
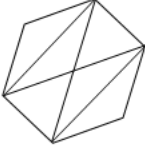
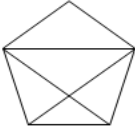

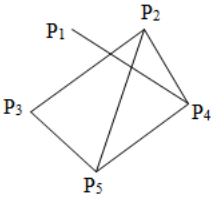


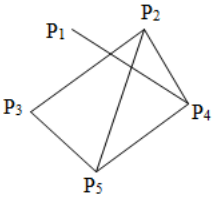
Id	
Question	Which of the following graphs is not planar?
A	
B	
C	
D	
Marks	1.5
Unit	4

Id	
Question	Let G be a simple connected planar graph with 13 vertices and 19 edges. Then, the number of faces in the planar embedding of the graph is ____
A	0
B	8
C	9
D	13
Marks	1.5
Unit	4

Id	
Question	Degree of each vertex in K_n is
A	n
B	$n - 1$
C	$n - 2$
D	$2n - 1$
Marks	1.5
Unit	4

Id	
Question	If G and G^* are isomorphic graphs, then number of connected components of G^* if G has 8 connected components, are
A	4
B	6
C	8
D	10
Marks	1.5
Unit	4

Id	
Question	 <p data-bbox="313 464 618 499">The degree of vertex P3</p>
A	1
B	2
C	3
D	None of these
Marks	1.5
Unit	4

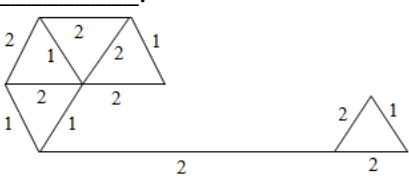
Id	
Question	 <p data-bbox="313 464 570 499">Degree of vertex P5</p>
A	1
B	2
C	3
D	4
Marks	1.5
Unit	4

Id	
Question	If v is an isolated vertex in a graph (multigraph) G then what is its degree?
A	0
B	1
C	2
D	3
Marks	1.5
Unit	4

Id	
Question	Let G be an arbitrary graph with n nodes and k components. If a vertex is removed from G , the number of components in the resultant graph must lie between
A	k and n
B	$k - 1$ and $k + 1$
C	$k - 1$ and $n - 1$
D	$k + 1$ and $n - k$
Marks	1.5
Unit	4

Id	
Question	A cycle of n vertices is isomorphic to its complement. The value of n is _____.
A	4
B	5
C	6
D	7
Marks	1.5
Unit	4

Id	
Question	The maximum number of edges in a bipartite graph on 12 vertices is _____.
A	30
B	32
C	34
D	36
Marks	1.5
Unit	4

Id	
Question	<p>The number of distinct minimum spanning tree for the weighted graph below is</p> 
A	4
B	5
C	6
D	7
Marks	1.5
Unit	4

Id	
Question	Which of the following statements is/are TRUE for undirected graphs? P: Number of odd degree vertices is even Q: Sum of degree of all vertices is even
A	P only
B	Q only
C	Both P and Q
D	Neither P and Q
Marks	1.5
Unit	4

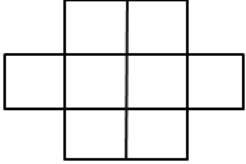
Id	
Question	Let G be a complete undirected graph on 6 vertices. If vertices of G are labeled, then number of distinct cycles of length 4 in G is equal to
A	15
B	30
C	90
D	360
Marks	1.5
Unit	4

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
A	3
B	4
C	5
D	6
Marks	1.5
Unit	4

Id	
Question	Define $\Sigma(G) = \sum id \times dd$, where id is the number of vertices of degree d in G . If S and T are two different trees with $\Sigma(S) = \Sigma(T)$, then
A	$ S = 2 T $
B	$ S = T - 1$
C	$ S = T $
D	$ S = T + 1$
Marks	1.5
Unit	4

Id	
Question	Ten different letters are given. Five letter words are formed from these given letters. The number of words having at least one letter repeated is
A	99748
B	87882
C	92182
D	67960
Marks	1.5
Unit	3

Id	
Question	At any time, the total number of persons on earth who have shaken hands an odd number of times has to be
A	an even number
B	an odd number
C	a prime number
D	a perfect square
Marks	1.5
Unit	3

Id	
Question	<p>Six x's has to be placed in the squares in the adjacent figure, such that each row contains at least one x. This can be done in</p> 
A	160 ways
B	180 ways
C	170 ways
D	26 ways
Marks	1.5
Unit	3

Id	
Question	A class is composed of 2 brothers and 6 other boys. In how many ways can all the boys be seated at a round table so that the two brothers are not seated together?
A	3000
B	3600
C	2050
D	2600
Marks	1.5
Unit	3

Id	
Question	For a game in which 2 partners oppose 2 other partners, six men are available. If every possible pair must play against every other pair, the number of games to be played is
A	36
B	45
C	42
D	90
Marks	1.5
Unit	3

Id	
Question	Out of 100 students, 10 students used to drink milk(M), coffee(C) and Tea(T); 20M and C; 30C and T; 25M and T; 12M only; 5C only and 8T only. The number of students who did not drink any of this is
A	18
B	24
C	20
D	16
Marks	1.5
Unit	3

Id	
Question	Let A be a finite set of size 'n'. The number of the elements in the power set of $A \times A$ is
A	2^{2^n}
B	2^{n^2}
C	$(2^n)^2$
D	$(2^2)^n$
Marks	1.5
Unit	3

Id	
Question	The number of permutations of 'n' different things taken not more than 'r' at a time, with repetitions being allowed, is
A	$(n^r - 1) / (n - 1)$
B	$(n^r - 1) / (n - 1)!$
C	$n(n^r - 1) / (n - 1)$
D	$(n^r - 1) / n!$
Marks	1.5
Unit	3

Id	
Question	The number of trailing zeroes in 200! (i.e. factorial of 200) is
A	49
B	40
C	48
D	52
Marks	1.5
Unit	3

Id	
Question	The number of substrings (of all lengths) that can be formed from a character string of length n is
A	n
B	n^2
C	$n(n-1)/2$
D	$n(n+1)/2$
Marks	1.5
Unit	3

