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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
1	1	If $A = \{1,2,3,4,6\} amd\ B = \{2,3,4\}$ then which one of the following is correct?	B is a subset of A	1	A is a universal set	B is a subset of A	B is a superset of A	A is a null set			
1	2	What is value of $(A - B) \cup (B - A) \cup (A \cap B)$?	$A \cup B$	1	$A \cup B$	$A \cap B$	A	B			
1	3	What is the cardinality of the set of odd positive integers less than 10?	5	1	10	5	3	20			
1	4	The set O of odd positive integers less than 10 can be expressed by _____	{1, 3, 5, 7, 9}	1	{1, 2, 3}	{1, 3, 5, 7, 9}	{1, 2, 5, 9}	{1, 5, 7, 9, 11}			
1	5	If X and Y are two sets, such that $X \cup Y$ has 40 elements, X has 28 elements and Y has 22 elements. How many elements does $X \cap Y$ have?	10	1	30	20	10	5			
1	6	If set A contains 3 elements and another set B contains 6 elements then what is minimum number of elements that$(A \cup B)$ can have?	6	1	3	6	8	9			
1	7	The cardinality of the set of even positive integers less than 20 is_____?	9	1	8	10	9	12			
1	8	Let the players who play cricket be 12, the ones who play football 10, those who play only cricket are 6, then the number of players who play only football are _____, assuming there is a total of 16 players.	4	1	16	8	4	10			

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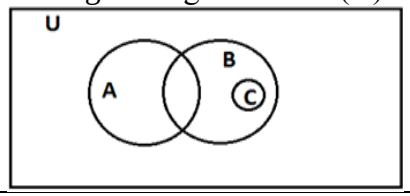
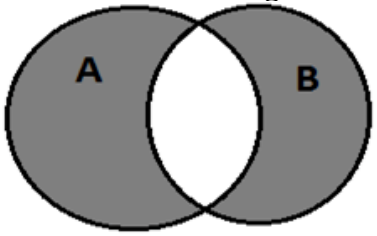
1	9	In the given figure the if n(A)=20,n(U)=50,n(C)=10 and n(A∩B)=5 then n(B)=? 	35	1	35	20	30	10		
1	10	Let the students who likes table tennis be 12, the ones who like lawn tennis 10, those who like only table tennis are 6, then number of students who likes only lawn tennis are, assuming there are total of 16 students.	4	1	16	8	4	10		
1	11	The shaded area of figure is best described by? 	A U B – (A ∩ B)	1	A‘ (Complement of A)	A U B – (A ∩ B)	A-B	B		
1	12	If $A\ is\ \{\{\Phi\},\{\Phi,\{\Phi\}\}\}$, then the power set of A has how many element?	4	1	2	4	6	8		
1	13	If the number of subsets of a set are 4 then the number of elements in that sets are ___	2	1	1	2	3	4		
1	14	Which of these sets are equal: A = {x,y,z}, B = {z,y,z,x}, C = {y,x,y,z}, D = {y,z,x,y}, E = {z,y,x}?	All of these	1	B and C	C and D	A and E	A and B		
1	15	If a set A={x: x is a prime number less than 4} then n[P(P(A))] is _____	16	1	8	16	32	64		
1	16	If $A = \{x: x\ is\ square\ of\ natural\ numbers \leq 8\}\ and\ B = \{2x+1: x \in N\}$, What is $A \cap B$?	{9,25, 49}	1	{0,1,4 ,9,25, 49,12 1}	{1,4,1 6,36,6 4}	{9,25, 49}	{1,9, 25,49 }		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
1	17	If M and B are two sets such that $M \cap B$ has 15%, M has 35%, B has 25%, how many percentages does $M \cup B$?	45%	1	30%	50%	45%	40%		
1	18	If $A = \{x: x \in N; x \leq 5\}$, $B = \{x: x\ is\ prime, x < 6\}\ and$ $C = \{x: x \in N, x\ is\ odd\ and\ x < 9\}$. Find $(A \cup B) \cap (A \cup C)$?	{1,2,3, 4,5}	1	{1,3,5 ,7,9}	{1,2,3, 4,5}	{2,3,4, 5,7}	{1,2, 3,4,5, 6,7,8 }		
1	19	In a survey of 60 people it was found that 25 people read newspapers H, 26 read newspaper I, 26 read newspapers T, 9 read both H and I, 11 read both H and T, 8 read both T and I, 3 read all three newspapers. Find the numbers of students who read exactly one newspaper?	30	1	22	30	25	None of these		
1	20	Let A denote the set of quadrilaterals having two diagonals equal and bisecting each other. Let B denotes the set of quadrilaterals having diagonals bisecting each other at 90°. The $A \cap B$ is	The set of Squar es	1	The set of Parall elogra ms	The set of Rhomb uses	The set of Squar es	The set of Recta ngles	The set of Rectangl es and Rhombu ses	None of these
1	21	Which of the following is/are not partitions of a set $S = \{e, q, u, a, t, i, o, n\}$ (i) $\{\{e, q, a\}, \{o, u\}, \{t, n, i\}\}$ (ii) $\{\{x: x\ is\ vowel\}, \{n, t, q, u\}\}$ (iii) $\{\{\ \}, \{t, q\}, \{s: s\ is\ vowel\}\}$ (iv) $\{\{a, e, i, o, u\}, \emptyset, \{t, n, q\}\}$ (v) $\{\{i, u, a\}, \{e, t, n\}, \{\emptyset\}, \{q, o\}\}$ (vi) $\{\emptyset, S\}$	(ii), (iii) & (v)	1	(ii), (iii) & (vi)	(iii), (iv) & (v)	(ii), (iii) & (v)	(i), (iii) & (v)	(ii), (v) & (vi)	(ii) & (iii)

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1	22	Given $A = \{\{a, b\}, \{c\}, \{d,e,f\}\}$ (a) List of elements of A. (b) Find $n(A)$ (c) Find power set of A.		3						
1	23	(a) Find the power set of the set: $Q = \{1, \{2,3\}, 4\}$ (b) Find the power set of the set: $A = \{x, \{y, z\}, w, p\}$		2						
1	24	For $A = \{2,3,4,5,6\}, B = \{3,4,5,6,7\}, C = \{4,5,6,7,8\}$. $Find\ (a)(A \cup B) \cap (A \cup C)(b)(A \cap B) \cup (A \cap C)$		2						
1	25	Write True or False: (a) $1 \subset \{1,2,3\}$ (b) $\{1,2\} \subseteq \{1,2,3\}$ (c) $\phi \subseteq \{\{\phi\}\}$ (d) $\phi \subseteq \{\phi, \{1\}, \{a\}\}$ (e) $\{a, \{b\}, c, d\} \subset \{a, b, \{c\}, d\}$		3						
1	26	If $A = \{x^2 - 2x - 3 = 0\} and\ B = \{y^2 - 4y - 5 = 0\}$ then find $A \cup (A \cap B)$?		2						
1	27	Let U be the set of Real numbers; $A = \{x \mid x\ is\ a\ solution\ of\ x^2 - 1 = 0\}$ and $B = \{-1, 4\}$. Compute:- (a) $\bar{A}$ (b) $\bar{B}$(c) $\overline{(A \cup B)}$ (d) $\overline{(A \cap B)}$		3						
1	28	If $A = \{4,5,7,8,10\}$, $B = \{4,5,9\}$ and $C = \{1,4,6,9\}$ then verify that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.		3						
1	29	Using Venn Diagram, prove or disprove: $A \cap B \cap C = [(A - B) \cup (A - C)]$		3						
1	30	Using Venn Diagram show that: $A \cup (\bar{B} \cap C) = (A \cup \bar{B}) \cap (A \cup C)$		3						
1	31	Using Venn Diagram show that: $A \oplus (B \oplus C) = (A \oplus B) \oplus C$		3						
1	32	Prove the following using Venn diagram: $A \cap (B \oplus C) = (A \cap B) \oplus (A \cap C)$		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
1	33	Show that: $((A \cup B) \cap \bar{A}) \cup \overline{(B \cap A)} \equiv \overline{(A \cap B)}$ by using Venn diagram.		3							
1	34	Show that: $A \cup (A^c \cap B) = (A \cup B)$ by using Venn diagram		3							
1	35	Prove that $(A - C) \cap (C - B) = \phi$ analytically, where A, B, C are sets. Verify Graphically.		3							
1	36	If A, B and C are sets, prove both analytically and graphically, that $A - (B \cap C) = (A - B) \cup (A - C)$.		3							
1	37	Find the sets A and B, if (a) $A - B = \{1, 3, 7, 11\}, B - A = \{2, 6, 8\}$ and $A \cap B = \{4, 9\}$ (b) $A - B = \{1, 2, 4\}, B - A = \{7, 8\}$ and $A \cup B = \{1, 2, 4, 5, 7, 8, 9\}$		3							
1	38	Let U = {1,2,3,4,5,6,7,8,9,10}, A = {1,2,4,5,6,7}, B = {1,3,5,6,9} & C = {2,5,6,7,8}. 1) Draw the venn diagram 2) Compute, $(A \cup B) \cap C, A - (B - A), (A \cap C) \times (A \cap B)$		3							
1	39	Prove that $(A \cup B)' \equiv A' \cap B'$		3							
1	40	If $U = \{a, b, c, d, e\}, P = \{a, b, c\}$ and $Q = \{b, c, e\}$. Prove the De Morgan's law.		3							
1	41	Prove $(A \cap B) \cup (A \cap B') = A$		3							
1	42	Prove the following identities using Venn diagram. (a) $(A \cup B) - (A \cap B) = (A - B) \cup (B - A)$, (b) $A - B = A - (A \cap B)$		3							
1	43	Prove that following: $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$		3							

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1	44	Let $S = \{1,2,3,4,5,6,7,8,9\}$. Determine whether or not each of the following is a partition of S. (a) $\{\{1,3,5\},\{2,6\},\{4,8,9\}\}$ (b) $\{\{1,3,5\},\{2,4,6,8\},\{5,7,9\}\}$ (c) $\{\{1,3,5\},\{2,4,6,8\},\{7,9\}\}$ (d) $\{S\}$		3						
1	45	Let $S = \{R, B, G, Y\}$. Determine which of the following is a partition of S. (a) $\{\{R\},\{B,G\}\}$ (b) $\{\{R,B,G,Y\}\}$ (c) $\{\phi,\{R,B\},\{G,Y\}\}$ (d) $\{\{B\},\{R,Y,G\}\}$		3						
1	46	Let the universal set be $U = \{1,2,3,\ldots,10\}$. Let $A = \{2,4,7,9\}, B = \{1,4,6,7,10\}$ and $C = \{3,5,7,9\}$. Find $(a) A \cup B$ $(b) A \cap B$ $(c) B \cap \bar{C}$ $(d)(A \cap \bar{B}) \cup C$ $(e)\overline{(B \cup C)} \cap C$		4						
1	47	If A, B, C are three sets, prove $(A - B) - C = A - (B \cup C)$ both analytically and using Venn Diagram.		3						
1	48	If A, B, C are three sets, prove that $A - (B - C) = (A - B) \cup (A \cap B \cap C)$ both analytically and using Venn Diagram.		3						
1	49	X is the set of all three digit integers. $X = \{a\ is\ an\ integer : 100 \leq a \leq 999\}$. Let A_i denote the set of integers in X whose i^{th} digit is i, then evaluate $\lvert A_1 \cup A_2 \cup A_3 \rvert$. Find the cardinality of the set $A_1 \cup A_2 \cup A_3$.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
1	50	Let $U = \{a, b, c, d, e, f, g, h, p, q, r\}, X = \{a, b, c, d, e\}, Y = \{c, d, e, f, g, h\}, Z = \{h, p, q, r\}$. Find $X \cup Y, Y \cap Z \cap X, X - (Y \cup Z), (X \cup Y)', X', \cup X' \cap Y', X \Delta Y$ using Venn Diagram.		4						
1	51	In a class of 120 students numbered 1 to 120, all even numbered students opt for Physics, those whose numbers are divisible by 5 opt for Chemistry and those whose numbers are divisible by 7 opt for Math. How many opt for none of the three subjects?		3						
1	52	Each student in Liberal Arts at some college has a mathematics requirement A and a science requirement B. A poll of 140 sophomore students shows that: 60 completed A, 45 completed B, 20 completed both A and B. Use a Venn diagram to find the number of students who have completed: (a) At least one of A and B; (b) exactly one of A or B; (c) neither A nor B.		4						
1	53	In a survey of 120 people, it was found that: 65 read Newsweek magazine, 45 read Time, 42 read Fortune, 20 read both Newsweek and Time 25 read both Newsweek and Fortune, 15 read both Time and Fortune, 8 read all three magazines. (a) Find the number of people who read at least one of the three magazines. (b) Find Venn diagram (c) Find the number of people who read exactly one magazine.		4						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
1	54	A survey of a sample of 25 new cars being sold at a local auto dealer was conducted to see which of three popular options air-conditioning (A), radio (R) and power windows (W), were already installed. The survey found: 15 had air-conditioning, 12 had radio, 11 had power windows, 5 had air conditioning and power windows, 9 had air-conditioning and radio, 4 had radio and power windows, 3 had all three options, 2 had no options. Find the number of cars that had: (a) Only power windows. (b) Only air conditioning. (c) Only radio. (d) Radio and power windows but not air conditioning. (e) Air-conditioning and radio but not power windows. (f) Only one of the options.		5						
1	55	A survey of 500 television watchers produced the following information: 285 watch football games,195 watch hockey games,115 watch basketball games,45 watch football and basketball games,70 watch football and hockey games,50 watch hockey and basketball games and 50 do not watch any of the 3 kinds of games. (i) How many people in the survey watch all 3 kinds of games? (ii) How many people watch exactly one of the sports? (iii) Draw the Venn diagram.		3						
1	56	Find the number of ways in which all letters of the word “MUNMUN” be arranged such that no two letters of same type are together. Use Principle of Inclusion and Exclusion.		4						

