  
d) connection of every node with every other node including itself in a digraph

23) Disconnected components can be created in case of \_\_\_\_\_\_\_\_\_\_\_[ C ]  
a) undirected graphs  
b) partial subgraphs  
c) disconnected graphs  
d) complete graphs

24)  A simple graph can have \_\_\_\_\_\_\_ [ D ]  
a) multiple edges   
b) self loops  
c) parallel edges  
d) no multiple edges, self-loops and parallel edges

25) Degree of a graph with 12 vertices is \_\_\_\_\_\_\_[ C ]  
a) 25  
b) 56  
c) 24  
d) 212

26) In a finite graph the number of vertices of odd degree is always \_\_\_\_\_\_[ A ]  
a) even  
b) odd  
c) even or odd  
d) infinite

27) G is an undirected graph with n vertices and 26 edges such that each vertex of G has a degree at least 4. Then the maximum possible value of n is \_\_\_\_\_\_\_\_\_\_\_[ C ]

a) 7  
b) 43  
c) 13  
d) 10

28) If a graph G is k-colorable and k<n, for any integer n then it is \_\_\_\_\_\_\_\_\_\_\_[ A ]  
a) n-colorable  
b) n2 nodes  
c) (k+n)-colorable  
d) (k3+n3+1) nodes

29)  For a connected planar simple graph G=(V, E) with e=|E|=16 and v=|V|=9, then find the number of regions that are created when drawing a planar representation of the graph?[ B ]

a) 321  
b) 9  
c) 1024  
d) 596

30) What is the number of edges of the greatest planar subgraph of K3,2 where m,n≤3?[ B ]  
a) 18  
b) 6  
c) 128  
d) 702

31) A non-planar graph can have \_\_\_\_\_\_\_\_\_\_\_\_[ B ]  
a) complete graph  
b) subgraph  
c) line graph  
d) bar graph

32) An immediate application of minimum spanning tree \_\_\_\_ [ B ]

a) gesture analysis b) handwriting recognition c) fingerprint detection d) soft computing

33) If minimum cost edge of a graph is unique, then that edge will be added to any MST. Choose the correct option. [ C ]

a) false b) maximum cost edge is added c) true d) minimum cost edge need not be unique

34) The spanning tree will be maximally acyclic if \_\_\_\_\_\_\_\_\_\_[ A ]

a) one additional edge makes a cycle in the tree  
b) two additional edges makes a cycle in the tree  
c) removing one edge makes the tree cycle free  
d) removing two edges make the tree cycle free

35)  In a maximum spanning tree the weighted graph is of \_\_\_\_ [ D ]

a) maximum number of edges  
b) maximum number of cyclic trees  
c) minimum number of vertices  
d) maximum weight

36) Prim’s algorithm can be implemented using \_\_\_\_\_\_\_[ C ]

a) a stack data structure  
b) radix sort  
c) priority queue data structure  
d) bubble sort

37) All undirected Multigraphs contain eulerian cycles. [ A ]

a) True  
b) False

38)Which of the following is not a type of graph in computer science? [ B ]  
a) undirected graph  
b) bar graph  
c) directed graph  
d) weighted graph

39) What is vertex coloring of a graph? [ A ]  
a) A condition where any two vertices having a common edge should not have same color  
b) A condition where any two vertices having a common edge should always have same color  
c) A condition where all vertices should have a different color  
d) A condition where all vertices should have same color

40) Minimum number of unique colors required for vertex coloring of a graph is called?[ C ]

a) vertex matching  
b) chromatic index  
c) chromatic number  
d) color number

41) Which of the following is false in the case of a spanning tree of a graph G? [ D ]  
a) It is tree that spans G  
b) It is a subgraph of the G  
c) It includes every vertex of the G  
d) It can be either cyclic or acyclic

42) Consider a complete graph G with 4 vertices. The graph G has \_\_\_\_ spanning trees.[ C ]  
a) 15  
b) 8  
c) 16  
d) 13

43) Kruskal’s algorithm is used to \_\_\_\_\_\_ [ A ]  
a) find minimum spanning tree   
b) find single source shortest path  
c) find all pair shortest path algorithm  
d) traverse the graph

44) Kruskal’s algorithm is a \_\_\_\_\_\_ [ C ]  
a) divide and conquer algorithm  
b) dynamic programming algorithm  
c) greedy algorithm  
d) approximation algorithm

45) Which of the following is true? [ A ]  
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

46) Prim’s algorithm is a \_\_\_\_\_\_ [ B ]  
a) Divide and conquer algorithm  
b) Greedy algorithm  
c) Dynamic Programming  
d) Approximation algorithm

47) Prim’s algorithm is also known as \_\_\_\_\_\_\_\_\_\_ [ D ]  
a) Dijkstra–Scholten algorithm  
b) Borůvka’s algorithm  
c) Floyd–Warshall algorithm  
d) DJP Algorithm

48) Which of the following is false about Prim’s algorithm? [ B ]  
a) It is a greedy algorithm  
b) It constructs MST by selecting edges in increasing order of their weights  
c) It never accepts cycles in the MST  
d) It can be implemented using the Fibonacci heap

49) Which of the following is false about the Kruskal’s algorithm? [ C ]  
a) It is a greedy algorithm  
b) It constructs MST by selecting edges in increasing order of their weights  
c) It can accept cycles in the MST  
d) It uses union-find data structure