Id	
Question	The number of divisors of 600 (including 1 and 600) is
A	24
B	22
C	23
D	25
Marks	1.5
Unit	3

Id	
Question	A, B are two 8-bit numbers such that $A+B < 2^8$. The number of possible combinations of A and B is
A	2^9
B	2^8
C	2^{16}
D	2^4-1
Marks	1.5
Unit	3

Id	
Question	Consider a company that assembles computers. The probability of a faulty assembly of any computer is p . The company therefore subjects each computer to a testing process. This testing process gives the correct result for any computer with a probability of q . What is the probability of a computer being declared faulty?
A	$pq + (1 - p)(1 - q)$
B	$(1 - q)p$
C	$(1 - p)q$
D	Pq
Marks	1.5
Unit	3

Id	
Question	25 persons are in a room. 15 of them play hockey, 17 play football and 10 of them play both hockey and football. Then the number of persons playing neither hockey nor football is
A	2
B	17
C	13
D	3
Marks	1.5
Unit	3

Id	
Question	Suppose we uniformly and randomly select a permutation from the $20!$ permutation of $1, 2, 3, \dots, 20$. What is the probability that 2 appears at an earlier position than any other even number in the selected permutation?
A	$\frac{1}{2}$
B	$\frac{1}{10}$
C	$\frac{9!}{20!}$
D	None of the above
Marks	1.5
Unit	3

Id	
Question	How many numbers of five digits can be formed from the numbers 2, 0, 4, 3, 8 when repetition of digits is not allowed?
A	96
B	144
C	120
D	14
Marks	1.5
Unit	3

Id	
Question	4 buses runs between Bhopal and Gwalior. If a man goes from Gwalior to Bhopal by a bus and comes back to Gwalior by another bus, then the total possible ways are
A	12
B	4
C	16
D	8
Marks	1.5
Unit	3

Id	
Question	If ${}^{12}P_r$, then r is equal to
A	5
B	3
C	4
D	2
Marks	1.5
Unit	3

Id	
Question	In how many ways can 5 prizes be distributed among four students when every student can take one or more prizes?
A	1024
B	120
C	625
D	600
Marks	1.5
Unit	3

Id	
Question	How many words comprising of any three letters of the word UNIVERSAL can be formed?
A	504
B	540
C	405
D	450
Marks	1.5
Unit	3

Id	
Question	Find the total number of 9 digit numbers which have all the digits different.
A	$9 * 9!$
B	$10!$
C	$9!$
D	None of these
Marks	1.5
Unit	3

Id	
Question	If ${}^n P_4 : {}^n P_5$ then $n =$
A	4
B	6
C	5
D	7
Marks	1.5
Unit	3

Id	
Question	In how many ways can 10 true-false questions are replied?
A	20
B	512
C	100
D	1024
Marks	1.5
Unit	3

Id	
Question	The number of 5 digit telephone numbers having at least one of their digits repeated is
A	90,000
B	30,240
C	100,000
D	69,760
Marks	1.5
Unit	3

Id	
Question	Numbers greater than 1000 but not greater than 4000 which can be formed with the digits 0, 1, 2, 3, 4 (repetition of digits is allowed), are
A	350
B	450
C	375
D	576
Marks	1.5
Unit	3

Id	
Question	If the best and the worst paper never appear together, then six examination papers can be arranged in how many ways?
A	120
B	240
C	480
D	None of these
Marks	1.5
Unit	3

Id	
Question	The sum of the digits in the unit place of all numbers formed with the help of 3, 4, 5, 6 taken all at a time is
A	18
B	108
C	432
D	144
Marks	1.5
Unit	3

Id	
Question	The number of ways in which 6 rings can be worn on the four fingers of one hand is (a) 46 (b) 64
A	4^6
B	6^4
C	6C_4
D	None of these
Marks	1.5
Unit	3

Id	
Question	There are 3 candidates for a post and one is to be selected by the votes of 7 men. The number of ways in which votes can be given is
A	7^5
B	7C_3
C	3^7
D	None of these
Marks	1.5
Unit	3

Id	
Question	In how many ways can mn letters in n letter-boxes?
A	$(mn)^n$
B	$(n)^{mn}$
C	$(m)^{mn}$
D	None of these
Marks	1.5
Unit	3

Id	
Question	What subset the power set of empty set has exactly?
A	one subset
B	two subset
C	three subset
D	None
Marks	1.5
Unit	1

Id	
Question	If set A has 4 elements and B has 3 elements then set $n(A \cup B)$ is
A	12
B	14
C	24
D	None
Marks	1.5
Unit	1

Id	
Question	If set A and B have 3 and 4 elements respectively then the number of subsets of set $A \cup B$ is
A	1024
B	2048
C	4096
D	None
Marks	1.5
Unit	1

Id	
Question	What is the cartesian product of $A = \{1, 2\}$ and $B = \{a, b\}$?
A	$\{(1, a), (1, b), (2, a), (b, b)\}$
B	$\{(1, 1), (2, 2), (a, a), (b, b)\}$
C	$\{(1, a), (2, a), (1, b), (2, b)\}$
D	None
Marks	1.5
Unit	1

Id	
Question	Which of the following is subset of set $A = \{1, 2, 3, 4\}$
A	$\{1, 2\}$
B	$\{1, 2, 3\}$
C	$\{1\}$
D	All of these
Marks	1.5
Unit	1

Id	
Question	Which of the following two sets are disjoint?
A	{1, 3, 5} and {1, 3, 6}
B	{1, 2, 3} and {1, 2, 3}
C	{1, 3, 5} and {2, 3, 4}
D	{1, 3, 5} and {2, 4, 6}
Marks	1.5
Unit	1

Id	
Question	Let the set $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$. Then the number of elements in $A \cap B$ is
A	4
B	5
C	4
D	None
Marks	1.5
Unit	1

Id	
Question	Let the set $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$. Then the number of elements in $A \cap B$ is
A	1
B	2
C	3
D	None
Marks	1.5
Unit	1

Id	
Question	Which of the following propositions is tautology?
A	$(p \cup q) \cap q$
B	$p \cup (q \cap p)$
C	$p \cup (p \cap q)$
D	None
Marks	1.5
Unit	1