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1	57	Words are formed by using all the letters of the word “HONOLULU” exactly once so that no two alikes are together. How many ways are there? Use Principle of Inclusion and Exclusion.		4						
1	58	How many numbers of 11-lettered word that can be formed using all the letters of the word: “EXAMINATION” if alike letters are never adjacent. Use Principle of Inclusion and Exclusion.		4						
1	59	In a class students undergoing a computer course the following were observed Out of a total 50 students: 30 know Web Designing, 18 know Tally 26 know Networking, 9 know both Web Designing and Tally, 16 know both Web Designing and Networking, 8 know both Tally and Networking, 47 know at least one of the three courses. From this we have to determine (a) How many students know none of these courses? (b) How many students know all three courses? (c) How many students know exactly one course?		4						
1	60	Consider a set of integers from 1 to 250. Find how many of these numbers are divisible by 3 or 5 or 7? Also, indicate how many are divisible by 3 or 5 but not 7?		3						
1	61	How many integers between 1 to 2000 are divisible by 2, 3, 5 or 7?		3						
1	62	Among 100 students, 32 study Maths, 20 study Physics, 45 study Biology, 15 study Maths and Biology, 7 study Maths and Physics, 10 study Physics and Biology and 30 do not study any of the three subjects. (a) Find the number of students studying all the three subjects? (b) Find the number of students studying exactly one of the three subjects?		4						

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1	63	The 60,000 fans who attended the home coming football game bought up all the paraphernalia for their cars. Altogether 20,000 bumpers stickers, 36,000 window decals and 12000 key rings were sold. We know that 52,000 fans bought at least one item and no one bought more than one of a given item. Also 6000 fans bought both decals and key rings, 9000 bought both decals and bumpers stickers and 5000 bought both key rings and bumper stickers. a) How many fans bought all three items? b) How many fans bought exactly one item? (Only using Venn diagram) c) Someone questioned the accuracy of the total number of purchasers: 52000(given that all the other numbers have been confirmed to be correct.) This person claimed the total number of Purchasers to be either 60,000 or 44,000. How do you dispel the claim?		5						
1	64	There are 350 farmers in a large region. 260 farm beetroot, 100 farm yams, 70 farm radish, 40 farm beetroot and radish, 40 farm yams and radish, 30 farm beetroot and yams. Determine the number of farmers that farm beetroot, yams and radish.		3						
1	65	Among 200 students in a class, 104 students got an “A” in first exam and 84 students got “A” in second exam. If 68 students did not get an “A” in both exam. (a) How many students got “A” in both the exam. (b) If number of students who got an “A” in the first exam is equal to that who got an “A” in second exam. If the total number of students who got “A” in exactly one exam is 160 and if 16 students did not get “A” in either exam. Determine the number of students who got “A” in first exam, those who got “A” in second exam and number of students who got “A” in both exams?		4						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
1	66	It was found that in the first-year computer science class of 80 students, 50 knew COBOL, 55 'C' and 46 PASCAL. It was also known that 37 knew 'C' and COBOL, 28 'C' and PASCAL and 25 PASCAL and COBOL. 7 students however knew none of the languages. Find (i)How many knew all the three languages? (ii)How many knew exactly two languages? (iii)How many knew exactly one language? (iv) Fill in the correct number of languages in each region of Venn diagram.		4						
1	67	Suppose that 200 out of 220 mathematics students at a college take atleast one of the languages French, German and Russian. Also, suppose 165 study French, 145 study German, 142 study Russian, 120 study French and German, 125 study French and Russian, 115 study German and Russian. (a) Find the number of students who study all the three languages. (b) Draw Venn diagram. (c) Determine number of students who study (i) Exactly one language, (ii) Exactly two language.		3						
1	68	Find the number of ways in which all letters of the word "KUTKUT" be arranged such that no two letters of same type are together. Use Principle of Inclusion and Exclusion.		3						
1	69	Find the number of ways in which all letters of the word "INDEPENDENCE" be arranged such that no two letters of same type are together using Principle of Inclusion and Exclusion.		4						
2	70	Let $A = \{1,2,3,4,5\}$. A map f from A to A is defined as $f(1) = 2, f(2) = 3, f(3) = 3$ is_____.	Not a function	1	One-one only	Onto only	Many-one	bijective	Not a function	None
2	71	Let $A = \{1,2,3,4,5\}$. A map f from A to A is defined as $f(1) = 1, f(1) = 3, f(2) = 2, f(3) = 3, f(4) = 3$ and $f(5) = 3$ is_____.	Not a function	1	One-one only	Onto only	Many-one	bijective	Not a function	None

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2	72	Let X = {1,2,3,4}. Determine which of the relation on X is a function from X into X. f = {(2,3), (1,4), (2,1), (3,2), (4,4)}, g = {(3,1), (4,2), (1,1)}, h = {(2,1), (3,4), (1,4), (2,1), (4,4)}.	h	1	f	g	h	F and g	All of these	None of these
2	73	If $A = \{1,2,3\}$, $B = \{4,6,9\}$ and R is a relation from A to B defined by 'x *is smaller than* y'. The range of R is _____.	$\{4,6,9\}$	1	{1,2,3}	$\{4,6,9\}$	$\{1,2,3,4,6,9\}$	{1,4, 6,9}	{1}	All real numbers
2	74	In a get to gather function, everybody handshakes with everybody else. The total number of handshakes is 105. The number of the person in hall is_____	15	1	12	11	14	18	16	15
2	75	Let f: $\mathbb{Z} \to \mathbb{Z}$ defined as $f(x) = x^2 - 5$ is _____.	Many-one only	1	One-one only	Onto only	Many-one	bijective	Not a function	None
2	76	Which of the following function f: $\mathbb{Z} \to \mathbb{Z}$ are not injective? (i) $5x - 3$ (ii) $x^2 + 4$. (iii) $x^3 - 3x^2 + 7$ (iv) $x^4 + 3x - 1$ (v) $x^4 - x^2 + 4$	(ii),(iii) & (v)	1	(ii) & (iv)	(ii), (iii) & (v)	(ii), (iii) & (iv)	(ii) & (iv)	(iii) & (v)	(iii), (iv) & (v)
2	77	*Let* f: $\mathbb{Z} \to \mathbb{Z}$ defined as $f(x) = 4x - 3$ *is*____.	One-one only	1	One-one only	Onto only	Many-one	bijective	Not a function	None
2	78	*Let* f: $\mathbb{N} \to \mathbb{N}$ defined as $f(x) = \|x\|$ is _____.	bijective	1	One-one only	Onto only	Many-one	bijective	Not a function	None

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2	79	Let f: A → A defined as f(x) = x is known as _____.	(2)&(3)	1	Const ant	Identit y	Bijecti ve	Many -one	(1)& (4)	(2)&(3)
2	80	Let $f,g,h:R\to R$ be defined by $f(x)=x, g(x)=2x, h(x)=3x$ then find the composition of the function $[f\cdot(g\cdot h)](x)$ at x = -1.	-6	1	0	6	-6	2	-2	None of these
2	81	If set P consists of 4 elements and set Q consists of 5 elements, then how many injective functions can we define from P to Q?	120	1	144	120	20	16	15	Not possib le
2	82	A function f: ℝ → ℝ defined as f(x) = 3x + 5 is _____.	Bijecti ve	1	One-one only	Many-one only	Onto only	Bijec tive	Neither one-one nor ont2o	Not well define
2	83	How many distinct permutations of the letters in the word 'ELEMENTS' are there?	$\frac{8!}{3!}$	1	8!	$\frac{8!}{3!}$	8! – 3!	$\frac{8!}{3}$	$\frac{8}{3!}$	$\frac{8!}{3^3}$
2	84	Five boys and five girls are to be seated in a row then how many ways John and Mary Must be seated together?	2× 9!	1	5! × 6!	5! × 5!	8! × 18	10!	2× 9!	
2	85	How many distinct even numbers can be formed from digits 3, 5, 7, 8 without repetition?	16	1	3	16	12	13	23	24
2	86	How many distinct permutations can be formed from a word 'BANANA' with all vowels together?	$\frac{4!}{2!}$	1	6!	$\frac{6!}{3!}$	3! · 3!	$\frac{4!}{2!}$	$\frac{4!}{3!}$	4! · 3!
2	87	A box contains 8 blue balls and 6 red balls. Find the number of ways two balls can be drawn from the box if they must be different color.	48	1	8	6	14	48	36	64
2	88	Find n if $P(n,4) = 42\ P(n,2)$.	9	1	6	7	8	9	10	12

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
2	89	Find the number of ways 3 elements a, b, c, can be assigned to 3 cells, so exactly 1 cell is empty.	18	1	3	6	9	12	18	24
2	90	How many 4 letter words can be formed of a word 'SOCIOLOGICAL' as all letters are different.	$P(7, 4)$	1	4!	7!	P(12,4)	P(10, 4)	P(7,4)	$\frac{12!}{3!\,2!\,2!}$
2	91	In how many ways letter 'ORGANISE' can be arranged in such a way that all vowels always come together?	$5! \cdot 4!$	1	8!	$\frac{8!}{3!}$	$5! + 4!$	$5! \cdot 4!$	6!	None
2	92	The number of three English letter words, having at least one consonant, but not having two consecutive consonants, is	3780	1	2205	3780	2730	3360	3500	None
2	93	In how many ways can three examinations be scheduled within a five days period so that no two examinations are scheduled on the same day?	60	1	15	50	20	60	40	None
2	94	What would be the number of permutations of letters a, b, c, d, e, f, g taken all together if neither 'cab' nor 'fed' pattern appear?	4806	1	4500	4800	4806	4808	4506	None
2	95	In how many ways can you take 3 cards with at least 2 aces out of well stuffed 52 cards?	292	1	48	132	288	292	300	306
2	96	There are 12 points in a plane of which 5 are colinear then the what is the number of triangles that can be formed with vertices at these points are _____.	210	1	210	35	70	105	792	175
2	97	In a course, a professor gives five grades {A, B, C, D, F}. What is the minimum number of students required so that four of them are guaranteed to get same grade?	16	1	15	16	14	12	18	25

