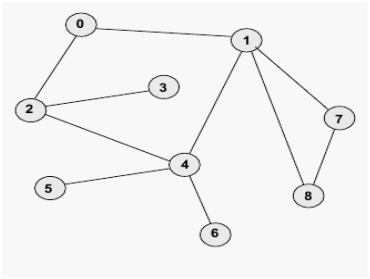
Id	
Question	A graph is a set of _____ and set of _____
A	Vertices, Edges
B	variables, values
C	vertices, distances
D	Variable, equation
Answer	A
Marks	1
Unit	2

Id	
Question	graph is a pair of sets (V, E), where V is the set of --------- and E is the set of -------, connecting the pairs of vertices
A	Vertices, Edges
B	variables, values
C	vertices, distances
D	Variable, equation
Answer	A
Marks	1
Unit	2

Id	
Question	Other name for directed graph is .....
A	Direct graph
B	None of these
C	Dir-graph
D	Digraph
Answer	D
Marks	1
Unit	2

Id	
Question	A graph is a collection of nodes, called -------- and line segments called arcs or -------- that connect pair of the nodes.
A	Vertices, path
B	Edges, vertices
C	Vertices, Edges
D	Graph nodes , Edges
Answer	C
Marks	1
Unit	2

Id	
Question	following graph is a ---------- 
A	Directed graph
B	Undirected graph
C	Both a and b
D	None
Answer	B
Marks	1
Unit	2

Id	
Question	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
D	both b and c
Answer	D
Marks	1
Unit	2

Id	
Question	the maximum degree of any vertex in a single graph wih N vertices is
A	N
B	N-1
C	N+1
D	2N+1
Answer	B
Marks	1
Unit	2

Id	
Question	The degree of any vertex of graph is .....
A	The number of edges incident with vertex
B	Number of vertex in a graph
C	Number of vertices adjacent to that vertex
D	Number of edges in a graph
Answer	A
Marks	1
Unit	2

Id	
Question	If for some positive integer k, degree of vertex d(v)=k for every vertex v of the graph G, then G is called... ?
A	K graph
B	K-regular graph
C	Empty graph
D	All of above
Answer	B
Marks	1
Unit	2

Id	
Question	A graph with no edges is known as empty graph. Empty graph is also known as... ?
A	Trivial graph
B	Regular graph
C	Bipartite graph
D	None of these
Answer	A
Marks	1
Unit	2

Id	
Question	A graph G is called a ..... if it is a connected acyclic graph ?
A	Cyclic graph
B	Regular graph
C	Tree
D	Not a graph
Answer	C
Marks	1
Unit	2

Id	
Question	The complete graph K, has... different spanning trees?
A	n^n-2
B	n*n
C	n^n
D	n^2
Answer	A
Marks	1
Unit	2

Id	
Question	Choose the most appropriate definition of plane graph
A	A graph drawn in a plane in such a way that any pair of edges meet only at their end vertices
B	A graph drawn in a plane in such a way that if the vertex set of graph can be partitioned into two non - empty disjoint subset X and Y in such a way that each edge of G has one end in X and one end in Y.
C	A simple graph which is Isomorphic to Hamiltonian graph
D	None of these
Answer	A
Marks	1
Unit	2

Id	
Question	A vertex of a graph is called even or odd depending upon ?
A	Total number of vertices in a graph is even or odd
B	Total number of edges in a graph is even or odd
C	Its degree is even or odd
D	None of these
Answer	C
Marks	1
Unit	2

Id	
Question	If G is an undirected planer graph on n vertices with e edges then ?
A	e<=n
B	e<=2n
C	e<=3n
D	None of these
Answer	B
Marks	1
Unit	2

Id	
Question	A complete Graph with N vertices has -------- edges.
A	N(N-1)/2
B	N^2/2
C	N(N+1)/2
D	(N+1)^2/2
Answer	A
Marks	1
Unit	2

Id	
Question	In Breadth First Search of Graph, which of the following data structure is used?
A	Stack
B	Queue
C	Link list
D	All of these
Answer	B
Marks	1
Unit	2

Id	
Question	In Depth First Search of Graph, which of the following data structure is used?
A	Stack
B	Queue
C	Link list
D	All of these
Answer	A
Marks	1
Unit	2

Id	
Question	The complexity of multiplying two matrices of order m*n and n*p is
A	mnp
B	mp
C	mn
D	np
Answer	A
Marks	1
Unit	2

Id	
Question	For an undirected graph with n vertices and e edges, the sum of the degree of each vertex is equal to
A	2n
B	(2n-1)/2
C	2e
D	e^2/2
Answer	C
Marks	1
Unit	2

Id	
Question	An undirected graph G with n vertices and e edges is represented by adjacency list. What is the time required to generate all the connected components?
A	O (n)
B	O (e)
C	O (e+n)
D	O (e^2)
Answer	C
Marks	1
Unit	2

Id	
Question	A graph with n vertices will definitely have a parallel edge or self loop of the total number of edges are
A	more than n
B	more than n+1
C	more than (n+1)/2
D	more than (n-1)/2
Answer	D
Marks	1
Unit	2

Id	
Question	For an undirected graph G with n vertices and e edges, the sum of the degrees of each vertex is
A	2e
B	ne
C	2n
D	e^n
Answer	A
Marks	1
Unit	2

Id	
Question	A directed graph is ……. if there is a path from each vertex to every other vertex in the digraph
A	Weakly Connected
B	Strongly Connected
C	Tightly connected
D	linear connected
Answer	B
Marks	1
Unit	2

Id	
Question	In the …….. traversal we process all of a vertex’s descendents before we move to an adjacent vertex.
A	Depth First
B	Breadth First
C	With First
D	Depth Limited
Answer	A
Marks	1
Unit	2

Id	
Question	State True of False. i) Network is a graph that has weights or costs associated with it. ii) An undirected graph which contains no cycles is called a 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
Answer	B
Marks	1
Unit	2

Id	
Question	Which of the following statements are TRUE? (1) The problem of determining whether there exists a cycle in an undirected graph is in P. (2) The problem of determining whether there exists a cycle in an undirected graph is in NP. (3) If a problem A is NP-Complete, there exists a non-deterministic polynomial time algorithm to solve A.
A	1,2 and 3
B	1 and 2 only
C	2 and 3 only
D	1 and 3 only
Answer	A
Marks	1
Unit	2

Id	
Question	Consider an undirected random graph of eight vertices. The probability that there is an edge between a pair of vertices is 1/2. What is the expected number of unordered cycles of length three?
A	1/8
B	1
C	7
D	8
Answer	C
Marks	1
Unit	2

Id	
Question	Which of the following statements is/are TRUE for an undirected graph? P: Number of odd degree vertices is even Q: Sum of degrees of all vertices is even
A	P Only
B	Q Only
C	Both P and Q
D	Neither P nor Q
Answer	C
Marks	1
Unit	2

Id	
Question	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
A	Dijkstra’s algorithm starting from S.
B	Warshall’s algorithm
C	Performing a DFS starting from S.
D	Performing a BFS starting from S.
Answer	D
Marks	1
Unit	2

Id	
Question	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
A	There is a minimum spanning tree containing e.
B	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.
C	Every minimum spanning tree has an edge of weight w .
D	e is present in every minimum spanning tree.
Answer	D
Marks	1
Unit	2