Id	
Question	If $S = \{1, 2, 3, 4\}$ then the number of elements in $p(S)$ is equal to
A	4
B	8
C	16
D	None
Marks	1.5
Unit	1

Id	
Question	Which of the following two sets are equal?
A	$A = \{1, 2\}$ and $B = \{1\}$
B	$A = \{1, 2\}$ and $B = \{1, 2, 3\}$
C	$A = \{1, 2, 3\}$ and $B = \{2, 1, 3\}$
D	None
Marks	1.5
Unit	1

Id	
Question	The greatest common divisor of 7 and 5 is
A	1
B	2
C	3
D	None
Marks	1.5
Unit	1

Id	
Question	By Euclid's Algorithm the gcd (664, 414) is
A	4
B	5
C	2
D	None
Marks	1.5
Unit	1

Id	
Question	The number '1' is
A	Prime number
B	Composite number
C	Neither prime nor composite number
D	None
Marks	1.5
Unit	1

Id	
Question	All prime numbers are odd
A	True
B	False
C	Both (a) and (b)
D	None
Marks	1.5
Unit	1

Id	
Question	The remainder when 111 is divided by 12 is
A	0
B	1
C	2
D	3
Marks	1.5
Unit	1

Id	
Question	Let the set $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$. Then the set $A - B$ is
A	$\{1, -4\}$
B	$\{1, 2, 3\}$
C	$\{1\}$
D	$\{2, 3\}$
Marks	1.5
Unit	1

Id	
Question	The quotient when 19 is divided by 6 is
A	1
B	2
C	3
D	None
Marks	1.5
Unit	1

Id	
Question	Power set of empty set has exactly _____ subset.
A	One
B	Two
C	Zero
D	Three
Marks	1.5
Unit	1

Id	
Question	Which of the following statement is false?
A	$A \cap A = A$
B	$(A \cup B)' = A' \cup B'$
C	$A \cup A = A$
D	$A - (B \cap C) = (A - B) \cup (A - C)$
Marks	1.5
Unit	1

Id	
Question	The quotient and remainder when 18 is divided by 5 is
A	2 and 3
B	1 and 2
C	3 and 2
D	3 and 3
Marks	1.5
Unit	1

Id	
Question	The complement of the set A is
A	$A - B$
B	$U - A$
C	$A - U$
D	$B - A$
Marks	1.5
Unit	1

Id	
Question	The union of the sets $A = \{1, 2, 5\}$ and $B = \{1, 2, 6\}$ is
A	$\{1, 2, 6, 1\}$
B	$\{1, 2, 5, 6\}$
C	$\{1, 2, 1, 2\}$
D	None
Marks	1.5
Unit	1

Id	
Question	Which of the following two sets are disjoint?
A	{1, 3, 5} & {1, 3, 6}
B	{1, 2, 3} & {1, 2, 3}
C	{1, 3, 5} & {2, 4, 6}
D	None
Marks	1.5
Unit	1

Id	
Question	Two sets are called disjoint if there intersection is
A	Empty set
B	Null set
C	Finite set
D	None
Marks	1.5
Unit	1

Id	
Question	If A and B are any two sets, then $A \cup (A \cap B)$ is equal to
A	A
B	A^c
C	B
D	B^c
Marks	1.5
Unit	1

Id	
Question	What is the Cartesian product of $A = \{ 1, 2 \}$ and $B = \{ a, b \}$?
A	$\{ (1,a) (1,b) (2,a) (b,b) \}$
B	$\{ (1,1) (2,2) (a,a) (b,b) \}$
C	$\{ (1,a) (2,a) (1,b) (2,b) \}$
D	$\{ (1,1) (a,a) (2,a) (1,b) \}$
Marks	1.5
Unit	1

Id	
Question	The number of elements in power set P (S) of the set S = { $[\Phi],1,[2,3]$ }
A	2
B	4
C	8
D	None of these
Marks	1.5
Unit	1

Id	
Question	Which of the following is true ?
A	$(A - B) \cap (A \cap B) = A$
B	$(A - B) \cap (A \cap B) = \Phi$
C	$(A - B) \cap (A \cap B) = B$
D	$(A - B) \cap (A \cap B) = A - B$
Marks	1.5
Unit	1

Id	
Question	Let $P(S)$ denotes the power set of the set S , the dual of the lattice $(P(S), \subseteq)$ is
A	Doesn't exist
B	$(P(S), \subseteq)$
C	$(P(S), \supseteq)$
D	(S, \supseteq)
Marks	1.5
Unit	1

Id	
Question	In a room containing 35 people, there are 15 people who speak Hindi, 19 people who speak Telugu and 22 people who speak Kannada , 10 persons who speak Hindi & Telugu, 11 persons speak both Telugu and Kannada whereas 15 persons speak both Kannada and English. How many people speak all the three languages ?
A	6
B	9
C	12
D	15
Marks	1.5
Unit	1

Id	
Question	If A,B,C are subsets of universal set U then $(A \cap B \cap C) \cup (A' \cap B \cap C) \cup B' \cup C'$ is?
A	$B' \cup C'$
B	$A \cup B' \cup C'$
C	$A' \cup B' \cup C'$
D	U
Marks	1.5
Unit	1

Id	
Question	Let $A = \{ a,b,c,d \}$ which of the following is not true ?
A	$R_1 = \{ (a,a) (c,c) \}$ is Symmetric, Anti-Symmetric and Transitive on A
B	$R_2 = \{ (a,b) (b,a) (a,c) (c,a) (c,d) \}$ is Symmetric and Anti-Symmetric
C	$R_3 = \{ (b,c) (c,b) (d,d) \}$ is Symmetric but not Anti-Symmetric
D	$R_4 = \{ (a,b) (b,c) (c,c) \}$ is Anti-Symmetric but not Symmetric
Marks	1.5
Unit	2

Id	
Question	Let $A = \{ a,b,c \}$ and a relation on set A is defined as $S = \{ (a,b) (b,c) (a,c) (c,c) (a,a) (b,a) \}$ which of the following is true ?
A	R Is equivalence relation
B	R is Irreflexive relation (or) Anti-symmetric
C	R is Symmetric (or) Asymmetric relation
D	R is Transitive
Marks	1.5
Unit	2