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
2	98	If 7 colors are used to paint 50 bicycles then at least how many bicycles will be of same color?	8	1	6	7	8	9	10	11
2	99	At least how many people among 200000 people are born at same day? (In a year)	548	1	547	548	549	550	551	None
2	100	Six friends discover that they have total 2161 Rs with them on trip then one or more of them must have at least _____ Rs?	361	1	360	361	362	365	369	370
2	101	Let $f: \mathbb{z} \to \mathbb{z}$ defined as $f(x) = x, if\ x\ is\ even\ \&\ x+1, if\ x\ is\ odd$ is	Many one and Onto		One-one and Into	Many one and Into	One-one and Onto	Many one and Onto	Not a function	Not defined for some numbers
2	102	Let there are 10 points $a_1, a_2, \dots, a_{10}$ on a plane such that no three points lies on a same line then how many triangles can be drawn through these points?	120		45	60	90	120	110	None
2	103	Represent the given function in (i) Graphical (ii) Tabular & (iii) Matrix form $f = \{(1,2), (4,3), (3,2), (6,5), (2,4), (5,1)\}$		3						
2	104	Let $f, g : Z \to Z$ be two functions defined as $f(x) = x^2 + 3$ and $g(x) = x^2 + 2x - 5$. Find gof and fog. Are they equal?		3						
2	105	Let $f, g, h : R \to R$ be functions defined as $f(x) = x^3 - 1,\ g(x) = \log x\ , h(x) = \cos x$. Find $hogof$, fog, hof and hog.		4						
2	106	Show that $f: R - \left\{-\frac{5}{3}\right\} \to R - \left\{-\frac{2}{3}\right\}$ defined as $f(x) = \frac{1-2x}{3x+5},\ x \neq -\frac{5}{3}$ is bijective. Find f^{-1}.		4						
2	107	Show that $f: R - \left\{\frac{7}{3}\right\} \to R - \left\{\frac{4}{3}\right\}$ defined as $f(x) = \frac{4x-5}{3x-7}$, is bijective. Find f^{-1}.		4						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
2	108	Find an inverse of function $f: R-\{3\} \to R-\{1\}$ defined as $f(x)=\frac{x-2}{x-3}$ if it exists.		3						
2	109	Find an inverse of function $f: Z \to Z$ defined as $f(x)=4x+7$ if it exists.		3						
2	110	Let $X=\{1,2,3\}$ and p,q,r,s be functions from X to X given by $p=\{(1,2),(3,1),(2,3)\}$ $q=\{(1,3),(2,1),(3,3)\}$ $r=\{(1,2),(2,2),(3,1)\}$ $s=\{(1,3),(2,3),(3,3)\}$ Find $p\ o\ q, r\ o\ q, q\ o\ s$ and $p\ o\ q\ o\ s$.		4						
2	111	Let $f,g,h: R \to R$ be functions defined as $f(x)=x^3+x$, $g(x)=\cos x$, $h(x)=3x+2$. Find $(hog)of$ and $ho(gof)$. Are they equal?		3						
2	112	Let $f,g: R^+ \to R^+$ be two functions defined as $f(x)=x^2+4x+4$ and $g(x)=\sqrt{x}$. Check gof and fog are One-one or not.		3						
2	113	Find the number of times the digits 3 will be written when listing the integers from 1 to 1000.		3						
2	114	3 cards are chosen from a pack of 52 cards. (1) In how many ways can this be done? (2) In how many ways can you select three cards so that all of them are face cards? (3) In how many of the selections, all cards are of the same colour? (4) In how many of them all cards are of the same suit?		3						
2	115	The Indian cricket team consist of 16 players. It includes 2 wicket keepers and 5 bowlers. In how many ways can cricket eleven be selected if we have select1 wicket keeper and at least 4 bowlers?		2						
2	116	How many possible ways to win in a horse race with three horses if ties are possible? (i.e. two or three horses may tie)		2						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
2	117	A man, a woman, a boy,a girl, a dog and a cat are walking down a long and winding road one after the other. (i) In how many ways can this happen? (ii) In how many ways can this happen if dog and only the dog is between the man and boy?		3						
2	118	Suppose repetitions are not permitted. (a) Find the number of three-digit numbers that can be formed from the six digits 2, 3, 5, 6, 7, and 9. (b) How many of them are less than 400? (c) How many of them are even?		3						
2	119	How many permutations can be made by the letters of the word, “SERIES”? How many of these will start from S and end with S? In how many of these words, the vowels and the constants will be situated in alternative order?		3						
2	120	How many rectangles are there in 8×8 chess board?		3						
2	121	A class contains 9 men and 3 women. Find the number of ways a teacher can select a committee of 4 from the class where there is (i) no restrictions, (ii) 2 men and 2 women, (iii) exactly one woman, (iv) at least one woman.		4						
	122	In a box there are 5 black pens, 3 white pens and 4 red pens. In how many ways can 2 black pens, 2 white pens and 2 red pens can be chosen?		3						
2	123	Find the number m of ways 10 students can be divided into three teams where one team has 4 students and the other teams have 3 students		3						
2	124	How many distinct numbers can be formed of 5 digits such that number is (i) odd, (ii) multiple of 5, (iii) divisible by 10.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
2	125	A committee of 12 students consist of 3 representatives from first year, 4 from second year and 5 from third year. Out of these 12 students, 3 are to be excluded from the committee by drawing lots. What is the chance that: (i) 3 students belong to 3 different years, (ii) 2 belong to first year and 1 belong to other years, (iii) Three belong to same year.		3						
2	126	How many 6 lettered palindromes are there which can be formed using the letters from alphabets?		4						
2	127	A man has 7 relatives, 4 of them are ladies and 3 gentlemen, his wife has 7 relatives and 3 of them are ladies and 4 gentlemen. In how many ways can they invite a dinner party of 3 ladies and 3 gentlemen so that there are 3 of man's relatives and 3 of wife's relatives?		5						
2	128	Suppose repetitions are not permittable, (1) How many four-digit numbers can be formed from six digits 1, 2, 3, 5, 7, 8? (2) How many of such numbers are less than 4000? (3) How many in (1) are even? (4) How many in (2) are odd? (5) How many in (1) contain both 3 and 5. (6) How many in (1) are divisible by 10.		4						
2	129	Suppose 7 students are staying in a hall in a hostel and they are allotted 7 beds. Among them, Pravin does not want to bed next to Minesh because Minesh snores. Then, in how many ways can you allot the beds?		4						
2	130	How many numbers greater than a one million can be formed by using the digits 4,6,0,6,8,4,6?		3						
2	131	Find the minimum number of students needed to guarantee that 4 of them were born: (a) on the same day of the week; (b) in the same month.		2						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
2	132	Minimum how many cards must be picked from adeck of 52 cards so as to guarantee that at least 3 cards of (i) same suit, (ii) same color, (iii) non face.		3						
2	133	How many minimum numbers of students in a class that at least 3 student's names start with same letter?		3						
2	134	How many 7-digit numbers greater than 1000000 can be formed by using only digits 1, 2, 0, 2, 4, 2, 4?		3						
2	135	A research team of 6 people is to formed from 10 Chemists, 5 Politicians, 8 Economists and 15 Biologists. How many teams have (a) At least 5 Chemists? (b) Exactly 3 Economists? (c) 4 Chemists but no Economist?		4						
3	136	The declarative sentences to which it is possible to assign one and only one of the two possible truth values are called _____.	statements	1	conjunctions	disjunctions	statements	connectives		
3	137	Which of the following is not a statement?	"This statement is true."	1	"Canada is a country."	"Moscow is the capital of Spain."	"This statement is true."	"Toronto is an old city."		
3	138	If truth value of statement P is T, then the truth value of ¬P is _____	F	1	T	F	T or F	T and F		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
3	139	The statement $(\sim p) \rightarrow (\sim q)$ is logically equivalent to which of the statements below? i) $(p \rightarrow q)$ ii) $q \rightarrow p$ iii) $(\sim q) \vee p$ iv) $(\sim p) \vee q$	II and III only	1	I only	II only	II and III only	II and IV only	I and II only	
3	140	If truth values of statement P is true and Q is false, then the truth value of P∧Q (conjunction of P and Q) is _____.	F	1	T	F	T or F	T and F		
3	141	If truth values of statement P is true and Q is false, then the truth value of P∨Q (disjunction of P and Q) is _____.	T	1	T	F	T or F	T and F		
3	142	If truth value of statement P is T and statement Q is F then the truth value of (P∨Q)∧P is _____.	T	1	T	F	T or F	T and F		
3	143	Consider the statements P: mark is rich. and Q: Mark if happy. Then the symbolic form of the statement "Mark is poor but happy" is _____.	⅂P∧Q	1	P∧Q	⅂P∧Q	⅂P∨Q	P∨Q		
3	144	A statement P is equivalent to _____.	ALL OF ABOVE	1	⅂⅂P	P∧P	P∨P	ALL OF ABOVE		
3	145	If P:product is good. and Q:service is good. then the symbolic form of "either product is good or service is good but not both." is _____.	(P∨Q) ∧ ⅂(P∧Q)	1	(P∨Q) ∧ ⅂(P∧Q)	(P∧Q) ∧ ⅂(P∧Q)	(P∧Q) ∨ ⅂(P∧Q)	(P∧Q) ∨ ⅂(P∨ Q)		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
3	146	Which of the following is not a well-formed formula?	((¬P →Q) →(Q →P)))	1	(P→(P∨Q))	((¬Q∧ P)∧Q)	((¬P →Q) →(Q →P)))	((¬Q ∨P)∧ Q)		
3	147	If $p \to q$ is false then determine the truth value of $(\neg(p \wedge q)) \to q$	False	1	True	False	True or False	True and False		
3	148	p is proposition "Indian army moves back", q is proposition "Chinese army moves back", r is proposition "There is no war" Then what is the contrapositive of the statement "If Indian army moves back and Chinese army moves back, then there is no war"	$\sim r \to \sim(p \wedge q)$	1	$\sim r \to (\sim p \to \sim q)$	$r \to (p \wedge q)$	$\sim (p \wedge q) \to \sim r$	$\backsim r \to (p \wedge q)$	$\sim r \to \sim(p \wedge q)$	None of the above
3	149	Let p : it is raining outside. & q : I have an umbrella. & r : it is sunny. & s: I have sunglasses. & t : I will go for a walk. Then the symbolic form of the following statement would be: "if it is raining outside and I do not have an umbrella or if it is sunny and I have sunglasses , then I will go for a walk ."	$(p \wedge \sim q) \vee (r \wedge s) \to t$	1	$(p \vee \sim q) \wedge (r \vee s) \to \sim t$	$(p \wedge \sim q) \wedge (r \vee s) \to \sim t$	$(p \to q) \wedge (\sim r \to \sim s) \to t$	$(p \wedge \sim q) \vee (r \wedge s) \to t$	$(p \to q) \wedge (r \to s) \to t$	
3	150	What is the proposition form of "If the parcel is not properly addressed or is too large, then the post office will not accept it but the parcel is not too large and if Ram wrote the address on the parcel, then it is properly addressed."	$((\sim p \vee q) \to \sim r) \wedge ((\sim q \wedge s) \to p)$	1	$((\sim p \vee q) \to \sim r) \wedge ((\sim q \wedge s) \to p)$	$((\sim p \vee q \to \sim r) \equiv ((\sim q \wedge s) \to p)$	$((p \vee q) \to \sim r) \equiv ((\sim q \wedge s) \to p)$	$((\sim p \vee q) \to \sim r) \leftrightarrow ((\sim q \wedge s) \to p)$		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
3	151	Consider the following expressions: i) False ii) Q iii) True iv) $p \vee q$ v) $\sim q \vee p$ The number of expressing given above that are logically implied by $p \wedge (p \rightarrow q)$ is _____	4	1	1	2	3	4	5	None of these
3	152	$(\boldsymbol{P} \vee \boldsymbol{Q}) \wedge (\boldsymbol{P} \rightarrow \boldsymbol{R}) \wedge (\boldsymbol{Q} \rightarrow \boldsymbol{S})$ is equivalent to	None of these	1	$S \wedge R$	$S \rightarrow R$	$S \vee R$	All of the abov e	None of these	
3	153	If p = a number from{8,9,10,11,12} q = not a composite number r = a square number s = a prime number then what is the value of $\sim((\boldsymbol{p} \rightarrow \sim \boldsymbol{q}) \wedge (\sim \boldsymbol{r} \vee \sim \boldsymbol{s}))$	11	1	8,9,10 , 11, 12	8,9,10	11,12	11	12	
3	154	The compound statement “if you won the race, then you did not run faster than others” is equivalent to I) If you won the race, then you ran faster than others II) If you faster than others, then you won the race. III) If you did not win the race, then you did not run faster than others. IV) If you run faster than others, then you did not win the race.	IV only	1	II and III only	IV only	II and IV only	I an d III only	II only	
3	155	$\sim(p \wedge (\sim q)) \equiv$ _____	$\sim p \vee q$	1	$\sim p \wedge \sim q$	$\sim p \wedge q$	$\sim p \vee q$	$\sim p \vee \sim q$		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
3	156	The statement $(\sim p) \rightarrow (\sim q)$ is logically equivalent to which of the statements below? iv) $(p \rightarrow q)$ v) $q \rightarrow p$ vi) $(\sim q) \vee p$ vii) $(\sim \boldsymbol{p}) \vee \boldsymbol{q}$	II and III only	1	I only	II only	II and III only	II and IV only	I and II only	I and III only
3	157	$\sim (p \wedge q) \rightarrow (\sim p \vee (\sim p \vee q)) \equiv$ ____	$\sim p \vee q$	1	Tautology	Contradiction	Contingency	$\sim p \vee q$	$\sim (p \vee q)$	$\sim p \wedge q$
3	158	Show the following equivalences. $(P \rightarrow Q) \rightarrow Q \equiv (P \vee Q)$		3						
3	159	Show the following equivalences: $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \equiv R$		4						
3	160	Show the following equivalences: $\neg (P \wedge Q) \rightarrow (\neg P \vee (\neg P \vee Q)) \equiv (\neg P \vee Q)$		5						
3	161	Construct the truth table for the following formula. $\sim (p \vee q) \Leftrightarrow (\sim p \wedge \sim q)$		3						
3	162	Constructthe truth table for given statement formulas.(i) $(p \vee q) \leftrightarrow (q \rightarrow r)$ (ii)$(\sim p \vee q) \wedge p$		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
3	163	Construct a truth table for each of these compound propositions. (i) $P \wedge \urcorner p$ (ii) $P \vee \urcorner p$ (iii) $(p \vee \urcorner p) \rightarrow q$ (iv) $(p \vee q) \rightarrow (p \wedge q)$ (v) $(p \rightarrow q) \leftrightarrow (\urcorner p \rightarrow \urcorner q)$ (vi) $(p \rightarrow q) \rightarrow (q \rightarrow p)$ (vii) $P \wedge (p \vee q)$		5							
3	164	Show the following equivalence: $(p \rightarrow (q \rightarrow r)) \equiv ((p \rightarrow q) \rightarrow (p \rightarrow r))$		3							
3	165	Prove that: $\sim (p \vee q) \equiv \sim p \wedge \sim q$ using truth table.		3							
3	166	Show that $p \leftrightarrow q$ is logically equivalent to $((p \rightarrow q) \wedge (q \rightarrow p))$ also $\big((p \rightarrow q) \wedge (q \rightarrow p)\big)$ is logically equivalent to $(\sim p \vee q) \wedge (\sim q \vee p)$.		3							
3	167	Consider the statements P : Mark is rich. and Q : Mark is happy. Write the following statements into symbolic form. a) Mark is poor but happy. b) Mark is rich or unhappy. c) Mark is neither rich nor happy. d) Mark is poor or he is both rich and unhappy.		4							