Id	
Question	How many undirected graphs (not necessarily connected) can be constructed out of a given set V= {V 1, V 2,…V n} of n vertices ?
A	n(n-l)/2
B	2^n
C	n!
D	2^(n(n-1)/2)
Answer	D
Marks	1
Unit	2

Id	
Question	Consider an undirected unweighted graph G. Let a breadth-first traversal of G be done starting from a node r. Let d(r, u) and d(r, v) be the lengths of the shortest paths from r to u and v respectively, in G. lf u is visited before v during the breadth-first traversal, which of the following statements is correct?
A	d(r, u) < d (r, v)
B	d(r, u) > d(r, v)
C	d(r, u) <= d (r, v)
D	None of the above
Answer	C
Marks	1
Unit	2

Id	
Question	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?
A	{u,v} must be an edge in G, and u is a descendant of v in T
B	{u,v} must be an edge in G, and v is a descendant of u in T
C	If {u,v} is not an edge in G then u is a leaf in T
D	If {u,v} is not an edge in G then u and v must have the same parent in T
Answer	C
Marks	1
Unit	2

Id	
Question	Let G be an undirected connected graph with distinct edge weight. Let emax be the edge with maximum weight and emin the edge with minimum weight. Which of the following statements is false?
A	Every minimum spanning tree of G must contain emin
B	If emax is in a minimum spanning tree, then its removal must disconnect G
C	No minimum spanning tree contains emax
D	G has a unique minimum spanning tree
Answer	C
Marks	1
Unit	2

Id	
Question	Consider a weighted complete graph G on the vertex set {v1,v2 ,v} such that the weight of the edge (v,,v) is 2|i-j|. The weight of a minimum spanning tree of G is:
A	n — 1
B	2n — 2
C	nC2
D	2
Answer	B
Marks	1
Unit	2

Id	
Question	An undirected graph G has n nodes. Its adjacency matrix is given by an n × n square matrix whose (i) diagonal elements are 0‘s and (ii) non-diagonal elements are 1‘s. which one of the following is TRUE?
A	Graph G has no minimum spanning tree (MST)
B	Graph G has a unique MST of cost n-1
C	Graph G has multiple distinct MSTs, each of cost n-1
D	Graph G has multiple spanning trees of different costs
Answer	C
Marks	1
Unit	2

Id	
Question	Maximum number of edges in a n-Node undirected graph without self loop is
A	n2
B	n(n – 1)
C	n(n + 1)
D	n(n – 1)/2
Answer	D
Marks	1
Unit	2

Id	
Question	Which two of the following are equivalent for an undirected graph G? (i) G is a tree (ii) There is at least one path between any two distinct vertices of G (iii) G contains no cycles and has (n-1) edges (iv)G has n edges
A	(i) and (ii)
B	(i) and (iii)
C	(i) and (iv)
D	(ii) and (iii)
Answer	B
Marks	1
Unit	2

Id	
Question	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
A	15
B	30
C	90
D	160
Answer	A
Marks	1
Unit	2

Id	
Question	what is a tree
A	Is a bipartite graph
B	With n node contains n-1 edges
C	Is a connected graph
D	All of these
Answer	D
Marks	1
Unit	2

Id	
Question	A graph in which all nodes are of equal degree is called
A	Multi graph
B	Non regular graph
C	Complete graph
D	Regular graph
Answer	D
Marks	1
Unit	2

Id	
Question	Graphs are represented using
A	Adjacency Tree
B	Adjacency graph
C	Adjacency list
D	Adjacency Queue
Answer	C
Marks	1
Unit	2

Id	
Question	if every node u in G is adjacent to every other node v in G, A graph is said to be
A	Isolated
B	Complete
C	Finite
D	Strongly Connected
Answer	B
Marks	1
Unit	2

Id	
Question	A graph is a tree if and only if it
A	Is completely connected
B	Is minimally connected
C	Contains a circuit
D	Is planar
Answer	B
Marks	1
Unit	2

Id	
Question	Let G be a simple undirected planar graph on 10 vertices with 15 edges. If G is a connected graph, then the number of bounded faces in any embedding of G on the plane is equal to
A	3
B	4
C	5
D	6
Answer	D
Marks	1
Unit	2

Id	
Question	Which of the following statement is false ?
A	G is connected and is circuit less
B	G is connected and has n edges
C	G is minimally connected graph
D	G is circuit less and has n-1 edges
Answer	B
Marks	1
Unit	2

Id	
Question	The number of circuits that can be created by adding an edge between any two vertices in a tree is
A	2
B	Exactly 1
C	At exactly 2
D	None
Answer	B
Marks	1
Unit	2

Id	
Question	In a tree between every pair of vertices there is
A	Exactly one path
B	A self loop
C	Two circuits
D	n number of paths
Answer	A
Marks	1
Unit	2

Id	
Question	Degree of vertex =
A	outdegree - indegree
B	(indegree – outdegree)/2
C	indegree/outdegree
D	Indegree+outdegree
Answer	D
Marks	1
Unit	2

Id	
Question	Graph is----------connected if there is path from each vertex to every other vertex in directed graph.
A	Strongly
B	weakly
C	Both a and b
D	None of these
Answer	A
Marks	1
Unit	2

Id	
Question	Graph is represented by----------
A	Adjacency Matrix
B	Adjacency list
C	Both a and b
D	None of these
Answer	C
Marks	1
Unit	2

Id	
Question	In adjacency matrix if there is edge between two vertices then matrix intersect has value----------and if there is not edge then matrix intersect has value---------
A	0,1
B	1,0
C	2,infinity
D	Any value
Answer	B
Marks	1
Unit	2

Id	
Question	Which operation we apply on graph----------
A	Add vertex
B	Delete vertex
C	Find vertex
D	All of these
Answer	D
Marks	1
Unit	2

Id	
Question	A network data model is represented efficiently using
A	Stack
B	Queue
C	Tree
D	Graph
Answer	D
Marks	1
Unit	2

Id	
Question	An isolated vertex in a graph has
A	0 degree
B	1 degree
C	Outdegree but no indegree
D	Indegree but no outdegree
Answer	C
Marks	1
Unit	2

Id	
Question	A MST can be obtained from
A	Prims
B	Kruskal
C	Both a and b
D	A and not b
Answer	C
Marks	1
Unit	2

Id	
Question	Let A be an adjacency matrix of a graph G. The ijth entry in the matrix A^k , gives
A	The number of paths of length K from vertex Vi to vertex Vj
B	Shortest path of K edges from vertex Vi to vertex Vj.
C	Length of a Eulerian path from vertex Vi to vertex Vj.
D	Length of a Hamiltonian cycle from vertex Vi to vertex Vj.
Answer	B
Marks	1
Unit	2

Id	
Question	The maximum degree of any vertex in a simple graph with n vertices is
A	n-1
B	n+1
C	n
D	2n-1
Answer	A
Marks	1
Unit	2

Id	
Question	State True or False. i) An undirected graph which contains no cycles is called forest. ii) A graph is said to be complete if there is an edge between every pair of vertices.
A	True, False
B	False, True
C	False, False
D	True, True
Answer	D
Marks	1
Unit	2