Id	
Question	Let $A = \{7,11,2\}$, $R = \{ (7,7) (7,11) (11,11) (2,2) (11,2) (11,7) \}$ the relation R is ?
A	Equivalence
B	Reflexive, not symmetric and not transitive
C	Reflexive, not symmetric and transitive
D	None of these
Marks	1.5
Unit	2

Id	
Question	If a binary relation R on set S is reflexive, Anti-symmetric and transitive then R is,
A	Equivalence relation
B	Partially ordered
C	Totally ordered
D	None of these
Marks	1.5
Unit	2

Id	
Question	A Boolean algebra is only a
A	Complemented group
B	Complemented & distributive set
C	Distributive poset
D	Complemented & distributive lattice
Marks	1.5
Unit	2

Id	
Question	Let a relation R be defined on the set of all real numbers by $a R b \Leftrightarrow 1 + ab > 0$ thus R is ?
A	Reflexive. Transitive but not Symmetric
B	Reflexive. Symmetric but not Transitive
C	Symmetric, Transitive but not Reflexive
D	An equivalence relation
Marks	1.5
Unit	2

Id	
Question	Which of the following relations on set “A” is a function $A = \{ a,b,c,d \}$?
A	$R1 = \{ (a,b) (b,c) (a,c) (c,d) \}$
B	$R2 = \{ (a,a) (b,b) (c,c) \}$
C	$R3 = \{ (a,c) (b,c) (c,c) (d,c) \}$
D	None of the above
Marks	1.5
Unit	2

Id	
Question	If $ A = 5$, $ B = 3$, then number of onto functions from A to B ?
A	35
B	150
C	29
D	27
Marks	1.5
Unit	2

Id	
Question	Find the inverse of function $f(x)=x^3+ 3$?
A	$X^{1/3}$
B	$(X + 3)^{1/3}$
C	$(X - 3)^{1/3}$
D	X^3
Marks	1.5
Unit	2

Id	
Question	If $f : A \rightarrow B$ is a Surjective then
A	No two elements of A have the same image in B
B	Every element of A has an image in B
C	Every element of B has atleast one pre- image in A
D	A and B are finite non empty sets
Marks	1.5
Unit	

Id	
Question	$f : \mathbb{N} \rightarrow \mathbb{N}$ defined by $f(x)=4x+ 3$ then f is ?
A	One – one only
B	Onto only
C	Bijection
D	Neither one – one (nor) onto
Marks	1.5
Unit	2

Id	
Question	Let $f : \mathbb{R} \rightarrow \mathbb{R}$ is a function defined as, $f(x)=bx^2$, $x \in \mathbb{R}$, $b \neq 0$, then which of the following is true ?
A	F is invertible
B	F is one – one but not onto
C	F is onto but not one – one
D	Data insufficient
Marks	1.5
Unit	2

Id	
Question	Let $f : \mathbb{R} \rightarrow \mathbb{R}$ is a function defined as, $f(x)=2x+7$, which of the following defines inverse of f ?
A	$X + 7/2$
B	$X - 7/2$
C	$\frac{1}{2}(x - 7)$
D	f^{-1} doesn't exist
Marks	1.5
Unit	

Id	
Question	Let $f: \mathbb{Z}^+ \rightarrow \mathbb{Q}$ is a mapping from set of positive integers to the set of complex numbers, defined as $f(x) = \frac{x}{2x+1}$, $x \in \mathbb{Z}^+$ then which of the following is true ?
A	f is a bijective mapping
B	f is a injective but not surjective mapping
C	f is a not injective but surjective mapping
D	f is neither injective nor surjective
Marks	1.5
Unit	2

Id	
Question	Suppose X and Y are sets and $ X $ and $ Y $ are their respective cardinalities. It is given that there are exactly 92 functions from X to Y. From this we conclude that
A	$ X = 1, Y = 92$
B	$ X = 92, Y = 1$
C	$ X = 92, Y = 92$
D	None of the above
Marks	1.5
Unit	2

Id	
Question	<p>Let $A = \{ a,b,c,d \}$, $B = \{ p,q,r,s \}$ denote sets $R : A \rightarrow B$, R is a function from A to B. Then which of the following relations are not functions ?</p> <p>(i) $\{ (a,p) (b,q) (c,r) \}$</p> <p>(ii) $\{ (a,p) (b,q) (c,s) (d,r) \}$</p> <p>(iii) $\{ (a,p) (b,s) (b,r) (c,q) \}$</p>
A	(i) and (ii) only
B	(ii) and (iii) only
C	(i) and (iii) only
D	None of these
Marks	1.5
Unit	2

Id	
Question	The power set of $A = \{ \Phi, \{ \Phi \}, \{ \{ \Phi \} \}, \{ \{ \{ \Phi \} \} \}, 5 \}$ consists of no. of elements
A	16
B	15
C	32
D	31
Marks	1.5
Unit	2

Id	
Question	Let $A = \{ 1,2,3,4,\dots,\infty \}$ and a binary operation '+' is defined by $a + b = ab \forall a,b \in A$. Which of the following true ?
A	$(A,+)$ is a semi group but not monoid
B	$(A,+)$ is a monoid but not group
C	$(A,+)$ is a group
D	$(A,+)$ is not a semi group
Marks	1.5
Unit	6

Id	
Question	Let A is set of all integers and a binary operation ‘*’ is defined by $a * b = \max(a,b)$ then $(A, *)$ is ?
A	Abelian group
B	Group
C	Semi group
D	Monoid
Marks	1.5
Unit	2

Id	
Question	Which of the following is a group ?
A	{ 1,2,3,4,5 } w.r.t (*)6
B	{ 0,1,2,3,4,5 } w.r.t (+)6
C	{ 1,2,3,4,5,6,7,8,9,10 } w.r.t (*)11
D	{ 1,2,3,4,5,6 } w.r.t (+)7
Marks	1.5
Unit	6

Id	
Question	If $G = \{ 1,2,3,4,5,6 \}$ is a group with respect to $(*)_7$ which of the following is not true ?
A	Inverse of 3 is 2
B	Inverse of 2 is 3
C	Inverse of 5 is 4
D	Inverse of 4 is 2
Marks	1.5
Unit	6