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
3	168	Using the following propositions: p: I am bored q: I am waiting for one hour r: There is no bus translate the following into English. $(I)\ (q \vee r) \rightarrow p$ $(II)\ \neg q \rightarrow \neg p$ $(III)\ (q \rightarrow p) \vee (r \rightarrow p)$		3						
3	169	Given the truth values of P and Q as T and those of R and S as F, find the truth values of the following. a) (ד(P ∧ Q) ∨ (דR)) ∨ ((Q ⇄ דP) → (R ∨ דS)) b) (P ⇄ R) ∧ (דQ → S) c) (P ∨ (Q → (R ∧ דP))) ⇄ (Q ∨ דS)		5						
3	170	If P= Ram is beautiful, Q=Ram is mixable, R=His friend like ram. write the following Statement in language (i) $(P \rightarrow Q) v (P \rightarrow R)$ (ii) $P \rightarrow (Q v R)$ Then Examine are the above statement equivalence?		4						
3	171	Show that the following statement is tautological $(p \wedge (p \rightarrow q)) \rightarrow q$		3						
3	172	Use the law of logic to show that $[(p \rightarrow q) \wedge \sim q] \rightarrow \sim p$ is a tautology.		4						
3	173	Check whether the statements are tautology or not. (using truth table) (P→(Q→R)) →((P→Q) →(P→R))		4						
3	174	Prove that $P \rightarrow (P \vee Q)$ is Tautology.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
3	175	Find if the following is a tautology, contradiction or contingency. $((p \vee q) \wedge \sim p) \rightarrow q$		4						
3	176	Find if the following is a tautology, contradiction or contingency. $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$		5						
3	177	Find if the following is a tautology, contradiction or contingency. $(p \wedge q) \wedge \sim (p \vee q)$		3						
3	178	Check whether $((\sim p \wedge q) \vee (q \wedge r)) \rightarrow r$ is a tautology, contradiction or contingency.		5						
3	179	Check whether the statement $((p \rightarrow \sim q) \wedge (r \rightarrow q) \wedge r) \rightarrow p$ is a tautology, contradiction or contingency.		4						
3	180	Check whether the following is Tautology, Contradiction or Contingency. $[(p \wedge q) \vee \{q \wedge (\sim r)\}] \leftrightarrow [\{(\sim p) \wedge r\} \vee \{(\sim q) \wedge (\sim r)\}]$		4						
3	181	Prove that: $(p \rightarrow (q \rightarrow r)) \equiv ((p \rightarrow q) \rightarrow (p \rightarrow r))$		5						
3	182	Prove that: $\sim (p \vee q) \equiv \sim p \wedge \sim q$		3						
3	183	Show the following equivalence: $(P \rightarrow ((P \rightarrow (Q \rightarrow P)) \rightarrow P)) \equiv (P \vee (\sim P))$		4						
3	184	Show that propositions $\sim(p \wedge q)$ and $\sim p \vee q$ are logically equivalent.		5						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
3	185	Show the following equivalence: $(Q \to ((P \to P) \to Q)) \equiv Q \vee \sim Q$		2						
3	186	Write Converse, Contrapositive, Inverse and Negation for the given conditional statement: A family becomes literate if the women in it are literate.		3						
3	187	Express the Contrapositive, Converse, Inverse and Negation form of the conditional statement: "I will Pass the DM exam if the marks are greater than 9".		3						
3	188	Express the Contrapositive, Converse, Inverse and Negation forms of the conditional statement given below: I will wash the car if the weather is nice.		3						
3	189	Express the contrapositive and inverse forms of the conditional statement: "I will watch cartoon or cricket match if I turn on TV".		3						
3	190	Express the cards, Converse, Inverse and Negation form of the conditional statement: "If $2x > 0$ is even number and x is rational number, then $x + 1$ is whole number."		3						
3	191	Construct Converse, Inverse and Contra positive of direct statement "If $4x - 2 = 10, then\ x = 3.$"		3						
3	192	Check whether $(\sim p \to r) \wedge (p \leftrightarrow q)$ is a tautology, contradiction or contingency.		3						
3	193	Express the contrapositive, converse and inverse form of the following statement. $if\ 3 < b\ and\ 1 + 1 = 2$, then $\sin\frac{\pi}{3} = \frac{1}{2}$.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
3	194	Express the contrapositive and Negation forms of the conditional statement: If it is weekend ,it means there is no work to do.		2						
4	195	“The product of two negative real numbers is not negative.” Is given by?	∀x ∀y ((x < 0) ∧ (y < 0) → (xy > 0))	1	∃x ∀y ((x < 0) ∧ (y < 0) → (xy > 0))	∃x ∃y ((x < 0) ∧ (y < 0) ∧ (xy > 0))	∀x ∃y ((x < 0) ∧ (y < 0) ∧ (xy > 0))	∀x ∀y ((x < 0) ∧ (y < 0) → (xy > 0))		
4	196	If T(x) denotes is a trigonometric function. P(x) denotes x is a periodic function and C(x) denotes x is a continuous function then the statement “it is not the case that some trigonometric function are not periodic” can be 1logically represent as I) $\sim\exists x(T(X) \vee \sim P(X))$ II) $\sim\exists x(\sim T(X) \wedge \sim P(X))$ III) $\sim\exists x(T(X) \wedge \sim P(X))$ IV) $\sim\exists x(T(X) \wedge P(X))$	III only	1	I only	III only	II only	IV only		
4	197	What is the logical translation of the following statement? “None of my friends are perfect” I) $\exists x(f(x) \wedge \sim p(x))$ II) $\sim\exists x(f(x) \wedge p(x))$ III) $\exists x(\sim f(x) \wedge p(x))$ IV) $\exists x(\sim f(x) \wedge \sim p(x))$	II only	1	II only	II and III only	III only	I and IV only		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	198	The correct formula for the sentence, "not all rainy day are cold" is I) $\forall d(Rainy(d) \wedge \sim cold(d))$ II) $\forall d(\sim Rainy(d) \rightarrow cold(d))$ III) $\exists d(\sim Rainy(d) \rightarrow cold(d))$ IV) $\exists d(Rainy(d) \wedge \sim cold(d))$	IV only	1	II and III only	II only	IV only	I only		
4	199	Negation of the proposition $\exists x H(x)$ is I) $\exists x \sim H(x)$ II) $\forall x \sim H(x)$ III) $\forall x H(x)$ IV) $\sim x H(x)$	II only	1	I only	III only	II only	IV only		
4	200	If $A = \{1,2,3,4\}$ and $x \in A$ then which of the following is true? 1) $\exists x\ (x^2 = 5)$ 2) $\forall x\ (x^2 > 5)$ 3) $\forall x\ (x^2$is odd) 4) $\forall x\ (x^2 + x$ is even)	4)	1	1)	2)	3)	4)	2) & 3)	1) & 2)

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	201	Translate $\forall \boldsymbol{x} \exists \boldsymbol{y}(\boldsymbol{x} < \boldsymbol{y})$ in statement, considering domain as a real number for both the variable. I) For all real numbers x there exists a real number y such that x is less than y. II) For every real numbers y there exists a real number x such that x is less than y. III) For some real number x there exist a real number y such that x is less than y. IV) For each and every real number x and y such that x is less than y.	I only	1	I only	IV only	II only	III only		
4	202	The cnf of $p \wedge (p \rightarrow q)$ is, I) $p \wedge (p \vee q)$ II) $p \vee (p \wedge q)$ III) $p \wedge (q \vee p)$ IV) $p \wedge (\sim p \vee q)$	IV only	1	I only	IV only	II only	III only		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	203	Use quantifiers and predicates with more than one variable to express, "There is a pupil in this lecture who has taken at least one course in Discrete Maths." I) ∃x∃yP (x, y), where P (x, y) is "x has taken y," the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lectures. II) ∃x∃yP (x, y), where P (x, y) is "x has taken y," the domain for x consists of all Discrete Maths lectures, and the domain for y consists of all pupil in this class III) ∀x∀yP (x, y), where P (x, y) is "x has taken y," the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lectures IV) ∃x∀yP(x, y), where P (x, y) is "x has taken y," the domain for x consists of all pupil in this class, and the domain for y consists of all Discrete Maths lectures	I only	1	I only	II only	III only	IV only		
4	204	Find a counterexample of the statement $\forall x \forall y(xy > y)$, when it is false. where the domain for all variables consist of all integers. I) X = -1,y = 24 II) X = -5, y = 7 III) Both X = -1,y = 24 and X = -5, y = 7 IV) Does not have any counter example.	III only	1	I only	II only	III only	IV only		
4	205	The negation of the statement: "All math majors are male" I) It is not the case that all math majors are male II) There exists at least one math major who is female (not male). III) Every math majors are male. IV) Every male are math majors.	I and II only	1	I and II only	III and IV only	II only	None of these		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	206	Let T(x,y) mean that students x likes dish y, where the domain for x consists of all students at your school and the domain for y consist of all dishes. express $\sim T(Amit, South\ indian)$ by a simple English sentence. I) All the students does not like south Indian dishes. II) Amit does not like south Indian people. III) Amit does not like south Indian dishes. IV) Amit does not like some dishes.	III only	1	I only	II only	III only	IV only		
4	207	"Parul is out for a trip or it is not snowing" and "It is snowing or Raju is playing chess" then which argument is valid for these primes?	Parul is out for a trip or Raju is playing chess	1	Parul is out for trip	Raju is playing chess	Parul is out for a trip and Raju is playing chess	Parul is out for a trip or Raju is playing chess		
4	208	What would be the conclusion to the following premises in the argument? If it rains, Erik will be sick. Erik was not sick. I) It did not rain. II) If Erick is sick, it rains III) Erick is sick and it rains IV) Erick is sick or it rains.	I and II only	1	I and II only	III and IV only	III only	None of these		
4	209	The CNF of $(\sim p \to q) \wedge (p \to q)$ is, I) $(\sim p \wedge q) \wedge (p \to q)$ II) $(\sim p \vee q) \wedge (p \to q)$ III) $(p \vee q) \wedge (\sim p \vee q)$ IV) $(p \wedge q) \vee (\sim p \wedge q)$	III only	1	I only	IV only	II only	III only		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	210	Obtain cnf of i) $(\sim p \to r) \wedge (p \to q)$ ii) $(p \wedge q) \vee (\sim p \wedge q \wedge r)$		5						
4	211	Find cnf & dnf without using truth table $(p \to q) \wedge (q \to p)$		5						
4	212	Obtain CNF of following without using truth table: $\mathbf{qv\ (p \wedge r) \wedge \sim((p\ v\ r) \wedge q)}$		4						
4	213	Find dnf of i) $(p \to q) \wedge (\sim p \wedge q)$ ii) $(p \wedge (p \to q)) \to q$		5						
4	214	Find cnf of i) $p \wedge (p \to q)$ ii) $\sim (p \vee q) \leftrightarrow (p \wedge q)$		5						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	215	Find dnf of $(p \rightarrow (q \wedge r)) \wedge (\sim p \rightarrow (\sim p \wedge \sim r))$ by truth table method.		5						
4	216	Find cnf&dnf of $(p \leftrightarrow (q \vee r)) \rightarrow \sim p$ by truth table method.		7						
4	217	Obtain dnf of the form $\sim(p \rightarrow (q \wedge r))$		4						
4	218	Obtain DNF of $p \vee (\sim p \rightarrow (q \vee (q \rightarrow \sim r)))$		3						
4	219	Obtain CNF and DNF of the form $(\sim p \rightarrow r) \wedge (p \leftrightarrow q)$		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	220	Use the laws of logic to show that $[(p \to q) \wedge \sim q] \to \backsim p$ is a tautology		3						
4	221	Obtain CNF and DNF of $[\ (\sim p \vee r) \wedge (p \vee q)\ ] \leftrightarrow (q \vee \sim r)$.		3						
4	222	Find DNF with and without using truth table for $p \Rightarrow \big((p \Rightarrow q) \wedge \sim (\sim q \vee \sim p)\big)$		3						
4	223	Obtain CNF and DNF for the following using truth table: $(p \to q) \wedge (q \vee (p \wedge r))$		5						
4	224	Obtain the Disjunctive Normal Form without using truth table.$[(p \to q) \wedge (q \to r)] \to (p \to r)$		5						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
4	225	Obtain conjunctive normal forms of $(p \to q) \to (\neg r \wedge q)$.		3							
4	226	Let p: it is raining outside. & q: I have an umbrella. & r: it is sunny. Then the symbolic form of the following statement would be: "if it is raining outside and I do not have an umbrella or if it is sunny and I have an umbrella, then it is not raining outside." And Compute CNF and DNF with using truth table.		3							
4	227	Determine the validity of argument given: S1: If I like Maths then I will study S2: Either I will study or I will fail ---------- S: If I fail then I do not like Maths.		5							
4	228	Test the validity of the following argument: If I study, then I will not fail mathematics. Either I do not play basketball or I will study, but not both. But I failed mathematics. _____ Therefore, I must have played basketball		4							
4	229	Determine the validity of argument given: S1: If a man is a bachelor, he is unhappy. S2: If a man is unhappy, he dies young. ---------- S: Bachelors die young.		5							