Id	
Question	Match the following. a) Completeness i) How long does it take to find a solution b) Time Complexity ii) How much memory need to perform the search. c) Space Complexity iii) Is the strategy guaranteed to find the solution when there in one.
A	a-iii, b-ii, c-i
B	a-i, b-ii, c-iii
C	a-iii, b-i, c-ii
D	a-i, b-iii, c-ii
Answer	C
Marks	1
Unit	2

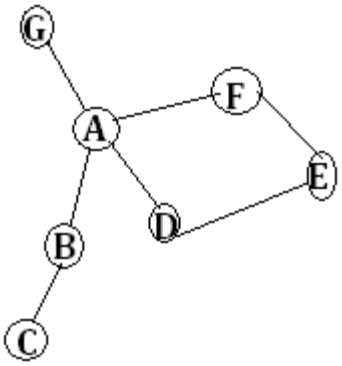
Id	
Question	State True of False. i) Network is a graph that has weights or costs associated with it. ii) An undirected graph which contains no cycles is called a forest. iii) A graph is said to be complete if there is no edge between every pair of vertices.
A	True, False, True
B	True, True, False
C	True, True, True
D	False, True, True
Answer	B
Marks	1
Unit	2

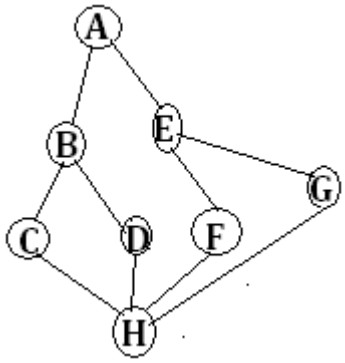
Id	
Question	In the …….. traversal we process all of a vertex’s descendents before we move to an adjacent vertex.
A	DFS
B	BFS
C	With first
D	Depth limited
Answer	A
Marks	1
Unit	2

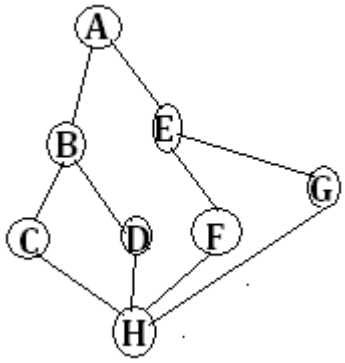
Id	
Question	A graph with n vertices will definitely have a parallel edge or self loop of the total number of edges are
A	more than n
B	more than n+1
C	more than (n+1)/2
D	more than n(n-1)/2
Answer	D
Marks	1
Unit	2

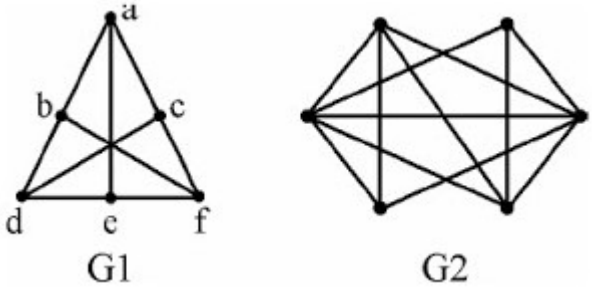
Id	
Question	Consider the following statements : (i) A graph in which there is a unique path between every pair of vertices is a tree. (ii) A connected graph with $e = v - 1$ is a tree. (iii) A graph with $e = v - 1$ that has no circuit is a tree. Which of the above statements is/are true ?
A	(i) & (iii)
B	(ii) & (iii)
C	(i) & (ii)
D	All of the above
Answer	D
Marks	1
Unit	2

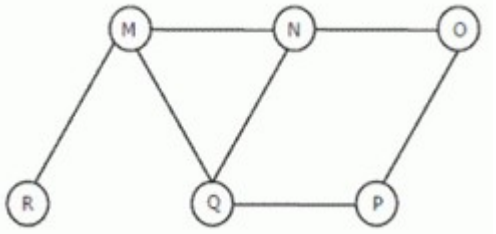
Id	
Question	A simple graph G with n − vertices is connected if the graph has
A	(n − 1) (n − 2)/2 edges
B	more than (n − 1) (n − 2)/2 edges
C	less than (n − 1) (n − 2)/2 edges
D	$\sum^{k}_{(i=1)}$ C(ni, 2) edges
Answer	B
Marks	1
Unit	2

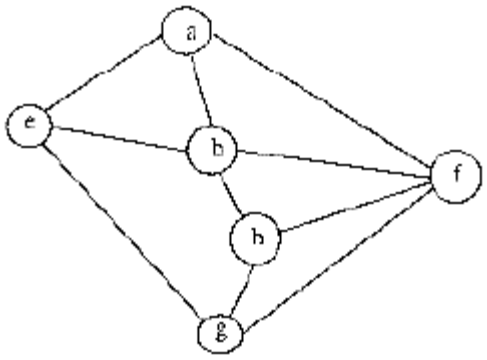
Id	
Question	considers the following graph for obtaining the DFS sequence. 
A	A B C D E F G
B	A B C D E G F
C	A B D F G C E
D	None of these
Answer	A
Marks	1
Unit	2

Id	
Question	considers the following graph for obtaining the DFS sequence. 
A	A B C D E F G H
B	A B C H D F E G
C	A B E C D F G H
D	None of these
Answer	B
Marks	1
Unit	2

Id	
Question	considers the following graph for obtaining the bfs sequence 
A	A B C D E F G H
B	A B E C D F G H
C	A B C H D F E G
D	None of these
Answer	B
Marks	1
Unit	2

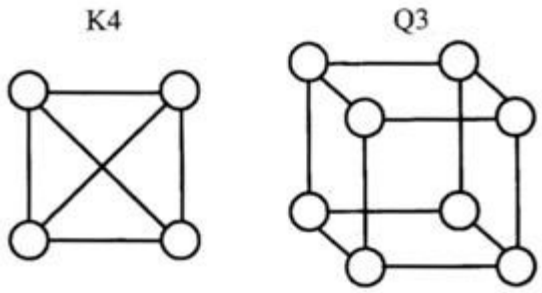
Id	
Question	**G1 and G2 are two graphs as shown :** 
A	Both G1 and G2 are planar graphs
B	Both G1 and G2 are not planar graphs
C	G1 is planar and G2 is not planar graph
D	G1 is not planar and G2 is planar graph
Answer	D
Marks	1
Unit	2

Id	
Question	The **Breadth First Search algorithm has been implemented using the queue data structure. One possible order of visiting the nodes of the following graph is** 
A	MNOPQR
B	NQMPOR
C	QMNPRO
D	QMNPOR
Answer	C
Marks	1
Unit	2

Id	
Question	**Consider the following graph**  **Among the following sequences** **I) a b e g h f II) a b f e h g III) a b f h g e** **IV) a f g h b e** **Which are depth first traversals of the above graph?**
A	I, II and IV only
B	II, III and IV only
C	I and IV only
D	I, III and IV only
Answer	D
Marks	1
Unit	2

Id	
Question	An undirected graph G has n vertices and n-1 edges then G is:
A	Cyclic
B	Addition of edge will make it cyclic
C	Eulerian
D	Is a Tree
Answer	D
Marks	1
Unit	2

Id	
Question	Graph having every pair of vertices connected is called:
A	Cycle graph
B	Complete graph
C	Peterson graph
D	Is a Tree
Answer	B
Marks	1
Unit	2