Id	
Question	$G = (\{ 1,2,3,4,5,6,7,8,9,10 \}, (*)_{11})$ which of the following are not subgroup of G . a) b) c) d)
A	$H_1 = \{ 1,2,7 \}$
B	$H_2 = \{ 2,4 \}$
C	$H_3 = \{ 1,2,3,4,5 \}$
D	All of the above
Marks	1.5
Unit	2

Id	
Question	Let $(G,*)$ be cyclic group of order 36 with generator a. then find number of generator a. then find the number of generators in G?
A	9
B	6
C	12
D	15
Marks	1.5
Unit	6

Id	
Question	If * is a binary operation \mathbb{Z} defined by $a*b = a+b+2 \forall a,b \in \mathbb{Z}$ their identity element in the group $(\mathbb{Z}, *)$ is
A	0
B	1
C	-2
D	2
Marks	1.5
Unit	6

Id	
Question	If $G = \{ -1,0,1 \}$ then $(G,*)$ is (where $*$ is usual multiplication)
A	Semi group
B	Monoid
C	Group
D	Commutative group
Marks	1.5
Unit	6

Id																															
Question	<p data-bbox="310 285 938 321">For the composition table of a cyclic group show</p> <table data-bbox="337 327 740 852" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">*</td> <td style="padding: 5px;">a</td> <td style="padding: 5px;">b</td> <td style="padding: 5px;">c</td> <td style="padding: 5px;">d</td> </tr> <tr> <td colspan="5" style="border-top: 1px solid black; border-left: 1px solid black; border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 5px;">a</td> <td style="padding: 5px;">a</td> <td style="padding: 5px;">b</td> <td style="padding: 5px;">c</td> <td style="padding: 5px;">d</td> </tr> <tr> <td style="padding: 5px;">b</td> <td style="padding: 5px;">b</td> <td style="padding: 5px;">a</td> <td style="padding: 5px;">d</td> <td style="padding: 5px;">c</td> </tr> <tr> <td style="padding: 5px;">c</td> <td style="padding: 5px;">c</td> <td style="padding: 5px;">d</td> <td style="padding: 5px;">b</td> <td style="padding: 5px;">a</td> </tr> <tr> <td style="padding: 5px;">d</td> <td style="padding: 5px;">d</td> <td style="padding: 5px;">c</td> <td style="padding: 5px;">a</td> <td style="padding: 5px;">b</td> </tr> </table> <p data-bbox="310 877 808 913">which one of the following is correct ?</p>	*	a	b	c	d						a	a	b	c	d	b	b	a	d	c	c	c	d	b	a	d	d	c	a	b
*	a	b	c	d																											
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c	c	d	b	a																											
d	d	c	a	b																											
A	a,b are generators																														
B	b,c are generators																														
C	c,d are generators																														
D	d,a are generators																														
Marks	1.5																														
Unit	6																														

Id	
Question	$G = \{ 1,2,4,7,8,11,13,14 \}$ is a group under multiplication modulo 15. The inverse of 13 and 8 are respectively.
A	7 and 2
B	4 and 8
C	11 and 4
D	2 and 7
Marks	1.5
Unit	6

Id	
Question	Let $S = \{ 0,3,6,9 \}$ and $(S, (+)_{12})$ forms a group where $(+)_{12}$; find value of $(0+3+6+9)^{-1}$
A	3
B	6
C	9
D	0
Marks	1.5
Unit	6

Id	
Question	What is the domain of a function?
A	the maximal set of numbers for which a function is defined
B	the maximal set of numbers which a function can take values
C	it is a set of natural numbers for which a function is defined
D	none of the mentioned
Marks	1.5
Unit	2

Id	
Question	What is domain of function $f(x) = x^{1/2}$?
A	$(2, \infty)$
B	$(-\infty, 1)$
C	$(0, \infty)$
D	None of the mentioned
Marks	1.5
Unit	2

Id	
Question	What is the range of a function?
A	the maximal set of numbers for which a function is defined
B	the maximal set of numbers which a function can take values
C	it is set of natural numbers for which a function is defined
D	none of the mentioned
Marks	1.5
Unit	2

Id	
Question	What is domain of function $f(x) = x^{-1}$ for it to be defined everywhere on domain?
A	$(2, \infty)$
B	$(-\infty, \infty) - \{0\}$
C	$[0, \infty)$
D	None of the mentioned
Marks	1.5
Unit	2

Id	
Question	The range of function $f(x) = \sin(x)$ is $(-\infty, \infty)$.
A	True
B	false
Marks	1.5
Unit	2

Id	
Question	Codomain is the subset of range.
A	True
B	False
Marks	1.5
Unit	2

Id	
Question	What is range of function $f(x) = x^{-1}$ which is defined everywhere on its domain?
A	$(-\infty, \infty)$
B	$(-\infty, \infty) - \{0\}$
C	$[0, \infty)$
D	None of the mentioned
Marks	1.5
Unit	2

Id	
Question	If $f(x) = 2^x$ then range of the function is?
A	$(-\infty, \infty)$
B	$(-\infty, \infty) - \{0\}$
C	$(0, \infty)$
D	None of the mentioned
Marks	1.5
Unit	2

Id	
Question	If $f(x) = x^2 + 4$ then range of $f(x)$ is given by?
A	$[4, \infty)$
B	$(-\infty, \infty) - \{0\}$
C	$(0, \infty)$
D	None of the mentioned
Marks	1.5
Unit	2

Id	
Question	Let $f(x)=\sin^2(x) + \log(x)$ then domain of $f(x)$ is $(-\infty, \infty)$.
A	True
B	False
Marks	1.5
Unit	2

Id	
Question	An injection is a function which is?
A	many-one
B	one-one
C	Onto
D	none of the mentioned
Marks	1.5
Unit	2

Id	
Question	A mapping $f : X \rightarrow Y$ is one one if _____
A	$f(x_1) \neq f(x_2)$ for all x_1, x_2 in X
B	If $f(x_1) = f(x_2)$ then $x_1 = x_2$ for all x_1, x_2 in X
C	$f(x_1) = f(x_2)$ for all x_1, x_2 in X
D	None of the mentioned
Marks	1.5
Unit	2