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	230	Determine the validity of argument given: If 7 is less than 4, then 7 is not a prime number. 7 is not less than 4. ---------- 7 is a prime number		5						
4	231	Test the validity of the argument: If 8 is even number, then 2 does not divide 9. Either 7 is not prime number or 2 divides 9. But 7 is prime number. _____ Therefore, 8 is odd number.		3						
4	232	Determine the validity of argument given: If two sides of a triangle are equal, then the opposite angles are equal. Two sides of a triangle are not equal. ---------- The opposite angles are not equal.		5						
4	233	Determine the validity of argument given: If I study, then I will not fail in DM. If I do not play cricket, then I will study. But I failed in DM. ---------- Therefore, I must have played cricket.		5						
4	234	Test the validity of the argument: If my brother stands first in the class, I will give him a watch. Either he stands first or I was out of station. I did not give my brother a watch this time. I was out of station.		5						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
4	235	Test the validity of the following argument: If I drive to work, then I will arrive tired. I arrive at work tired. --- I drive to work.		4							
4	236	Determine the validity of argument given: If I don't pay my income taxes, then I file for an extension or I am a felon. I'm not afelon and I didn't file for an extension. Therefore, I paid my income taxes.		3							
4	237	Consider the argument "If you have a current password, then you can log onto the network" "You have a current password " Therefore, "You can log onto the network" Determine the validity of the argument.		5							
4	238	Write the following statements in symbolic form, using quantifiers. (i) All students have taken a course in communication skills. (ii) There is a girl student in the class who is also a sports person. (iii) Some students are intelligent, but not hard working.		3							
4	239	Rewrite the following statements using quantifiers and predicate symbols: i) All birds can fly ii) Not all birds can fly iii) Some men are genius iv) Some numbers are not rational v) Each integer is either even or odd		5							

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
4	240	Write the following two proposition in symbols. (i) 'for every number x there is a number y such that y = x+1.' (ii) 'There is a number y such that, for every number x, y = x+1.'		3						
4	241	Negate each of the statement. i) $\forall x, \lvert x \rvert = x$ ii) $\exists x, x^2 = x$ iii) If there is a riot, then someone is killed. iv) It is day light and all the people are arisen.		4						
5	242	What is the recurrence relation for 1, 7, 31, 127, 499?	$b_n = 4 b_{n-1} + 3$	1	$b_{n+1} = 5 b_{n-1} +3$	$b_n = 4 b_{n-1} + 3$	$b_{n+1} = 4 b_n + 3$			
5	243	The recurrence T(n) = 2T(n-1) + n , n≥2 and T(1)=1 evaluates to	$2^{n+1} - n - 2$	1	$2^n - n$	$2^{n+1} - n - 2$	$2^n + n$	$2^{n+1} - 2n - 2$		
5	244	Solution to recurrence relation T(n)= T(n-1)+2, is given by where n>0 and T(0)=5	T(n)= 2n+5	1	T(n)= 2n-5	T(n)=n -5	T(n)= 2n+5	T(n) =n-3		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
5	245	If the degree of a Recurrence Relation is ___, then it is called a linear Recurrence Relation?	One	1	One	Zero	Infinite	Two		
5	246	If R (n) = _ and it is of order n, the equation is a linear homogeneous difference equation?	0	1	0	1	2	Infinite		
5	247	What is the order of the equation $a_{t+20} - a_t = a_{t-19} - a_{t+18}$	39	1	39	17	19	21	18	32
5	248	If R (n) ≠ 0, then the equation is a ____ difference equation?	Linear nonhomogeneous	1	Bilinear Homogeneous	Linear Homogeneous	Bilinear nonhomogeneous	Linear non homogeneous		
5	249	What is the order of the equation $a_{r+2} - 8a_{r+1} + 5a_r = 7r + 2^r$?	2	1	0	1	2	3		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
5	250	The solution to the recurrence relation $a_n = a_{n-1} + 2n$, with initial term $a_0 = 2$ are _____	$2 + n + n^2$	1	4n+7	$2 + n + n^2$	$3n^2$	5(n+1)/2			
5	251	Find the value of a_4 for the recurrence relation $a_n = 2a_{n-1} + 3, with\ a_0 = 6$	141	1	320	221	141	65			
5	252	To determine the unique solution of the recurrence relation $a_n = 2a_{n-1}$ for $n \geq 1$, we require how many initial conditions?	1	1	0	1	2	3	n-1		
5	253	Determine the value of a_2 for the recurrence relation $a_n = 17a_{n-1} + 30n\ with\ a_0 = 3.$	1437	1	4387	5484	238	1437			
5	254	Suppose f_n is defined recursively by $f_{n+1} = 2f_n + 3$ with $f_1 = 9$ then the value of f_5 is, (a) 185 (b) 195 (c) 198 (d) 21 (e) 45 (f) 0 (g) None of these.	None of these	1	185	195	198	21	45	None of these	

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
5	255	Let $a_n = 2a_{n-1} - a_{n-2} + 4$ with $a_0 = 2, a_1 = 5$. a_{25} =___.	1277	1	125	1250	1255	1277	1297	None of these
5	256	Solve the recurrence relation $a_r - 7a_{r-1} + 10a_{r-2} = 0$ *given that* $a_0 = 0, a_1 = 3$		3						
5	257	Solve the recurrence relation $a_n = 2a_{n-1},\ a_0 = 1$		3						
5	258	Solve the recurrence relation $a_n - 3a_{n-1} + 2a_{n-2} = 0$		3						
5	259	Solve the recurrence relation $a_k - 5a_{k-1} + 6a_{k-2} = 0,\ a_0 = 2$ *and* $a_1 = 5$		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
5	260	Solve the recurrence relation $a_n + 6a_{n-1} + 12a_{n-2} + 8a_{n-3} = 0$		3						
5	261	Solve the recurrence relation $S_k = S_{k-1} + S_{k-2}, \quad k \geq 2;\ S_0 = 1, S_1 = 1$		3						
5	262	Solve the recurrence relation $a_r - 7a_{r-1} + 16a_{r-2} - 12a_{r-3} = 0;$ $a_0 = 1, a_1 = 4, a_2 = 8$		4						
5	263	Find the particular solution of the recurrence relation $a_{n+2} - 3a_{n+1} + 2a_n = 5^n$		4						
5	264	Solve the recurrence relation $a_n = 5a_{n-1} - 6a_{n-2} + 7^n$.		5						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
5	265	Solve the recurrence relation $a_n - 4a_{n-1} + 4a_{n-2} = n + 3^n$		4						
5	266	Solve the recurrence relation $a_n + 5a_{n-1} + 6a_{n-2} = 3n^2$		3						
5	267	Solve the recurrence relation $a_{n+2} - 2a_{n+1} + a_n = 3n + 5$		3						
5	268	Solve the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = 9;\ a_0 = 0, a_1 = 1$		3						
5	269	Solve the recurrence relation $a_n - 6a_{n-1} + 9a_{n-2} = (n+1)3^n$		4						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
5	270	Solve the recurrence relation $a_r - 7a_{r-1} + 12a_{r-2} = r.4^r$		4						
5	271	Solve the recurrence relation $a_{n+1} - 2a_n = 7$		3						
5	272	Solve the recurrence relation $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3}; \forall n \geq 3$, given that $a_0 = 1, a_1 = 4$ & $a_2 = 28$.		3						
5	273	Solve the recurrence relation $a_{n+2} - 5a_{n+1} + 6a_n = 4^n$		3						
5	274	Solve the recurrence relation $a_{n+1} - a_n = n^2$		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
5	275	Solve the recurrence relation $a_n - 3a_{n-1} + 2a_{n-2} = 2^n$		3						
5	276	Solve the recurrence relation $a_{n+2} - 2a_{n+1} + a_n = n^2.2^n$		4						
5	277	$a_r - 10a_{r-1} + 9a_{r-2} = 0\ with$ $a_0 = 3\ and\ a_1 = 11$. Find homogeneous solution.		4						
5	278	Consider $a_r - 8a_{r-1} + 16a_{r-2} = 0\ \ where\ a_2 = 16\ and\ a_3 = 80$, Find solution.		4						
5	279	Solve the recurrence relation: $d_n = 4(d_{n-1} - d_{n-2})$. Subject to initial conditions $d_0 = 1 = d_1$		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
5	280	Find the solution to the recurrence relation $a_n = -3a_{n-1} - 3a_{n-2} - a_{n-3}$, with initial conditions $a_0 = 1, a_1 = -2$ and $a_2 = -1$.		4							
5	281	Find total solution of $a_{r+2} + 2a_{r+1} - 3a_r = 4$		4							
5	282	Solve the recurrence relation $a_r - 4a_{r-1} + 4a_{r-2} = 3r + 2^r$		4							
5	283	Find total solution of $a_r + 5a_{r-1} + 6a_{r-2} = 3r^2 - 2r + 1$		5							
5	284	Solve $a_r - 7a_{r-1} + 10a_{r-2} = 6 + 8r$ with $a_0 = 1, a_1 = 2$		4							