Id	
Question	
A	K4 is planar while Q3 is not
B	Both K4 and Q3 are planar
C	Q3 is planar while K4 is not
D	Neither K4 nor Q3 are planar
Answer	B
Marks	1
Unit	2

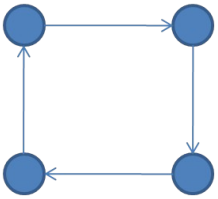
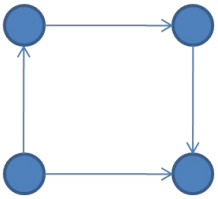
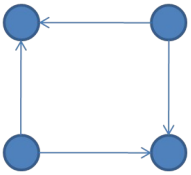
Id	
Question	Which one of the following is TRUE for any simple connected undirected graph with more than 2 vertices?
A	No two vertices have the same degree.
B	At least two vertices have the same degree
C	At least three vertices have the same degree
D	All vertices have the same degree
Answer	B
Marks	1
Unit	2

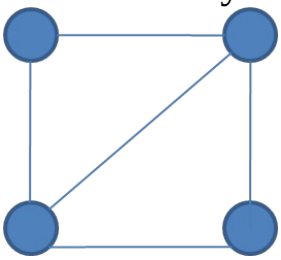
Id	
Question	The complexity of BFS implemented using an Adjacency Matrix will be ------
A	$O(\|V\|^2)$
B	O(N)
C	O(1)
D	None of these
Answer	A
Marks	1
Unit	2

Id	
Question	The complexity of BFS implemented using an Adjacency Matrix will be -------. And that when implemented by an Adjacency List is ------
A	$O(\|V\|^2)$, $O(\|V\|)$.
B	$O(\|V\|^2)$, $O(\|V\| + \|E\|)$.
C	$O(\|V\|)$, $O(\|V\| + \|E\|)$.
D	$O(\|V+E\|)$, $O(\|E\|)$.
Answer	B
Marks	1
Unit	2

Id	
Question	In an undirected graph if there is an edge from A to B then -------
A	B is adjacent to A
B	A is adjacent to B
C	BA is an edge in the graph
D	All of these
Answer	D
Marks	1
Unit	2

Id	
Question	A connected graph is said to be strongly connected if -----
A	there is a path from every vertex to remaining vertices
B	there is a path between any pair of vertices
C	there is a path from at least one vertex to remaining vertices
D	All of these
Answer	A
Marks	1
Unit	2

Id	
Question	Select a strongly connected graph
A	
B	
C	
D	None of the above
Answer	A
Marks	1
Unit	2

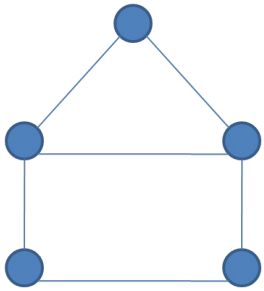
Id	
Question	A cycle is a simple path that begins & ends at the same vertex. Find no. of cycles in the given graph. 
A	1
B	2
C	3
D	4
Answer	C
Marks	1
Unit	2

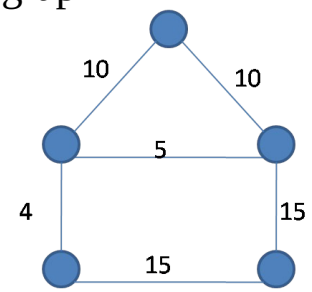
Id	
Question	Which of the following statements are correct about Kruskal’s algorithm? a) Kruskal’s algorithm builds a MST in a forest. b) Kruskal’s algorithm scans the edges in monotonically decreasing order by weight. c) Kruskal’s algorithm is a greedy algorithm.
A	A and C
B	A and B
C	Only c
D	Both B and C
Answer	A
Marks	1
Unit	2

Id	
Question	Pick the correct statement(s) from the following set of statements. I. In the Kruskal's algorithm, for the construction of minimal spanning tree for a graph, the selected edges always form a forest. II. In Prim's algorithm, for the construction of minimal spanning tree for a graph, the selected edges always form an orchard. III. DFS, BFS algorithms always make use of a queue, and stack respectively.
A	Only I
B	Only III
C	Both I and III
D	Both II and III
Answer	A
Marks	1
Unit	2

Id	
Question	Adjacency matrix of an undirected graph is
A	Symmetric matrix
B	Asymmetric matrix
C	Unit matrix
D	None of these
Answer	A
Marks	1
Unit	2

Id	
Question	Adjacency matrix is a
A	2d array
B	1d array
C	3d array
D	None of these
Answer	A
Marks	1
Unit	2

Id	
Question	Find the number of spanning trees of the given graph 
A	9
B	6
C	8
D	7
Answer	A
Marks	1
Unit	2

Id	
Question	Find the cost of the minimum cost spanning tree in the given graph 
A	34
B	29
C	25
D	40
Answer	A
Marks	1
Unit	2

Id	
Question	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
D	both b and c
Answer	D
Marks	1
Unit	2

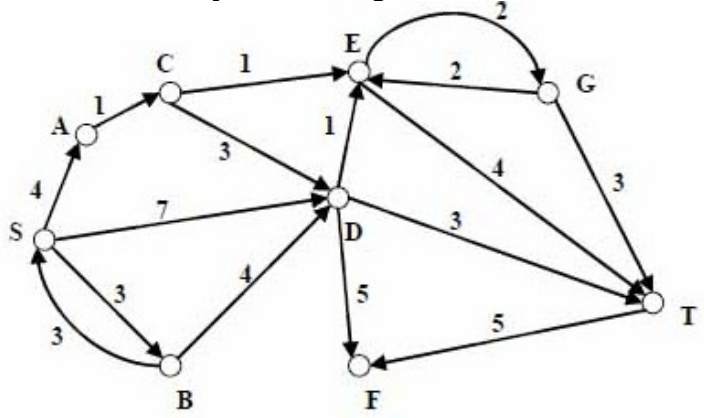
Id	
Question	A connected graph T without any cycles is called
A	a tree graph
B	free tree
C	a tree
D	All of above
Answer	D
Marks	1
Unit	2

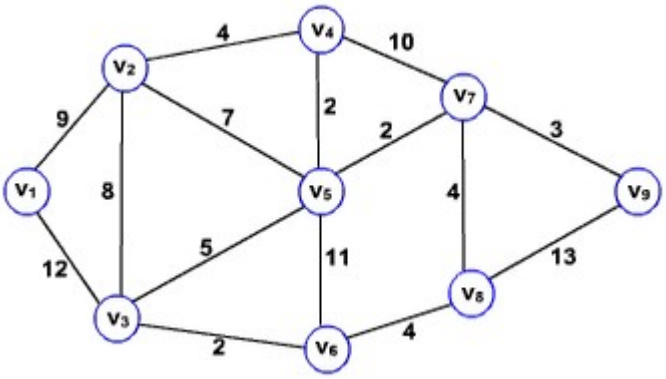
Id	
Question	Which of the following statements is false ?
A	Every tree is a bipartite graph
B	A tree contains a cycle
C	A tree with n nodes contains n-1 edges
D	A tree is a con- nected graph
Answer	B
Marks	1
Unit	2