50). If G is the forest with 54 vertices and 17 connected components, G has \_\_\_\_\_\_ total number of edges. [ B ]

a)38 b)37 c)36 d) 35

51. Any subset of edges that connects all the vertices and has minimum total weight, if all the edge weights of an undirected graph are positive is called \_\_\_\_\_\_\_ [ B ]

a) subgraph b) tree c) hamiltonian cycle d) grid

52) spanning tree means [ A ]

1. It has to cover all the vertices of the graph
2. It has to cover all the vertices and edges of the graph
3. It has to cover both vertices and edges of the graph
4. None of the above

53) How many cycles are there in a wheel graph of order 5? [ D ]  
a) 6  
b) 10  
c) 25  
d) 7

54)If two cycle graphs Gm and Gn are joined together with a vertex, the number of spanning trees in the new graph is \_\_\_\_\_\_[ C ]  
a) m+n-1  
b) m-n  
c) m\*n  
d) m\*n+1

55)For an n-vertex undirected graph, the time required to find a cycle is \_\_\_\_\_\_\_\_\_[ A ]  
a) O(n)  
b) O(n2)  
c) O(n+1)  
d) O(logn)

56)Topological sorting of a graph represents \_\_\_\_\_\_\_ of a graph.[ B ]  
a) linear probing  
b) linear ordering  
c) quadrilateral ordering  
d) insertion sorting.

57)For any graph say G, Cayley graph is \_\_\_\_\_\_\_\_\_\_\_\_\_\_[ B ]  
a) canonial  
b) not canonical  
c) isomorphic  
d) homomorphic

58)If two cycle graphs Gm and Gn are joined together with a vertex, the number of spanning trees in the new graph is \_\_\_\_\_\_[ C ]  
a) m+n-1   
b) m-n  
c) m\*n  
d) m\*n+1

59)A walk is an [ A]

a) alternative sequence of vertices and edges

b)not alternative sequence of vertices and edges

c) alternative sequence of edges and vertices

d)none of the above

60)Chromatic number means [ A ]

a)Minimum colors required to color a graph

b) Maximum colors required to color a graph

c) No colors required to color a graph

D) None of the above

61)A path is an [ C ]

a)circuit b) cycle c) trial d) none of the above

62)The length of the walk is based on [ A ]

a)No of edges in walk sequence

b)No of vertices in walk sequence

c)no of vertices and edges in walk sequence

d)None of the above

63)A Trail is an [ A ]

a)Open walk b)closed walk c)open walk and closed walk d)none of the above

64) The solution to the recurrence relation an=an-1+2n, with initial term a0=2 are \_\_\_\_ [ B ]

a) 4n+7 b) 2(1+n) c) 3n2 d) 5\*(n+1)/2

65) Determine the value of a2 for the recurrence relation an = 17an-1 + 30n with a0=3. [ D ]

a) 4387  
b) 5484  
c) 238  
d) 1437

66) Consider the recurrence relation a1=4, an=5n+an-1. The value of a64 is \_\_\_\_ [ A ]

a) 10399  
b) 23760  
c) 75100  
d) 53700

67)What is the recurrence relation for 1, 7, 31, 127, 499?[ C ]  
a) bn+1=5bn-1+3  
b) bn=4bn+7!  
c) bn=4bn-1+3  
d) bn=bn-1+1

68)  Find the value of a4 for the recurrence relation an=2an-1+3, with a0=6.[ C ]  
a) 320  
b) 221  
c) 141  
d) 65

69)  The solution to the recurrence relation an=an-1+2n, with initial term a0=2 are \_\_\_\_\_\_\_\_\_[ B ]  
a) 4n+7  
b) 2(1+n)  
c) 3n2  
d) 5\*(n+1)/2

70) Determine the solution for the recurrence relation bn=8bn-1−12bn-2 with b0=3 and b1=4.[ A ]  
a) 7/2\*2n−1/2\*6n  
b) 2/3\*7n-5\*4n  
c) 4!\*6n  
d) 2/8n

71)What is the solution to the recurrence relation an=5an-1+6an-2?[ B ]  
a) 2n2  
b) 6n  
c) (3/2)n  
d) n!\*3

 72)Determine the solution for the recurrence relation an = 6an-1−8an-2 provided initial conditions a0=3 and a1=5. [ B ]  
a) an = 4 \* 2n – 3n  
b) an = 3 \* 7n – 5\*3n  
c) an = 5 \* 7n  
d) an = 3! \* 5n

73)  What is the recurrence relation for the sequence 1, 3, 7, 15, 31, 63,…?[ B ]  
a) an = 3an-1−2an+2  
b) an = 3an-1−2an-2  
c) an = 3an-1−2an-1  
d) an = 3an-1−2an-3

74) What is multiplication of the sequence 1, 2, 3, 4,… by the sequence 1, 3, 5, 7, 11,….? [ A ]  
a) 1, 5, 14, 30,…  
b) 2, 8, 16, 35,…  
c) 1, 4, 7, 9, 13,…  
d) 4, 8, 9, 14, 28,…

75)  Find the sequence generated by 1/1−x2−x4.,assume that 1, 1, 2, 3, 5, 8,… has generating function 1/1−x−x2. [ A ]

a) 0, 0, 1, 1, 2, 3, 5, 8,…  
b) 0, 1, 2, 3, 5, 8,…  
c) 1, 1, 2, 2, 4, 6, 8,…  
d) 1, 4, 3, 5, 7,…