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
5	285	Find the general solution of $a_r + 5a_{r-1} + 6a_{r-2} = 42.4^r$		5						
5	286	Solve: $a_r - 4a_{r-1} + 4a_{r-2} = (r+1)2^r$		5						
5	287	Solve the recurrence relation$a_n = 3a_{n-1} - 2a_{n-2} + 2^n + 3n.$		4						
5	288	Solve: $a_r - a_{r-1} - 6a_{r-2} = -30$ *given* $a_0 = 20, a_1 = -5$		4						
5	289	Solve the equation with given boundary conditions. $a_r - 5a_{r-1} + 6a_{r-2} = 2^r + r, \quad r \geq 2,$ $a_0 = 1,\ a_1 = 1$		5						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
5	290	Solve the recurrence relation $a_n + 6a_{n-1} + 12a_{n-2} + 8a_{n-3} = 2^n, r \geq 3,$ $a_0 = 0,\ a_1 = 0, a_2 = 2$		5							
5	291	Solve the recurrence relation $a_n = 2a_{n-1} + 3a_{n-2} + 5^n, n \geq 2,$ $a_0 = -2,\ a_1 = 1$		4							
5	292	Solve the recurrence relation $a_r - 4a_{r-1} + 4a_{r-2} = 0, given\ that$ $a_0 = 1,\ a_1 = 6$		4							
5	293	Solve the recurrence relation: $d_n = 3d_{n-1} - 2d_{n-2}$. Subject to initial conditions $d_1 = -2, d_2 = 4$		4							
5	294	Solve the recurrence relation $a_n = -3a_{n-1} - 3a_{n-2} - a_{n-3}\ , given\ that\ a_0 = 5,\ a_1 = -9,\ a_2 = 15$		4							

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
6	295	The binary relation $\{(1,1),(2,1),(2,2),(2,3),(2,4),(3,1),(3,2),(3,3)\}$ on the set $\{1,2,3,4\}$ is _____.	no reflexive, no irreflexive, no transitive	1	reflective, symmetric and transitive	irreflexive, symmetric and transitive	no reflexive, no irreflexive, no transitive	irreflexive and antisymmetric			
6	296	Consider the relation: $R'(x,y)$ if and only if $x,y>0$ over the set of non-zero rational numbers, then R' is _____.	an equivalence relation	1	not equivalence relation	an equivalence relation	transitive and asymmetry relation	reflexive and antisymmetric relation			
6	297	What is the Cartesian product of set A and set B, if the set $A=\{1,2\}$ and set $B=\{a,b\}$?	{(1,a), (2,a), (1,b), (2,b)}	1	{(1,a), (1,b), (2,a), (b,b)}	{(1,1), (2,2), (a,a), (b,b)}	{(1,a), (2,a), (1,b), (2,b)}	{(1,1), (a,a), (2,a), (1,b)}			

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
6	298	The transitive closure of the relation $R = \{(0,1),(1,2),(2,2),(3,4),(5,3),(5,4)\}$ where $A = \{0,1,2,3,4,5\}$ is _____.	{(0,1), (0,2), (1,2), (2,2), (3,4), (5,3), (5,4)}	1	{(0,1), (0,2), (1,2), (2,2), (3,4), (5,3), (5,4)}	(0,0), (4,4), (5,5), (1,1), (2,2), (3,3)}	{(0,1), (1,2), (2,2), (3,4)}	{(0,1), (5,3), (5,4), (1,1), (2,2) }			
6	299	The transitive closure of a relation $R = \{(a,b),(c,b)\}$, where $A = \{a,b,c\}$ is,	{(a,b), (c,b) }	1	{(a,b) ,(c,b), (a,a)}	{(a,b),(c,b),(a, a),(b,b) }	{(a,b), (c,b)}	{(a,b),(b,c)}	{(a,b),(c ,b),(b,c), (a,c),(c,c)}	{(a,b), (b,c),(a,c),(a, a) }	
6	300	For two distinct sets, A and B, having cardinalities m and n respectively, the maximum cardinality of a relation R from A to B is?	mn	1	$m+n$	mn	m^n	None of the abov e			
6	301	$R = \{(2,4),(2,6),(3,6),(3,9)\}$ domain of R is_____.	{2,3}	1	{2, 3}	{4, 6, 9}	{2, 3, 4, 6, 9}	None of the abov e			
6	302	Let $A = \{1,2,3\}$ and $R = \{(1,1),(1,2),(2,3)\}$. Which of the following is true?	None of the above	1	R is reflex ive	R is symme tric	R is transit ive	None of the abov e			

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
6	303	Let R be a relation on the set N be defined by $\{(x,y)/x,y \in N, 2x+y=41\}$. Then R is	None of these	1	Reflexive	Symmetric	Transitive	None of these			
6	304	Let $A=\{1,2,3\}$ and $R=\{(1,1),(1,2),(2,1),(2,2),(3,3)\}$. Which of the following is true?	R is reflexive, symmetric and transitive	1	R is reflexive and symmetric but not transitive	R is reflexive and transitive but not symmetric	R is symmetric and transitive but not reflexive	R is reflexive, symmetric and transitive			
6	305	Which of the following is an equivalence relation?	{(1,1),(2,2)(3,3)}	1	{(1,2),(2,3),(3,4)}	{(1,1),(2,2),(3,3)}	{(1,2),(2,1),(3,4)}	{(1,2),(2,3),(3,2)}			
6	306	Which of below are compatible relations but not equivalence relations: I. $\forall x,y \in \mathbb{Z}, xRy$ iff $x \equiv y(mod\ m)$ where $m \in \mathbb{N}$. II. $\forall x,y \in \mathbb{Z}, xRy$ iff $x > y$. III. Blood relation in family set = {father, mother, elder son, younger son, elder daughter, younger daughter}. IV. $\forall a,b,c,d \in \mathbb{Z}, (a,b)R(c,d)$ iff $a^2+c=d+b^2$. V. $\forall A,B,C \subseteq \mathbb{R}, A$ is relation with B iff $A \cap B \neq \emptyset$.	Any two	1	Any one	Any two	Any three	Any four	All of them	None of above	

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	307	How many ordered pairs are there in the smallest equivalence relation on a set with 8 elements?	8	1	10^2	10^8	3^2	16	32	8
6	308	Which of the following is not an antisymmetric relation?	{(1,2), (2,1)(3,4)}	1	{(1,2) ,(2,3), (3,4)}	{(1,1), (2,2),(3,3)}	{(1,2), (2,1),(3,4)}	None of these		
6	309	"From set of all straight lines in 2D plane, lines are in relation iff they are not parallel to each other'' is, I. Reflexive II. Irreflexive III. Symmetric IV. Anti symmetric V. Transitive	Any two	1	Any one	Any two	Any three	Any four	All of above	None of them
6	310	Let T be the set of all triangles in the Euclidean plane and let a relation R on T be defined as aRb if a congruent to b, for all $a, b \in T$. Then R is	(c) and (d)bot h	1	reflex ive but not transit ive	Transit ive but not symme tric	equiva lence	Com patibl e Relat ion	(c) and (d) both	
6	311	Let R be the relation in the set $\boldsymbol{N}$given by $R = \{(a, b) : a = b - 2, b > 6\}$. Choose the correct answer.	(6,8)∈ R	1	(2,4) ∈R	(3,8)∈ R	(6,8)∈ R	(8,7) ∈R		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	312	Let $A = \{1,2,3,4\}$ and R be a relation on A defined by $(a, b) \in R$ if $a + b$ is odd. Which of the following is true about R?	R is symmetric	1	R is reflexive	R is symmetric	R is transitive	R is an equivalence relation		
6	313	Let R be the relation in the set $\{1, 2, 3, 4\}$ given by $R = \{(1, 2), (2, 2), (1, 1), (4,4), (1, 3), (3, 3), (3, 2)\}$. Choose the correct answer.	R is reflexive and transitive but not symmetric	1	R is reflexive and symmetric but not transitive.	R is reflexive and transitive but not symmetric	R is symmetric and transitive but not reflexive.	R is an equivalence relation		
6	314	Let $A = \{1, 2, 3\}$. Then number of relations containing $(1, 2)$ and $(1, 3)$ which are reflexive and symmetric but not transitive is	1	1	1	2	3	4		
6	315	Let $A = \{1, 2, 3\}$. Then number of equivalence relations containing $(1, 2)$is _____.	2	1	1	2	3	4		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	316	Let $A = \{1, 2, 3\}$. Then the number of relations containing $(1, 2)$ and $(2, 3)$ which are reflexive and transitive but not symmetric is _____.	3	1	1	2	3	4		
6	317	The number of equivalence relation in the set $\{1, 2, 3\}$ containing $(1, 2)$ and $(2, 1)$ is	2	1	1	2	3	4		
6	318	Let R be a relation on the set N of natural numbers defined by nRm if n divides m. Then R is	Reflexive, transitive but not symmetric	1	Reflexive and symmetric	Transitive and symmetric	Equivalence	Reflexive, transitive but not symmetric		
6	319	The maximum number of equivalence relations on the set $A = \{1, 2, 3\}$ are	5	1	1	2	3	5		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	320	Let us define a relation R in R as aRb if $a \geq b$. Then R is	reflexive, transitive but not symmetric	1	an equivalence relation	reflexive, transitive but not symmetric	symmetric, transitive but not reflexive	neither transitive nor reflexive but symmetric		
6	321	The relation R is defined on the set of natural numbers as $\{(a, b) : a = 2b\}$. Then, R^{-1} is given by	{(1, 2), (2, 4), (3, 6), …….. }	1	{(2, 1), (4, 2), (6, 3),…. }	{(1, 2), (2, 4), (3, 6), …….. }	$R^{-1}$is not defiend	None of these		
6	322	What type of relation is ‘less than’ in the set of real numbers?	only transitive	1	only symmetric	only transitive	only reflexive	equivalence		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
6	323	Let R be an equivalence relation on a finite set A having n elements. Then the number of ordered pairs in R is _____.	greater than or equal to n	1	less than n	greater than or equal to n	Less than or equal to n	None of these			
6	324	Which one of the following relations on R is an equivalence relation?	aR_1b ⇔|a|=|b|	1	aR_1b ⇔|a|=|b|	aR_2b⇔ a ≥ b	aR_3b ⇔a divides b	aR_3b ⇔a< b			
6	325	Let $P = \{(x, y): x^2 + y^2 = 1, x, y \in R\}$. Then, P is	Symmetric	1	Reflexive	Symmetric	Transitive	Anti-symmetric			
6	326	If $A = \{1,2,3\}$, $B = \{4,6,9\}$ and R is a relation from A to B defined by 'x *is smaller than* y'. The range of R is _____.	{4,6,9}	1	{4,6,9}	{1,2,3}	{1,4,6,9}	{1}			
6	327	The range of the relation $R = \{(x, x^2) \mid x$ is a prime number less than $13\}$ is	{4,9,25,49,121}	1	{2,3,5,7}	{2,3,5,7,11}	{4,9,25,49,121}	{1,4,9,25,49,121}			