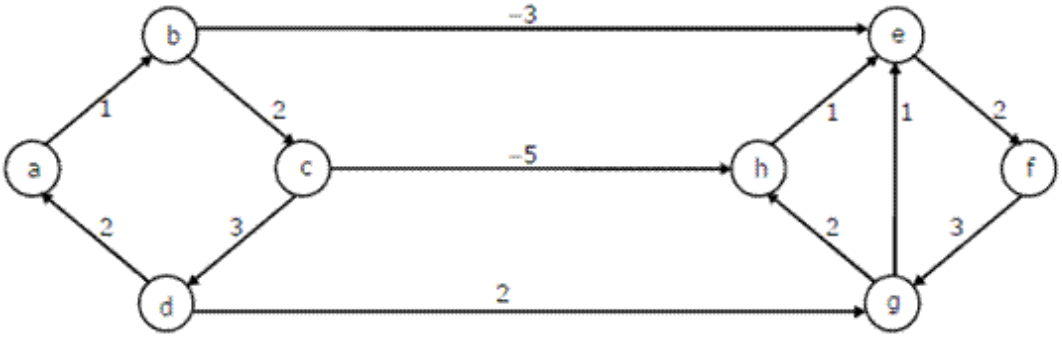
Id	
Question	The minimum number of edges in a connected cyclic graph on n vertices is
A	n
B	n-1
C	n+1
D	None of these
Answer	A
Marks	1
Unit	2

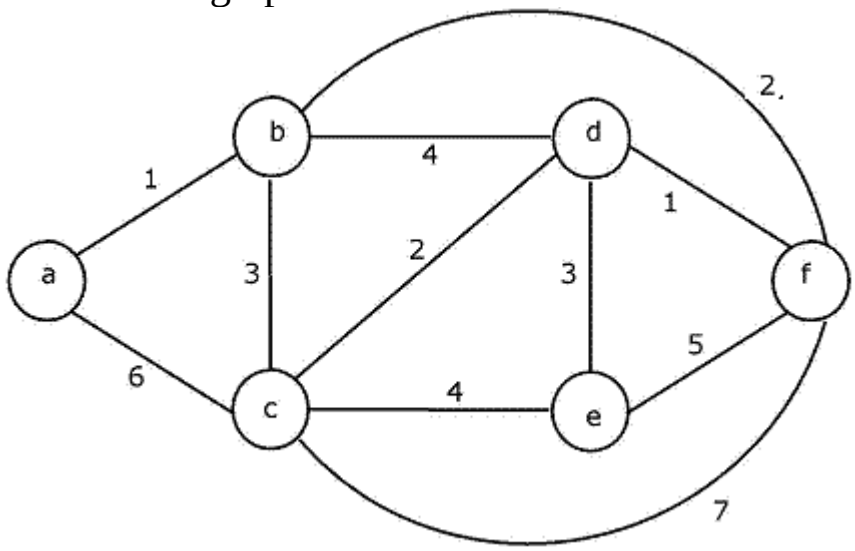
Id	
Question	Which of the following is useful in traversing a given graph by breadth first search?
A	Stack
B	Queue
C	set
D	list
Answer	B
Marks	1
Unit	2

Id	
Question	Which of the following is useful in traversing a given graph by depth first search?
A	Stack
B	Queue
C	set
D	list
Answer	A
Marks	1
Unit	2

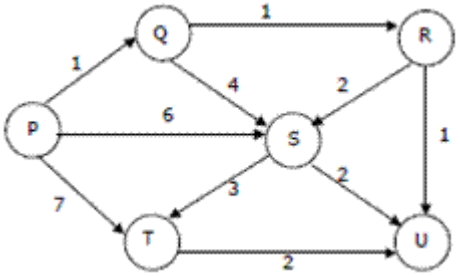
Id	
Question	Consider the directed graph shown in the figure below. There are multiple shortest paths between vertices S and T. Which one will be reported by Dijkstra's shortest path algorithm? Assume that, in any iteration, the shortest path to a vertex v is updated only when a strictly shorter path to v is discovered. 
A	SDT
B	SBDT
C	SACDT
D	SACET
Answer	D
Marks	2
Unit	2

Id	
Question	Consider the following graph and find the weight of GRAPH using Prims Algorithm 
A	The weight of the MST is 33
B	The weight of the MST is 43.
C	The weight of the MST is 23.
D	The weight of the MST is 35.
Answer	A
Marks	2
Unit	2

Id	
Question	Dijkstra’s single source shortest path algorithm when run from vertex a in the below graph, computes the correct shortest path distance to 
A	only vertex a
B	only vertices a, e, f, g, h
C	only vertices a, b, c, d
D	all the vertices
Answer	D
Marks	2
Unit	2

Id	
Question	Consider the graph  Which one of the following cannot be the sequence of edges added, in that order, to a minimum spanning tree using Kruskal's algorithm?
A	(a—b),(d—f),(b—f),(d—c),(d—e)
B	(a—b),(d—f),(d—c),(b—f),(d—e)
C	(d—f),(a—b),(d—c),(b—f),(d—e)
D	(d—f),(a—b),(b—f),(d—e),(d—c)
Answer	D
Marks	2
Unit	2

<table>
<tr><td>Id</td><td></td></tr>
<tr><td>Question</td><td>Consider a complete undirected graph with vertex set {0, 1, 2, 3, 4}. Entry Wij in the matrix W below is the weight of the edge{i j}
W=
<table><tr><td>0</td><td>1</td><td>8</td><td>1</td><td>4</td></tr><tr><td>1</td><td>0</td><td>12</td><td>4</td><td>9</td></tr><tr><td>8</td><td>12</td><td>0</td><td>7</td><td>3</td></tr><tr><td>1</td><td>4</td><td>7</td><td>0</td><td>2</td></tr><tr><td>4</td><td>9</td><td>3</td><td>2</td><td>0</td></tr></table>What is the minimum possible weight of a spanning tree T in this graph such that vertex 0 is a leaf node in the tree T?</td></tr>
<tr><td>1</td><td>7</td></tr>
<tr><td>B</td><td>8</td></tr>
<tr><td>C</td><td>9</td></tr>
<tr><td>D</td><td>10</td></tr>
<tr><td>Answer</td><td>D</td></tr>
<tr><td>Marks</td><td>2</td></tr>
<tr><td>Unit</td><td>2</td></tr>
</table>

Id	
Question	Suppose we run Dijkstra’s single source shortest-path algorithm on the following edge weighted directed graph with vertex P as the source. In what order do the nodes get included into the set of vertices for which the shortest path distances are finalized? 
A	P, Q, R, S, T, U
B	P, Q, R, U, S, T
C	P, Q, R, U, T, S
D	P, Q, T, R, U, S
Answer	B
Marks	2
Unit	2

Id	
Question	In the graph given below, what is the minimum possible weight of a path P from vertex 1 to vertex 2 in this graph such that P contains at most 3 edges? W= 0 1 8 1 4 1 0 12 4 9 8 12 0 7 3 1 4 7 0 2 4 9 3 2 0
A	7
B	8
C	9
D	10
Answer	B
Marks	2
Unit	2

Id	
Question	What is the necessary condition for Kruskal’s algorithm?
A	All vertices should be connected to all other
B	No edge should intersect another edge
C	All vertices should be visited
D	All vertices should have even degrees
Answer	C
Marks	1
Unit	2

Id	
Question	What input is required to implement Kruskal’s algorithm?
A	Number of vertices
B	Adjacency matrix
C	Number of edges
D	Graph
Answer	B
Marks	1
Unit	2