Id	
Question	A function is defined by mapping $f : A \rightarrow B$ such that A contains m elements and B contains n elements and $m \leq n$ then number of one one functions are _____
A	${}^n C_m \times m!$
B	${}^n C_m \times n!$
C	0
D	none of the mentioned
Marks	1.5
Unit	2

Id	
Question	A function is defined by mapping $f : A \rightarrow B$ such that A contains m elements and B contains n elements and $m > n$ then number of one one functions are _____
A	${}^n C_m \times m!$
B	${}^n C_m \times n!$
C	0
D	none of the mentioned
Marks	1.5
Unit	2

Id	
Question	For an onto function range is equivalent to codomain.
A	True
B	False
Marks	1.5
Unit	2

Id	
Question	Onto function are known as injection.
A	True
B	False
Marks	1.5
Unit	2

Id	
Question	Set A has 3 elements and set B has 4 elements then number of injections defined from A to B are?
A	12
B	24
C	36
D	48
Marks	1.5
Unit	2

Id	
Question	A function is defined by mapping $f : A \rightarrow B$ such that A contains m elements and B contains n elements and $1 \leq n \leq m$ then number of onto functions are _____
A	$\sum_{r=1}^{r=n} {}^n C_r (-1)^{n-r} r^m$
B	$\sum_{r=1}^{r=n} {}^n C_r (-1)^{n-r} r^n$
C	$\sum_{r=1}^{r=n} {}^n C_r (-1)^{m-r} r^n$
D	None of the mentioned
Marks	1.5
Unit	2

Id	
Question	A function is defined by mapping $f:A \rightarrow B$ such that A contains m elements and B contains n elements and $m > n$ then number of bijections are _____
A	${}^n C_m \times m!$
B	${}^n C_m \times n!$
C	0
D	none of the mentioned
Marks	1.5
Unit	2

Id	
Question	A bijection is a function which is many-one and onto.
A	True
B	False
Marks	1.5
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
Marks	1.5
Unit	4

Id	
Question	In an undirected graph the number of nodes with odd degree must be
A	Zero
B	Odd
C	Prime
D	Even
Marks	1.5
Unit	4

Id	
Question	A graph is a collection of
A	Row and columns
B	Vertices and edges
C	Equations
D	None of these
Marks	1.5
Unit	4

Id	
Question	The relation $\{ (1,2), (1,3), (3,1), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4) \}$ is
A	Reflexive
B	Transitive
C	Symmetric
D	Asymmetric
Marks	1.5
Unit	2

Id	
Question	An undirected graph possesses an eulerian circuit if and only if it is connected and its vertices are
A	all of even degree
B	all of odd degree
C	of any degree
D	even in number
Marks	1.5
Unit	4

Id	
Question	The number of colours required to properly colour the vertices of every planer graph is
A	2
B	3
C	4
D	5
Marks	1.5
Unit	4

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
Marks	1.5
Unit	4

Id	
Question	The number of leaf nodes in a complete binary tree of depth d is
A	$2d$
B	$2d-2$
C	$2^{d+1}-1$
D	2^{d+1}
Marks	1.5
Unit	5

Id	
Question	A graph with n vertices will definitely have a parallel edge or self loop if the total number of edges are
A	greater than $n-1$
B	less than $n(n-1)$
C	greater than $n(n-1)/2$
D	less than $n^2/2$
Marks	1.5
Unit	4

Id	
Question	A graph with one vertex and no edges is
A	Multigraph
B	Digraph
C	isolated graph
D	trivial graph
Marks	1.5
Unit	4

Id	
Question	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
Marks	1.5
Unit	4

Id	
Question	The number of colours required to properly color vertices of every planar graph is
A	2
B	3
C	4
D	5
Marks	1.5
Unit	4

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
Marks	1.5
Unit	4

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
Marks	1.5
Unit	4

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
Marks	1.5
Unit	4

Id	
Question	A graph with n vertices will definitely have a parallel edge or self loop if the total number of edges are
A	more than n
B	more than $n+1$
C	more than $(n+1)/2$
D	more than $n(n-1)/2$
Marks	1.5
Unit	4

Id	
Question	The maximum degree of any vertex in a simple graph with n vertices is
A	$n-1$
B	$n+1$
C	$2n-1$
D	n
Marks	1.5
Unit	4

Id	
Question	The complete graph with four vertices has k edges where k is
A	3
B	4
C	5
D	6
Marks	1.5
Unit	4

Id	
Question	Consider a weighted undirected graph with positive edge weights and let (u, v) be an edge in the graph. It is known that the shortest path from source vertex s to u has weight 53 and shortest path from s to v has weight 65. Which statement is always true ?
A	Weight $(u, v) \leq 12$
B	Weight $(u, v) = 12$
C	Weight $(u, v) \geq 12$
D	Weight $(u, v) > 12$
Marks	1.5
Unit	4

Id	
Question	Suppose v is an isolated vertex in a graph, then the degree of v is
A	0
B	1
C	2
D	3
Marks	1.5
Unit	4

Id	
Question	A graph is tree if and only if
A	Is planar
B	Contains a circuit
C	Is minimally
D	Is completely connected
Marks	1.5
Unit	4

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
Marks	1.5
Unit	4

Id	
Question	For the sequence 1, 7, 25, 79, 241, 727 ... simple formula for $\{a_n\}$ is _____
A	$3^{n+1} - 2$
B	$3^n - 2$
C	$(-3)^n + 4$
D	$n^2 - 2$
Marks	1.5
Unit	1

Id	
Question	For the sequence 0, 1, 2, 3 an is _____
A	$\lfloor n/2 \rfloor + \lfloor n/2 \rfloor$
B	$\lfloor n/2 \rfloor + \lfloor n/2 \rfloor$
C	$\lfloor n/2 \rfloor + \lfloor n/2 \rfloor$
D	$\lfloor n/2 \rfloor$
Marks	1.5
Unit	1

Id	
Question	For the sequence $a_n = \lfloor \sqrt{2n+1/2} \rfloor$, a_7 is _____
A	1
B	7
C	5
D	4
Marks	1.5
Unit	1

Id	
Question	For the sequence $a_n = 6 \cdot (1/3)^n$, a_4 is _____
A	$2/25$
B	$2/27$
C	$2/19$
D	$2/13$
Marks	1.5
Unit	1