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	328	If $A = \{x, y, z\}$, $B = \{X, Y, Z\}, C = \{x, y\}, D = \{Y, Z\}$, R is a relation from A to B defined by $R = \{(x, X), (x, Y), (y, Z)\}$ and S is a relation from C to D defined by $S = \{(x, Y), (y, Z)\}$. Find R', $R \cup S, R \cap S$ and $R - S$.		3						
6	329	Let $A = \{2,3,5\}$ and $B = \{6,8,10\}$ and define a binary relation R from A to B as follows: For all $(x, y) \in A \times B$, $(x, y) \in R \iff x/y(x$ divides $y)$ Write each R and R^{-1} as a set of ordered pairs.		2						
6	330	Let R be the relation on the set $\{1,2,3,4,5\}$ defined by the rule $(x, y) \in R$ if $x + y \leq 6$. Find the followings: (a) List the elements of R (b) List the elements of R^{-1} (c) Domain of R (d) Range of R (e) Range of R^{-1} (f) Domain of R^{-1} Also, check the domain of R is equal to range of R^{-1} and range of R is equal to domain of R^{-1}.		4						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	331	Given $A = \{1,2,3,4\}, B = \{a, b, c\}$ and $C = \{x, y, z\}$. Let R and S are the following relations from A to B and B to C, respectively $R = \{(1, b), (2, a), (2, c)\}$ and $S = \{(a, y), (b, x), (c, y), (c, z)\}$ (i) Determine the matrix and graph of the relation R , S, $R^{-1}, S^{-1}, and\ R \cdot S$. (ii) Determine inverse R^{-1} and S^{-1}. (iii) Find the range and domain of R^{-1} and S^{-1}.		4						
6	332	Let $A = \{1,2,3,4,6\}$ and let R be the relation on A defined by $'x\ divides\ y'$. Find R and draw the digraph of R.Find matrix of R. Find inverse relation of R.		3						
6	333	For each of these relations on the set $\{1,2,3,4\}$, decide whether it is symmetric, whether it is reflexive, whether it is transitive and whether it is anti-symmetric. (a) $\{(1,1), (1,2), (2,1), (2,2), (3,3), (4,4)\}$ (b) $\{(1,1), (2,2), (3,3), (4,4)\}$ (c) $\{(1,3), (1,4), (2,3), (2,4), (3,1), (3,4)\}$		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	334	Let $A=\{1,2,3,4\}$, which of the following relations are antisymmetric? $R_1=\{(1,1),(1,2),(2,1),(2,2),(3,4),(4,1),(4,4)\}$, $R_2=\{(1,1),(1,2),(2,1)\}$, $R_3=\{(1,1),(1,2),(1,4),(2,1),(2,2),(3,3),(4,1),(4,4)\}$, $R_4=\{(2,1),(3,1),(3,2),(4,1),(4,2),(4,3)\}$, $R_5=\{1,1),(1,2),(1,3),(1,4),(2,2),(2,3),(2,4),(3,3),(3,4),(4,4)\}$, $R_6=\{(3,4)\}$.		3						
6	335	Consider the following relations on $\{1,2,3,4\}$: $R_1=\{(1,1),(1,2),(2,1),(2,2),(3,4),(4,1),(4,4)\}$, $R_2=\{(1,1),(1,2),(2,1)\}$, $R_3=\{(1,1),(1,2),(1,4),(2,1),(2,2),(3,3),(4,1),(4,4)\}$, $R_4=\{(2,1),(3,1),(3,2),(4,1),(4,2),(4,3)\}$, $R_5=\{(1,1),(1,2),(1,3),(1,4),(2,2),(2,3),(2,4),(3,3),(3,4),(4,4)\}$, $R_6=\{(3,4)\}$. Which of these relations are reflexive, symmetric, transitive?		4						
6	336	Give an example of a relation which is: (1) reflexive and transitive but not symmetric; (2) symmetric and transitive but not reflexive; (3) reflexive and symmetric but not transitive; (4) reflexive and transitive but neither symmetric nor antisymmetric.		4						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
6	337	Show that the relation "Equality" defined in any set A, is an Equivalence relation.		3							
6	338	If R be a relation in the set of integers Z defined by $R = \{(x, y): x \in Z, y \in Z,\ (x - y)$is divisible by 6} then prove that R is an equivalence relation.		3							
6	339	Let Z denote the set of integers and the relation R in Z be defined by "aRb" iff $a - b$ is an even integer". Then show that R is an equivalence relation.		3							
6	340	Let R be the relation on the set of order pairs of positive integers such that $(a, b)R(c, d)$ if and only if $ad = bc$. Show that R is equivalence relation.		4							
6	341	$A = \{1,2,3,4\}$ If $R = \{(a, b)/(a - b)$ is an integral multiple of $2\}$ then find the digraph of relation and find the relation matrix M_R.		3							

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	342	Show that the relation $x \equiv y(mod\ 5)$ defined on the set of integers I is an equivalence relation.		3						
6	343	If R be a relation in the set of integers z defined by $R = \{(x, y): x \in z, y \in z, x - y$ is divisible by 3} Show that the relation R is an equivalence relation.		3						
6	344	Show that the relation 'is divisor of' in the set of $+ve$ integers is reflexive and transitive but not symmetric.		3						
6	345	Let $X = \{1,2,3,4\}$ and $R = \{(x, y) \mid x > y\}$. Draw the graph of R and also give its matrix. Check whether the given relation an equivalence relation?		4						
6	346	Let N be the set of natural numbers. Let R be a relation in N defined by xRy if and only if $x + 3y = 12$ Examine the relation for (i) reflexive (ii) symmetric (iii) transitive.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	347	Given $S = \{1,2,3,_{,} \dots \dots, 10\}$ and a relation R on S. Whrere, $R = \{(x, y)/x + y = 10\}$. What are the properties of relation R?		3						
6	348	Let A be a set of integers, let R be the relation on $A \times A$ defined by $(a, b)\ R\ (c, d)$ if and only if $a + d = b + c$. Prove that R is an equivalence relation.		4						
6	349	Let R be the relation on the set of order pairs of integers such that $(a, b)R(c, d)$ if and only if $a - d = c - b$. Is R equivalence relation?		4						
6	350	Consider the following relation on $\{1,2,3,4,5,6\}$. $R = \{(i, j)/\lvert i - j\rvert = 2\}$ Is $'R'$ transitive? Is R reflexive? Is R symmetric?		4						
6	351	Let R be a binary relation defines as $R = \{(a, b) \in R^2 : (a - b) \leq 3\}$, determine whether R is reflexive, symmetric, antisymmetric and transitive.		4						

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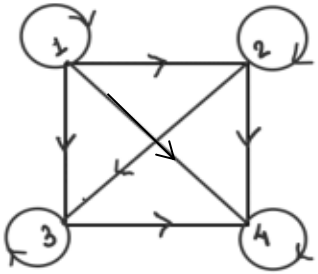
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	352	Show that the relation $(x, y)R(a, b) \iff x^2 + y^2 = a^2 + b^2$ is an equivalence relation. The relation R on $\mathbb{N}$.		3						
6	353	Determine whether the relation for the directed graph shown in figure are reflexive, symmetric, antisymmetric and or transitive. 		3						
6	354	If R and S are two equivalence relations on a set A, show that $R \cap S$ is also an equivalence relation on$A$.		3						
6	355	Union of two equivalence relation R and S , i.e., $R \cup S$ on set A is always reflexive and symmetric.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
6	356	If R is equivalence relation on set A then prove that R^{-1} is also equivalence relation on set A.		4							
6	357	Determine whether the relation R on set of all integers is reflexive, symmetric and transitive. Where $(x, y) \in R$ if and only if (i) $xy \geq 1$ (ii) $x \equiv y(mod\ 7)$		3							
6	358	Let m be the positive integer greater than 1 show that the relation $R = \{(a, b)/a \equiv b(mod\ m)\}$i.e. aRb iff m divides a-b in equivalence relation on the set of integers.		3							
6	359	Prove that the relation R is an equivalence relation, for the set of complex numbers is defined by $z_1 R z_2 \Leftrightarrow \left[\frac{z_1 - z_2}{z_1 + z_2}\right]$is real.		4							
6	360	If $A = \{1,2,3,4,5\}$ and $R = \{(1,2), (3,4), (4,5), (4,1), (1,1)\}$ find its transitive closure without using Warshall's Algorithm.		4							

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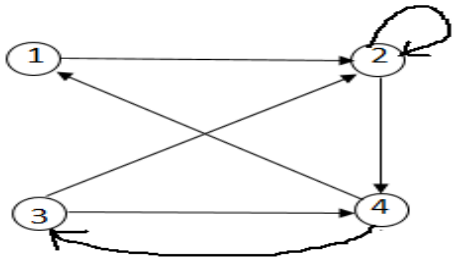
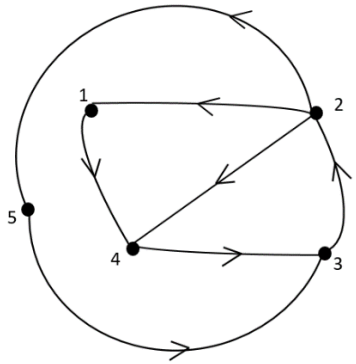
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	361	Find the transitive closure without using Warshall's Algorithm of the relation R on $A = \{1,2,3,4\}$ defined by the directed graph as shown in the figure. 		4						
6	362	Find the transitive closure of the relation R represented by the given digraph without using Warshall's algorithm. 		3						
6	363	Let $A = \{1,2,3,4\}$ and let$R = \{(1,1),(1,2),(1,4),(2,4),(3,1),(3,2),(4,2),(4,3),(4,4)\}$. Find transitive closure by using Warshall's algorithm.		4						

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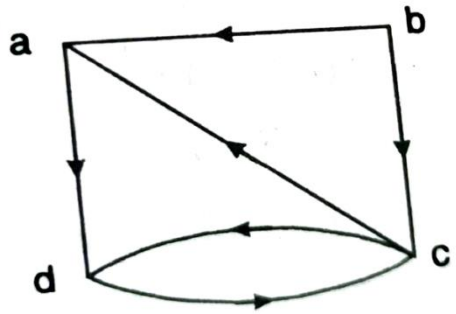
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	364	By using Warshall's algorithm, find the transitive closure of the relation $R = \{(2,1), (2,3), (3,1), (3,4), (4,1), (4,3)\}$ on set $A = \{1,2,3,4\}$.		4						
6	365	Find the transitive closure of R using Warshall's algorithm for $A = \{1, 2, 3, 4, 5, 6\}$ and $R = \{(x, y)/\|x - y\| = 2\}$.		4						
6	366	Let $A = \{11, 12, 13, 14\}$ and let $R = \{(11, 12), (12, 13), (13, 14), (12, 11)\}$. Find transitive closure of R using Warshall's algorithm.		4						
6	367	Let R be a relation with given directed graph. Find the matrix of transitive closure of R using Warshall's algorithm. 		4						

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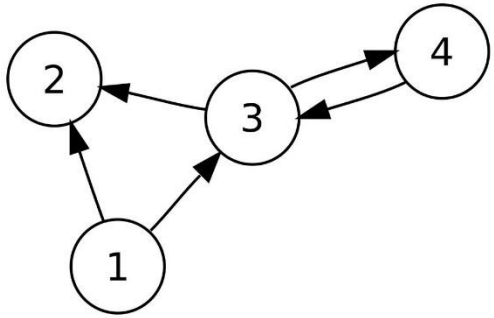
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	368	Find the transitive closure of R by Warshall's algorithm,  		4						
6	369	Let R be a relation on set $A = \{1,2,3,4,5\}$ and $R = \{(1,1), (1,2), (1,3), (1,4), (3,1), (3,2),$ $(5,1), (5,2), (5,3), (5,4), (5,5)\}$. Find transitive closure for R using Warshall's algorithm.		5						
6	370	Let $A = \{a_1,\ a_2,\ a_3,\ a_4,\ a_5\}$ and let R be a relation on A whose matrix is $M_R = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 \end{bmatrix}$ Find transitive closure of R using Warshall'salgorithm.		5						
6	371	Let R be a relation on set $A = \{1,2,3,4\}$ and $R = \{(1,1), (1,4), (2,1), (2,2), (3,3), (4,4)\}$. Find transitive closure for R using Warshall's algorithm.		5						

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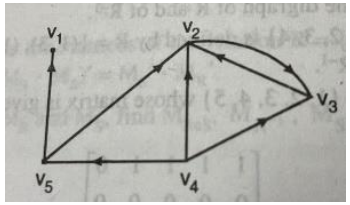
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
6	372	Find the transitive closure of R by Warshall's algorithm, $A = \{p, q, r, s, t\}$ and $R = \{(p,p), (p,s), (s,t), (s,q), (q,t), (r,r), (r,p), (t,s)\}$.		4						
6	373	Find the transitive closure of R by Warshall's algorithm where $A = \{1,2,3,4,5,6\}$ and $R = \{(1,3), (3,1), (2,4), (4,2), (4,6), (6,4), (3,5), (5,3)\}$		4						
6	374	Let R be a relation with directed graph shown in the figure, using Warshall's algorithm find the transitive closure of R. 		**4**						
7	375	Let a set S = {2, 4, 8, 16, 32} and $\leq$ be the partial order defined by a $\leq$b if a divides b. Number of edges in the Hasse diagram of S ____	4	1	5	6	3	4		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	376	The less-than relation, $<$, on a set of real numbers is _____	Not a partial ordering because it is not reflexive	1	Not a partial ordering because it is not reflexive	A partial ordering since it is antisymmetric and reflexive	A partial ordering since it is symmetric and reflexive	None of these		
7	377	$\leq$ is The relation a partial order if it is_____	reflexive, antisymmetric and transitive	1	reflexive, symmetric	asymmetric, transitive	reflexive, antisymmetric and transitive	irreflexive and transitive		
7	378	Which of the following is NOT necessary for a relation to be called a partially ordered relation?	Asymmetric relation	1	Reflexive relation	Anti-symmetric relation	Transitive relation	Asymmetric relation		

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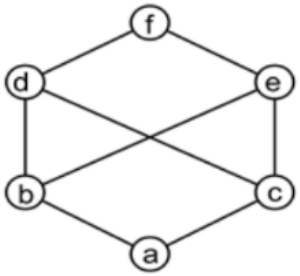
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	379	If $P = \{1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60\}$, then number of edges in the poset diagram of poset $(P\ ; |)$ is	20	1	17	20	18	19	20	22
7	380	A Poset in which every pair of elements has both a least upper bound and a greatest lower bound is termed as _____	lattice	1	sublattice	lattice	Complemented	None of these		
7	381	The graph given below is an example of _____ 	non-lattice poset	1	partial lattice	semilattice	non-lattice poset	bounded lattice		
7	382	Consider the lattice, the divisor of 42 ordered by divisibility then the complement of 6 is _____	7	1	7	1	14	2		