Id	
Question	a)Kruskal’s algorithm is used to construct a normal graph b)Prim’s algorithm is used to construct minimum spanning tree. State which of the above true
A	Only a
B	Only b
C	a and b
D	None of these
Answer	B
Marks	1
Unit	2

Id	
Question	What is the time complexity for Kruskal’s algorithm?
A	O(n log n)
B	O (n^2)
C	O(n-1)
D	O(n^2 log n^2)
Answer	A
Marks	1
Unit	2

Id	
Question	The complete graph K, has... different spanning trees?
A	n^n-2
B	n*n
C	n^n
D	n^2
Answer	A
Marks	1
Unit	1

Id	
Question	What is the final condition to stop Kruskal’s algorithm?
A	Number of vertices = n-1
B	Number of edges = n-1
C	Incoming degree of any vertex = outgoing degree
D	Degrees of all vertices should be even
Answer	B
Marks	1
Unit	2

Id	
Question	It is not necessary in Kruskal’s algorithm to have edges of minimum weights to be _____.
A	Parallel
B	Adjacent
C	Opposite
D	Intersecting
Answer	B
Marks	1
Unit	2

Id	
Question	In Kruskal’s algorithm each time edge of _____ weight has to be selected.
A	Maximum
B	Average
C	Minimum
D	Cyclic
Answer	C
Marks	1
Unit	2

Id	
Question	In Kruskal’s algorithm _____ should not be formed.
A	Circuit
B	Path
C	Shape
D	Sum
Answer	A
Marks	1
Unit	2

Id	
Question	In Kruskal’s algorithm the _____ weight is obtained
A	Maximum
B	Average
C	Minimum
D	Total
Answer	C
Marks	1
Unit	2

Id	
Question	A minimal spanning tree of a graph G is.... ?
A	A spanning sub graph
B	A tree
C	Minimum weights
D	All of above
Answer	D
Marks	1
Unit	2

Id	
Question	The spanning tree of connected graph with 10 vertices contains
A	9 edges
B	11 edges
C	10 edges
D	9 Vertices
Answer	A
Marks	1
Unit	2

Id	
Question	Let A be an adjacency matrix of a graph G. The ij entry in the matrix K A , gives
A	The number of paths of length K from vertex Vi to vertex Vj.
B	Shortest path of K edges from vertex Vi to vertex Vj.
C	Length of a Eulerian path from vertex Vi to vertex Vj.
D	Length of a Hamiltonian cycle from vertex Vi to vertex Vj
Answer	B
Marks	1
Unit	2

Id	
Question	Time complexity of prims algorithm is
A	O(N)
B	O(N2)
C	O(N log N)
D	O(Log N2)
Answer	B
Marks	1
Unit	2

Id	
Question	In prims algorithm, in each iteration
A	A new vertex is added to the tree
B	Many new vertices are added to the tree
C	0 or 1 vertex is added to the tree
D	None of the above
Answer	A
Marks	1
Unit	2

Id	
Question	In Kruskal’s algorithm, in each iteration
A	A new vertex is added to the tree
B	A new edge is added to merge 2 trees
C	A new edge is added to tree
D	0 or 1 vertex is added to the tree
Answer	B
Marks	1
Unit	2

Id	
Question	Dijkstra algorithm is for vertices of a graph
A	Shortest distance from 1 vertex to other
B	All pair shortest path
C	Both a and b
D	Minimum cost spanning tree
Answer	A
Marks	1
Unit	2

Id	
Question	Which algorithm should be used for finding minimum cost spanning tree of a dense graph
A	Prims
B	Kruskals
C	Both prims and Kruskals will be equally efficient
D	Both prims and Kruskals will be equally inefficient
Answer	A
Marks	1
Unit	2

Id	
Question	Which algorithm should be used for finding minimum cost spanning tree of a sparse graph
A	Prims
B	Kruskals
C	Both prims and Kruskals will be equally efficient
D	Both prims and Kruskals will be equally inefficient
Answer	B
Marks	1
Unit	2

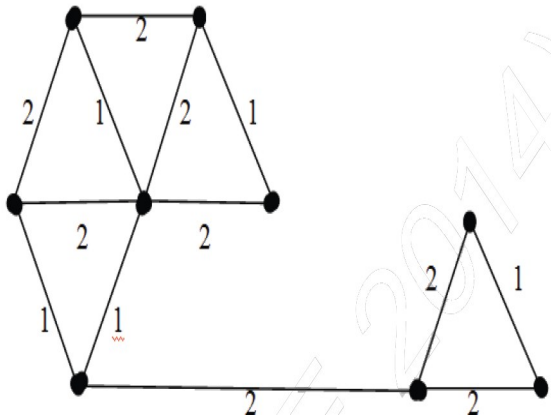
Id	
Question	A network data model is best represented using
A	queue
B	Stack
C	Tree
D	Graph
Answer	D
Marks	1
Unit	2

Id	
Question	Number of spanning tree of a graph without any cycle will be
A	0
B	1
C	2
D	Many
Answer	B
Marks	1
Unit	2

Id	
Question	Dijkstra algorithm is for
A	Shortest distance from 1 vertex to other vertices of a graph
B	All pair shortest path
C	Both a and b
D	Minimum cost spanning tree
Answer	A
Marks	1
Unit	2

Id	
Question	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
A	There is a minimum spanning tree containing e.
B	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.
C	Every minimum spanning tree has an edge of weight w .
D	e is present in every minimum spanning tree.
Answer	D
Marks	1
Unit	1

Id	
Question	MST can be obtained from
A	Prims
B	Kruskals
C	Both
D	A and not b
Answer	C
Marks	1
Unit	2

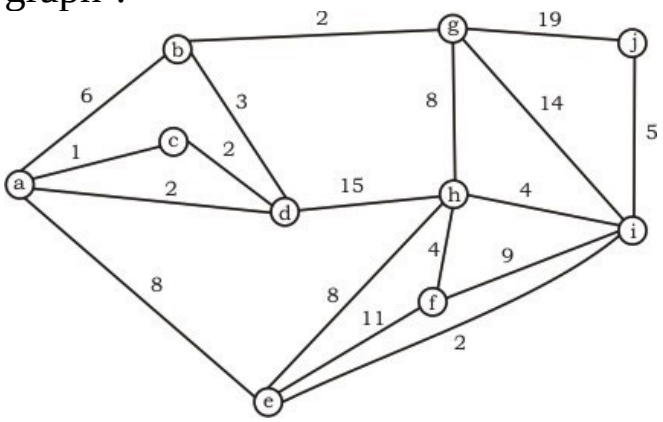
Id	
Question	 The number of distinct minimum spanning trees for the weighted graph below is _____
A	4
B	5
C	6
D	7
Answer	C
Marks	2
Unit	2