Id	
Question	The greatest common divisor of $3^{13}.5^{17}$ and $2^{12}.3^5$ is _____
A	3^0
B	3^1
C	3^3
D	3^5
Marks	1.5
Unit	1

Id	
Question	The greatest common divisor of 0 and 5 is _____
A	0
B	1
C	2
D	5
Marks	1.5
Unit	1

Id	
Question	The lcm of 3 and 21 is _____ if $\gcd(3,21)=3$.
A	3
B	12
C	21
D	42
Marks	1.5
Unit	1

Id	
Question	In the principle of mathematical induction, which of the following steps is mandatory?
A	induction hypothesis
B	inductive reference
C	induction set assumption
D	minimal set representation
Marks	1.5
Unit	3

Id	
Question	A drawer contains 12 red and 12 blue socks, all unmatched. A person takes socks out at random in the dark. How many socks must he take out to be sure that he has at least two blue socks?
A	18
B	35
C	28
D	14
Marks	1.5
Unit	3

Id	
Question	The least number of computers required to connect 10 computers to 5 routers to guarantee 5 computers can directly access 5 routers is _____
A	74
B	104
C	30
D	67
Marks	1.5
Unit	3

Id	
Question	In a group of 267 people how many friends are there who have an identical number of friends in that group?
A	266
B	2
C	138
D	202
Marks	1.5
Unit	3

Id	
Question	When four coins are tossed simultaneously, in _____ number of the outcomes at most two of the coins will turn up as heads.
A	17
B	28
C	11
D	43
Marks	1.5
Unit	3

Id	
Question	How many numbers must be selected from the set $\{1, 2, 3, 4\}$ to guarantee that at least one pair of these numbers add up to 7?
A	14
B	5
C	9
D	24
Marks	1.5
Unit	3

Id	
Question	During a month with 30 days, a cricket team plays at least one game a day, but no more than 45 games. There must be a period of some number of consecutive days during which the team must play exactly _____ number of games.
A	17
B	46
C	124
D	24
Marks	1.5
Unit	3

Id	
Question	In how many ways can 8 different dolls be packed in 5 identical gift boxes such that no box is empty if any of the boxes hold all of the toys?
A	2351
B	365
C	2740
D	1260
Marks	1.5
Unit	3

Id	
Question	A group of 20 girls plucked a total of 200 oranges. How many oranges can be plucked one of them?
A	24
B	10
C	32
D	7
Marks	1.5
Unit	3

Id	
Question	In a get-together party, every person present shakes the hand of every other person. If there were 90 handshakes in all, how many persons were present at the party?
A	15
B	14
C	16
D	17
Marks	1.5
Unit	3

Id	
Question	A bag contains 25 balls such as 10 balls are red, 7 are white and 8 are blue. What is the minimum number of balls that must be picked up from the bag blindfolded (without replacing any of it) to be assured of picking at least one ball of each colour?
A	10
B	18
C	63
D	35
Marks	1.5
Unit	3

Id	
Question	What is the sequence depicted by the generating series $4 + 15x^2 + 10x^3 + 25x^5 + 16x^6 + \dots$?
A	10, 4, 0, 16, 25, ...
B	0, 4, 15, 10, 16, 25,...
C	4, 0, 15, 10, 25, 16,...
D	4, 10, 15, 25,...
Marks	1.5
Unit	3

Id	
Question	What is multiplication of the sequence 1, 2, 3, 4,... by the sequence 1, 3, 5, 7, 11,.....?
A	1, 5, 14, 30,...
B	2, 8, 16, 35,...
C	1, 4, 7, 9, 13,...
D	4, 8, 9, 14, 28,...
Marks	1.5
Unit	3

Id	
Question	What will be the sequence generated by the generating function $4x/(1-x)^2$?
A	12, 16, 20, 24,...
B	1, 3, 5, 7, 9,...
C	0, 4, 8, 12, 16, 20,...
D	0, 1, 1, 3, 5, 8, 13,...
Marks	1.5
Unit	3

Id	
Question	What is the generating function for the sequence with closed formula $a_n=4(7^n)+6(-2)^n$?
A	$(4/1-7x)+6!$
B	$(3/1-8x)$
C	$(4/1-7x)+(6/1+2x)$
D	$(6/1-2x)+8$
Marks	1.5
Unit	3

Id	
Question	Suppose G is the generating function for the sequence 4, 7, 10, 13, 16, 19, ..., the find a generating function (in terms of G) for the sequence of differences between terms.
A	$(1-x)G-4/x$
B	$(1-x)G-4/x^3$
C	$(1-x)G+6/x$
D	$(1-x)G-x^2$
Marks	1.5
Unit	3

Id	
Question	Find the sequence generated by $1/1-x^2-x^4$., assume that 1, 1, 2, 3, 5, 8,... has generating function $1/1-x-x^2$.
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,...
Marks	1.5
Unit	3

Id	
Question	Every Isomorphic graph must have _____ representation
A	Cyclic
B	adjacency list
C	Tree
D	adjacency matrix
Marks	1.5
Unit	4

Id	
Question	A cycle on n vertices is isomorphic to its complement. What is the value of n ?
A	5
B	32
C	17
D	8
Marks	1.5
Unit	4

Id	
Question	How many perfect matchings are there in a complete graph of 10 vertices?
A	60
B	945
C	756
D	127
Marks	1.5
Unit	4

Id	
Question	A graph G has the degree of each vertex is ≥ 3 say, $\deg(V) \geq 3 \forall V \in G$ such that $3 V \leq 2 E $ and $3 R \leq 2 E $, then the graph is said to be _____ (R denotes region in the graph)
A	Planner graph
B	Polyhedral graph
C	Homomorphic graph
D	Isomorphic graph
Marks	1.5
Unit	4

Id	
Question	A graph is _____ if and only if it does not contain a subgraph homeomorphic to K_5 or $K_{3,3}$.
A	bipartite graph
B	planar graph
C	line graph
D	euler subgraph
Marks	1.5
Unit	4