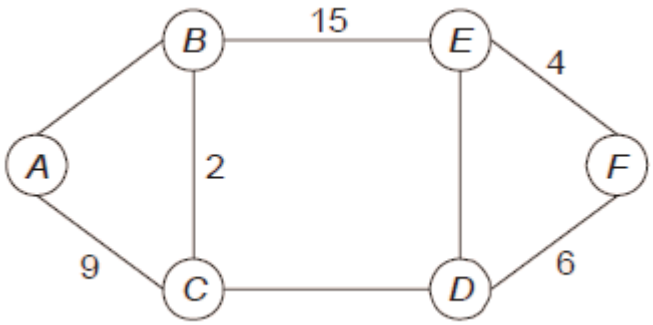
Id	
Question	Let s and t be two vertices in a undirected graph G + (V, E) having distinct positive edge weights. Let [X, Y] be a partition of V such that s ∈ X and t ∈ Y. Consider the edge e having the minimum weight amongst all those edges that have one vertex in X and one vertex in Y The edge e must definitely belong to:
A	the minimum weighted spanning tree of G
B	the weighted shortest path from s to t
C	each path from s to t
D	the weighted longest path from s to t
Answer	A
Marks	2
Unit	2

Id	
Question	Let G be an undirected connected graph with distinct edge weight. Let emax be the edge with maximum weight and emin the edge with minimum weight. Which of the following statements is false?
A	Every minimum spanning tree of G must contain emin
B	If emax is in a minimum spanning tree, then its removal must disconnect G
C	No minimum spanning tree contains emax
D	G has a unique minimum spanning tree
Answer	C
Marks	1
Unit	1

Id	
Question	Consider a weighted complete graph G on the vertex set {v1,v2 ,v} such that the weight of the edge (v,,v) is 2|i-j|. The weight of a minimum spanning tree of G is:
A	n — 1
B	2n — 2
C	nC2
D	2
Answer	B
Marks	1
Unit	1

Id	
Question	An undirected graph G has n nodes. Its adjacency matrix is given by an n × n square matrix whose (i) diagonal elements are 0‘s and (ii) non-diagonal elements are 1‘s. which one of the following is TRUE?
A	Graph G has no minimum spanning tree (MST)
B	Graph G has a unique MST of cost n-1
C	Graph G has multiple distinct MSTs, each of cost n-1
D	Graph G has multiple spanning trees of different costs
Answer	C
Marks	1
Unit	1

Id	
Question	What is the weight of a minimum spanning tree of the following graph ? 
A	29
B	31
C	38
D	41
Answer	B
Marks	2
Unit	2

Id	
Question	The graph shown below 8 edges with distinct integer edge weights. The minimum spanning tree (MST) is of weight 36 and contains the edges: {(A, C), (B, C), (B, E), (E, F), (D, F)}. The edge weights of only those edges which are in the MST are given in the figure shown below. The minimum possible sum of weights of all 8 edges of this graph is 
A	66
B	69
C	68
D	71
Answer	B
Marks	2
Unit	2

Id	
Question	Let G be connected undirected graph of 100 vertices and 300 edges. The weight of a minimum spanning tree of G is 500. When the weight of each edge of G is increased by five, the weight of a minimum spanning tree becomes _____.
A	1000
B	995
C	2000
D	1995
Answer	B
Marks	2
Unit	2

Id	
Question	Let G be a weighted connected undirected graph with distinct positive edge weights. If every edge weight is increased by the same value, then which of the following statements is/are TRUE? P: Minimum spanning tree of G does not change Q: Shortest path between any pair of vertices does not change
A	P only
B	Q only
C	Neither P nor Q
D	Both P and Q
Answer	A
Marks	1
Unit	2

Id	
Question	Let G be a complete undirected graph on 4 vertices, having 6 edges with weights being 1, 2, 3, 4, 5, and 6. The maximum possible weight that a minimum weight spanning tree of G can have is
A	6
B	7
C	8
D	9
Answer	B
Marks	2
Unit	2

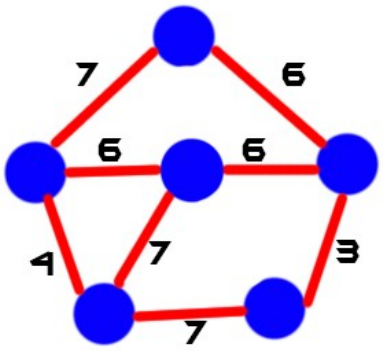
Id	
Question	G = (V, E) is an undirected simple graph in which each edge has a distinct weight, and e is a particular edge of G. Which of the following statements about the minimum spanning trees (MSTs) of G is/are TRUE I. If e is the lightest edge of some cycle in G, then every MST of G includes e II. If e is the heaviest edge of some cycle in G, then every MST of G excludes e
A	I only
B	II only
C	Both I and II
D	Neither I nor II
Answer	B
Marks	1
Unit	2

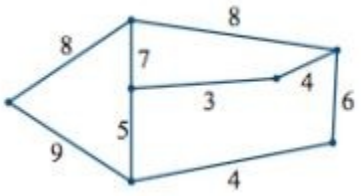
Id	
Question	What is the largest integer m such that every simple connected graph with n vertices and n edges contains at least m different spanning trees?
A	1
B	2
C	3
D	n
Answer	C
Marks	1
Unit	2

Id	
Question	Indicate the runtime of Dijkstra's algorithm when the implementation is based on a binary heap. (E = edges; V = vertices)
A	O(ElogV)
B	O(V2)
C	O(E + VlogV)
D	O(E + V)
Answer	A
Marks	1
Unit	2

Id	
Question	What algorithm technique is used in the implementation of Kruskal solution for the MST?
A	Greedy Technique
B	Divide-and-Conquer Technique
C	Dynamic Programming Technique
D	he algorithm combines more than one of the above techniques
Answer	A
Marks	1
Unit	2

Id	
Question	Which is true statement in the following?
A	Kruskal algorithm is multiple source technique for finding MST
B	Kruskal’s algorithm is used to find minimum spanning tree of a graph, time complexity of this algorithm is O(EV)
C	Both of above
D	Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best Tree edge) when the graph has relatively few edges
Answer	D
Marks	1
Unit	2

Id	
Question	 The minimum cost spanning tree has cost
A	30
B	31
C	33
D	26
Answer	D
Marks	2
Unit	2

Id	
Question	The minimum cost spanning tree has cost 
A	28
B	29
C	30
D	31
Answer	D
Marks	2
Unit	2

Id	
Question	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?
A	There is a minimum spanning tree containing e
B	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
C	Every minimum spanning tree has an edge of weight w
D	e is present in every minimum spanning tree.
Answer	B
Marks	1
Unit	2

Id	
Question	The minimum number of edges in a connected cycle graph of n vertices is
A	N-1
B	N
C	N+1
D	None of these
Answer	B
Marks	1
Unit	1

Id	
Question	Find the least number of vertices of a complete graph having at least 50 edges
A	25
B	20
C	15
D	10
Answer	D
Marks	1
Unit	1

Id	
Question	Maximum number of edges in a n-node undirected graph without self loop is
A	n2
B	
C	n – 1
D	
Answer	B
Marks	1
Unit	1

Id	
Question	What is the number of edges in a graph with 6 nodes, 2 of degree 4 and 4 of degree 2.
A	6
B	8
C	7
D	5
Answer	B
Marks	1
Unit	1

Id	
Question	What is the number of vertices in an undirected graph with 27 edges, 6 vertices of degree 2, 3 vertices of degree 4 and remaining of degrees 3 ?
A	10
B	11
C	18
D	19
Answer	D
Marks	1
Unit	2

Id	
Question	Maximum degree of a vertex in a simple graph is
A	n
B	n/2
C	n-1
D	n(n-1)/2
Answer	B
Marks	1
Unit	2

Id	
Question	The maximum degree of any vertex in a simple graph with n vertices is
A	n-1
B	n+1
C	n
D	2n-1
Answer	A
Marks	1
Unit	1

Id	
Question	How many nodes are necessary to construct a graph with exactly 6 edges in which each node is of degree 2 _____ ?
A	6
B	8
C	4
D	10
Answer	A
Marks	1
Unit	1

Id	
Question	What would be the minimum number of edges in a connected graph having 11 vertices.
A	5
B	10
C	15
D	20
Answer	B
Marks	1
Unit	1

1) A graph is a collection of.... ?

a. Row and columns
b. Vertices and edges
c. Equations
d. None of these

Answer = B

2) The degree of any vertex of graph is .... ?

a. The number of edges incident with vertex
b. Number of vertex in a graph
c. Number of vertices adjacent to that vertex
d. Number of edges in a graph

Answer = A

Explanation: The number of edges connected on a vertex v with the self loop counted twice is called the degree of vertex.

3) If for some positive integer k, degree of vertex d(v)=k for every vertex v of the graph G, then G is called... ?

a. K graph
b. K-regular graph
c. Empty graph
d. All of above

Answer = B

Explanation: A graph in which all vertices are of equal degree is called regular graph.

4) A graph with no edges is known as empty graph. Empty graph is also known as... ?

a. Trivial graph
b. Regular graph
c. Bipartite graph
d. None of these

Answer = A

Explanation: Trivial graph is the second name for empty graph.

5) Length of the walk of a graph is .... ?

a. The number of vertices in walk W
b. The number of edges in walk W
c. Total number of edges in a graph

d. Total number of vertices in a graph

Answer = B
Explanation: A walk is defined as finite altering sequence of vertices and edges. No Edges appear more than once but vertex may appear more than once.

6) If the origin and terminus of a walk are same, the walk is known as... ?
a. Open
b. Closed
c. Path
d. None of these

Answer = B
Explanation: A walk which begins and ends with same vertex is called closed walk otherwise it is open.

7) A graph G is called a ..... if it is a connected acyclic graph ?
a. Cyclic graph
b. Regular graph
c. Tree
d. Not a graph

Answer = C
Explanation: No explanation for this question.

8) Eccentricity of a vertex denoted by e(v) is defined by.... ?
a. max { d(u,v): u belongs to v, u does not equal to v : where d(u,v) is the distance between u&v}
b. min { d(u,v): u belongs to v, u does not equal to v }
c. Both A and B
d. None of these

Answer = A
Explanation: The eccentricity E(v) of a vertex V in the graph is the distance from v to the vertex farthest from v in G.

9) Radius of a graph, denoted by rad(G) is defined by.... ?
a. max {e(v): v belongs to V }
b. min { e(v): v belongs to V}
c. max { d(u,v): u belongs to v, u does not equal to v }
d. min { d(u,v): u belongs to v, u does not equal to v }

Answer = A
Explanation: The diameter or radius of a graph G is largest distance between two vertices in the graph G.

10) The complete graph K, has... different spanning trees?
a. n^n-2
b. n*n
c. n^n
d. n^2
^ = *raised to for exponent*
Answer = A

11) A tour of G is a closed walk of graph G which includes every edge G at least once. A ..... tour of G is a tour which includes every edge of G exactly once ?
a. Hamiltonian
b. Planar
c. Isomorphic
d. Euler

Answer = D
Explanation: If some closed walk in a graph contains all the edges then the walk is called Euler.

12) Which of the following is not a type of graph ?
a. Euler
b. Hamiltonian
c. Tree
d. Path

Answer = D
Explanation:Path is a way from one node no another but not a graph.

13) Choose the most appropriate definition of plane graph ?
a. A graph drawn in a plane in such a way that any pair of edges meet only at their end vertices
b. A graph drawn in a plane in such a way that if the vertex set of graph can be partitioned into two non - empty disjoint subset X and Y in such a way that each edge of G has one end in X and one end in Y.
c. A simple graph which is Isomorphic to Hamiltonian graph

d. None of these

Answer = A
Explanation: No explanation for this question.

14) A continuous non - intersecting curve in the plane whose origin and terminus coincide ?
a. Planer
b. Jordan
c. Hamiltonian
d. All of these

Answer = B
Explanation: The jordan graph is the set of all vertices of minimum eccentricity that is the set of all vertices A where the greatest distance to other vertex B is minimal.

15) Polyhedral is.... ?
a. A simple connected graph
b. A plane graph
c. A graph in which the degree of every vertex and every face is atleast 3
d. All of above

Answer = D
Explanation: A polyhedral graph is the undirected graph formed from the vertices and edges of a convex polyhedron

16) A path in graph G, which contains every vertex of G once and only once ?
a. Eulartour
b. Hamiltonian Path
c. Eular trail
d. Hamiltonian tour

Answer = B
Explanation:A Hamiltonian circuit in a connected graph is defined as a closed walk that traverse every vertex of G exactly once except the starting vertex.

17) A minimal spanning tree of a graph G is.... ?
a. A spanning sub graph
b. A tree

c. Minimum weights
d. All of above

Answer = D
Explanation: A tree is said to be spanning tree of connected graph G if it is subgraph of G and contains all the vertices of G.

18) A tree having a main node, which has no predecessor is.... ?
a. Spanning tree
b. Rooted tree
c. Weighted tree
d. None of these

Answer = B
Explanation:A tree in which one vertex distinguish from all other is called rooted tree.

19) Diameter of a graph is denoted by diam(G) is defined by.... ?
a. max (e(v) : v belongs to V)
b. max(d(u,v))
c. Both A and B
d. None of these

Answer = C
Explanation: The diameter of a graph G is largest distance between two vertices in a graph G.

20) A vertex of a graph is called even or odd depending upon ?
a. Total number of edges in a graph is even or odd
b. Total number of vertices in a graph is even or odd
c. Its degree is even or odd
d. None of these

Answer = C
Explanation: The vertex of a graph is called even or odd based on its degree.

21) Let A and B be any two arbitrary events then which one of the following is true ?
a. P(A intersection B) = P(A). P(B)
b. P(A union B) = P(A) + P(B)

c. P(AB) = P(A intersection B). P(B)
d. P(A union B) >= P(A) + P(B)

Answer = D

22) If X and Y be the sets. Then the set (X - Y) union (Y- X) union (X intersection Y) is equal to?
a. X union Y
b. Xc union Yc
c. X intersection Y
d. Xc intersection Yc

Answer = A

23) If G is an undirected planer graph on n vertices with e edges then ?
a. e<=n
b. e<=2n
c. e<=3n
d. None of these

Answer = B

24) Which of the following statement is false ?
a. G is connected and is circuitless
b. G is connected and has n edges
c. G is minimally connected graph
d. G is circuitless and has n-1 edges

Answer = B

25) Probability that two randomly selected cards from a set of two red and two black cards are of same color is ?
a. 1 / 2
b. 1 / 3
c. 2 / 3
d. None of these

Answer = B

26) The number of circuits that can be created by adding an edge between any two vertices in a tree is ?

a. Two
b. Exactly one
c. At least two
d. None

Answer = B

27) In a tree between every pair of vertices there is ?

a. Exactly one path
b. A self loop
c. Two circuits
d. n number of paths

Answer = A