Id	
Question	An isomorphism of graphs G and H is a bijection f the vertex sets of G and H. Such that any two vertices u and v of G are adjacent in G if and only if _____
A	f(u) and f(v) are contained in G but not contained in H
B	f(u) and f(v) are adjacent in H
C	$f(u * v) = f(u) + f(v)$
D	$f(u) = f(u)^2 + f(v)^2$
Marks	1.5
Unit	4

Id	
Question	What is the grade of a planar graph consisting of 8 vertices and 15 edges?
A	30
B	15
C	45
D	106
Marks	1.5
Unit	4

Id	
Question	A _____ is a graph with no homomorphism to any proper subgraph.
A	Poset
B	Core
C	Walk
D	Trail
Marks	1.5
Unit	4

Id	
Question	What is a star tree?
A	A tree having a single internal vertex and $n-1$ leaves
B	A tree having n vertices arranged in a line
C	A tree which has 0 or more connected subtrees
D	A tree which contains n vertices and $n-1$ cycles
Marks	1.5
Unit	5

Id	
Question	In preorder traversal of a binary tree the second step is _____
A	traverse the right subtree
B	traverse the left subtree
C	traverse right subtree and visit the root
D	visit the root
Marks	1.5
Unit	5

Id	
Question	An important application of binary tree is _____
A	Huffman coding
B	stack implementation
C	queue implementation
D	traverse a cyclic graph
Marks	1.5
Unit	5

Id	
Question	From the following code identify the which traversal of a binary tree is this _____ <pre>//if node has left child order(node.left) //if node has right child order(node.right) visit(node)</pre>
A	Inorder traversal
B	preorder traversal
C	postorder traversal
D	Euler tour traversal
Marks	1.5
Unit	5

Id	
Question	What is the minimum height for a binary search tree with 60 nodes?
A	1
B	3
C	4
D	2
Marks	1.5
Unit	5

Id	
Question	<p data-bbox="313 212 1442 247">From the following code identify the which traversal of a binary tree is this _____</p> <pre data-bbox="313 296 699 730">function traversal(node) { //Input:root node of the tree //Output:None visitLeft(node) //if node has left child traversal(node.left) visit_Below(node) //if node has right child traversal(node.right) visitRight(node) }</pre>
A	Inorder traversal
B	Euler Tour traversal
C	Post-order traversal
D	Pre-order Traversal
Marks	1.5
Unit	5

Id	
Question	For the expression $(7-(4*5))+(9/3)$ which of the following is the post order tree traversal?
A	*745-93/+
B	93/+745*-
C	745*-93/+
D	74*+593/-
Marks	1.5
Unit	5

Id	
Question	The time complexity of calculating the sum of all leaf nodes in an n-order binary tree is _____
A	$O(n^2)$
B	$O(n+1)$
C	$O(1)$
D	$O(n)$
Marks	1.5
Unit	5

Id	
Question	An immediate application of a Depth First Search traversal is _____
A	count the number of leaf nodes
B	perform Inorder traversal in easy way
C	count number of nodes
D	implement preorder traversal
Marks	1.5
Unit	5

Id	
Question	Breadth First Search traversal of a binary tree finds its application in _____
A	Cloud computing
B	Peer to peer networks
C	Weighted graph
D	Euler path
Marks	1.5
Unit	5

Id	
Question	Worst case complexity of Breadth First Search traversal _____
A	$O(n*n)$
B	$O(n\log n)$
C	$O(n^2 \log n)$
D	$O(n^3)$
Marks	1.5
Unit	5

Id	
Question	Evaluation of expression $a/b+c*d-e$ in postfix notation.
A	$ab+cd/*-e$
B	$ab/cd*+e-$
C	$abc/+d*-e$
D	$abcd/+*-e$
Marks	1.5
Unit	5

Id	
Question	Evaluation of $4*5+3/2-9$ in prefix notation.
A	$*45-/32+9$
B	$*+453/-29$
C	$-+*45/329$
D	$*+/45932$
Marks	1.5
Unit	5

Id	
Question	Infix to prefix conversion can be done using _____
A	two queues
B	two stacks
C	one stack and two queues
D	one stack
Marks	1.5
Unit	5

Id	
Question	Conversion from prefix to postfix expression can be done _____
A	using bubble sort
B	using radix sort
C	using two queues
D	in a direct manner
Marks	1.5
Unit	5

Id	
Question	What is the postfix expression of $9+3*5/(10-4)$?
A	$9\ 3\ +\ *\ 5\ /\ 10\ 4\ -$
B	$9\ 3\ 5\ +\ *\ /\ 10\ 4\ -$
C	$9\ 3\ +\ 5\ *\ /\ 10\ 4\ -$
D	$9\ 3\ 5\ *\ /\ +\ 10\ -\ 4$
Marks	1.5
Unit	5

Id	
Question	What is the postfix expression of $(A+B)-C*(D/E)+F$?
A	$AB + CDE / * - F +$
B	$ABCDE + / * F - +$
C	$ABC + * DE / F + -$
D	$AB + C - * DE / F +$
Marks	1.5
Unit	5

Id	
Question	$(g-(f^e/d+c)-ba)$
A	$^-/gfed+c-ab$
B	$-ab/+ec^d gf$
C	$-ab-+c/d^e fg$
D	$ab/+^-cde-fg$
Marks	1.5
Unit	5

Id	
Question	What is the postfix expression of the given expression, $(2*4-(5+7/3^4)-8)10$?
A	$2\ 4\ 5\ * \ 7\ 3\ 4\ ^\ / \ + \ 8\ - \ - \ 10$
B	$2\ 4\ * \ ^\ 5\ 7\ 3\ 4\ / \ + \ 8\ 10\ - \ -$
C	$2\ 4\ * \ 5\ 7\ ^\ 3\ 4\ / \ + \ - \ 8\ 10\ -$
D	$2\ 4\ * \ 5\ 7\ 3\ 4\ ^\ / \ + \ - \ 8\ - \ 10$
Marks	1.5
Unit	5

Id	
Question	Prefix expression can be evaluated _____
A	from right to left
B	from left to right
C	from the exact middle
D	from second right element
Marks	1.5
Unit	5

Id	
Question	For every spanning tree with n vertices and n edges what is the least number of different Spanning trees can be formed?
A	2
B	5
C	3
D	4
Marks	1.5
Unit	5