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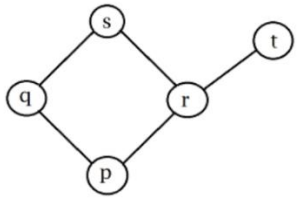
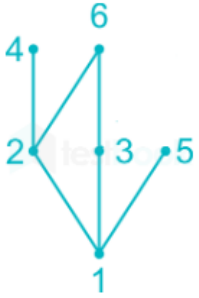
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	383	Consider the lattice the divisors of 60 ordered by divisibility. The compliment of 2 is	None of these	1	4	5	10	None of these		
7	384	Which element is 'minimal' in the following diagram? 	p	1	q	s	t	p		
7	385	What is the sum of maximal elements of the given Hasse Diagram? 	None of these	1	10	11	0	1	9	None of these
7	386	Which element of the poset $\{\{1,2,3,4,5,6,7,8,9,10,11,12\};\mid\}$ are maximal?	{7,8,9, 10,11, 12}	1	{1}	{7}	{7,8}	{7,8, 9}	{7,8,9,1 0,11,12}	None of these

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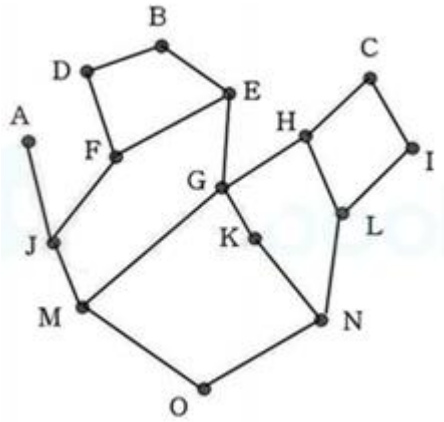
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	387	Consider the partially ordered set $S = \{A, B, C, D, E, F, G, H, I, J, K, L, M, N, O\}$ described by the Hasse diagram in the following figure  (I) The upper bound is B (II) Minimal element is O (III) Maximal elements are A, B, C (IV) Minimal elements are M, O, N	II, III are correct	1	I, II, III, IV are correct	I, II, III are correct	II, III are correct	I, IV are correct	I, II are correct	III, IV are correct
7	388	Let $D_{30} = \{1, 2, 3, 5, 6, 10, 15, 30\}$ and relation 'divides' be partial ordering on D_{30}. The all lower bounds of 10 and 15 respectively are	1,5	1	1,3	1,5	1, 3, 5	None of these		
7	389	Let $D_{30} = \{1, 2, 3, 5, 6, 10, 15, 30\}$ and relation 'divides' be partial ordering onD_{30}. The lub of 10 and 15 respectively is	30	1	30	15	10	6		

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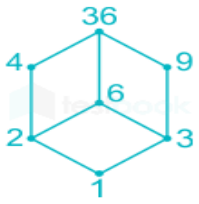
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	390	Consider the Poset $(Z^+, \mid)$, where Z^+ is the set of all positive integers and $\mid$ is the divisibility relation. Greatest lower bound and least upper bound of the set $\{2, 6, 15, 21\}$ in the given Poset respectively are:	1, 210	1	2, 21	1, 21	2, 210	1, 210	2, 15	1, 15
7	391	Let $A = \{1, 2, 3, 4, 6, 24, 36, 72\}$. Let $\leq$ be the partial order defined by $a \leq b$ if a divides b. Number of edges in the Hasse diagram of $(A, \leq)$ is___	11	1	12	14	13	11		
7	392	If $A = \{1,2,3,6,9,18,20\}$ then the number of edges in the Hasse Diagram of POSET $(A, \mid)$ is,	None of these	1	1	2	3	4	5	None of these
7	393	If $L = \{1, 2, 3, 4, 6, 9, 36\}$ is the lattice find the number of complements 9 is having in the below given Hasse diagram? 	2	1	3	4	6	2		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	394	Show that the relation $\geq$ is a partial ordering on the set of integers.		3						
7	395	Show that the set Z^+ of all positive integers under divisibility forms a poset.		3						
7	396	Define the relation R on the set Z by aRb if $a - b$ is non-negative even integer. Verify that R defines a partial order for Z.		3						
7	397	In set of natural number N = {1, 2, 3,….} show that the relation R defined as $aRb \iff a = b^k$ for a, b , k ∈ N is a partial order relation.		3						
7	398	Draw the digraph for the following relation and determine whether the relation is reflexive, symmetric, transitive and antisymmetric. $A = \{1,2,3,4,5,6,7,8\}$ and let xRy whenever y is divisible by x.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	399	Let R be the relation on the set A. $A = \{5, 6, 8, 10, 28, 36, 48\}$. Let $R = \{(a, b), a \text{ is a divisor of } b\}$. Draw the Hasse Diagram.		3						
7	400	Let $A = \{1,2,3,4,5,6,7,8,9,12,18,24\}$ be ordered by the relation x divides y. Show that the relations is partial ordering and draw the Hasse diagram.		3						
7	401	Draw the Hasse diagram of D_{24} with the relation divisibility.		3						
7	402	Draw the Hasse diagram for the partial ordering $\{(A, B) / A \subseteq B\}$ on the power set P(S) where $S = \{a, b, c\}$.		3						
7	403	Let $A = \{2, 3, 4, 6, 8, 24, 48\}$ be the partially ordered set with the relation R. 'x divides y'. Draw the Hasse diagram.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	404	Draw Hasse diagram for the following relations on set $A = \{1,2,3,4,12\}$. $R = \{(1,1),(2,2),(3,3),(4,4),(12,12),(1,2),(4,12),(1,3),(1,4),(1,12),(2,4),(2,12),(3,12)\}$		3						
7	405	Let $A = \{a,b,c,d\}$ and x be a relation on A whose matrix is $M_R = \begin{bmatrix}1 & 0 & 1 & 1\\ 0 & 1 & 1 & 1\\ 0 & 0 & 1 & 1\\ 0 & 0 & 0 & 1\end{bmatrix}$. (i) Prove that R is partial order. (ii) Draw Hasse diagram of R.		4						
7	406	Let $A = \{1,2,3,4\}$ and consider the relation $R = \{(1,1),(2,1),(2,2),(3,1),(3,3),(3,4),(4,4)\}$. Show that R is a partial ordering, and draw the Hasse diagram.		4						
7	407	Determine the Hasse diagram of the relation R. $A = \{1,2,3,4,5\}. R = \{(1,1),(1,2),(1,3),(1,4),(1,5),(2,4),(3,5),(2,2),(3,3),(4,4),(5,5)\}$		3						

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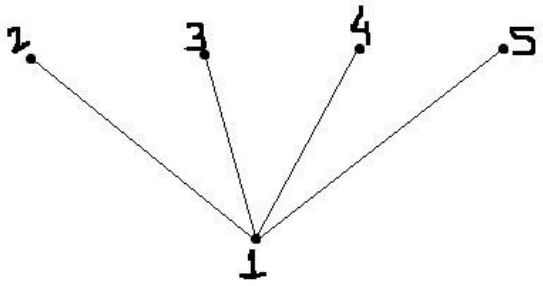
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	408	Determine the Hasse diagram of the relation on $A = \{1,2,3,4,5\}$. Whose matrix is shown. $$M_R = \begin{bmatrix} 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$		3						
7	409	Determine the matrix of the partial order whose Hasse diagram is given in the figure: 		3						
7	410	Draw the Hasse diagram of the following sets under partial ordering relation "divides" and indicate those which are chains. $(a)\{1,3,9,18\}$ (b)$\{1,2,5,10,20\}$		4						

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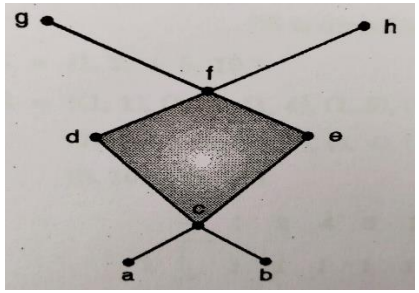
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	411	Draw Hasse diagram for the lattice (S_{30}, D) where S_{30} is the set of divisors of 30 and D is the divides relation.		3						
7	412	Let $A = \{a, b, c, d, e, f, g, h\}$ be the poset whose Hasse diagram is shown in figure. Find GLB and LUB of $B = \{c, d, e\}$. 		4						

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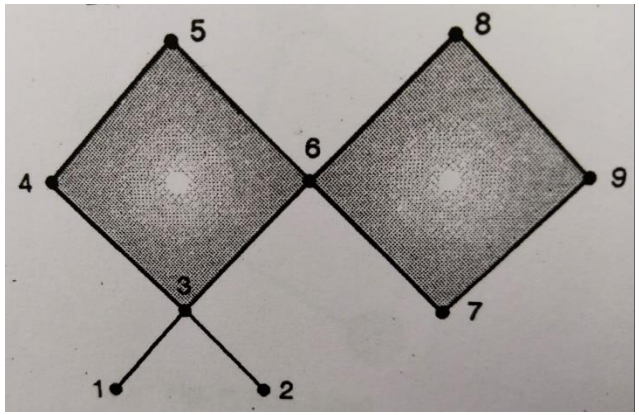
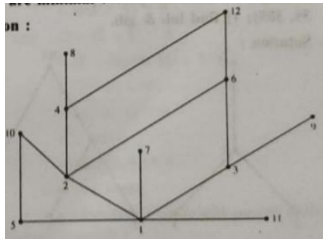
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	413	Let A be poset whose Hasse diagram is shown in figure. $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$. Find GLB, LUB of set $B = \{3,4,6\}$. 		4						
7	414	Which elements of the poset$\{\{1,2,3,4,5,6,7,8,9,10,11,12\}\}$ are maximal and which are minimal? 		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	415	Consider the divides relation on $S = \{2, 3, 5, 30, 60, 120, 180, 360\}$. Draw the Hasse diagram and find (a) all minimal and maximal element. (b) Greatest and least element		4						
7	416	Draw the Hasse diagram for the Poset $(\{\{1\},\{2\},\{4\},\{1,2\},\{1,4\},\{2,4\},\{3,4\},\{1,3,4\},\{2,3,4\}\},\subseteq)$. (a) Find the maximal elements. (b) Find the minimal elements. (c) Find all the upper bounds of $\{\{2\},\{4\}\}$. (d) Find the least upper bound of $\{\{2\},\{4\}\}$, if it exists. (e) Find all the lower bounds of $\{\{1,3,4\},\{2,3,4\}\}$. (f) Find the greatest lower bound of $\{\{1,3,4\},\{2,3,4\}\}$, if it exists.		3						

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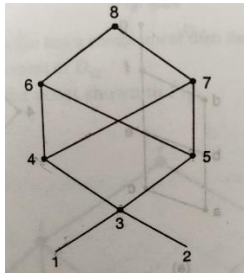
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	417	Consider the poset$A = \{1, 2, 3, 4, 5, 6, 7, 8\}$ under the partial order whose hasse diagram is as shown below. Consider the subsets $B = \{1,2\}$ and $C = \{3,4,5\}$ of A. Find (i) All the lower and upper bound of B and C. (ii) glb(B) ,lub(B), glb(C) and lub(C). 		4						
7	418	Find the greatest lower bound and least upper bound of the set (3, 9, 12) and (1, 2, 4, 5, 10) if they exists in the poset (Z^+, |). Where | is relation of divisibility.		4						
7	419	Draw Hasse diagram for partial ordering that the set of all subset of {1, 2, 3, 4} having at most two numbers partially devoted by ⊇ . Also find maximal, minimal, greatest and least elements.		4						

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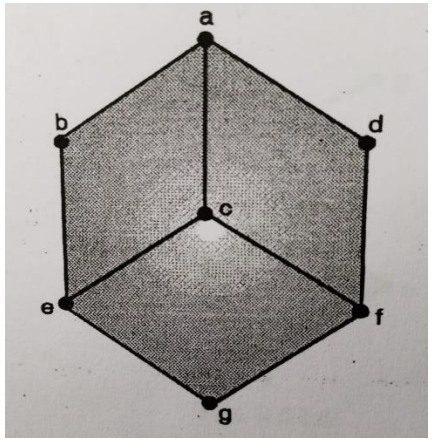
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	420	Which of the following diagram in the figure represents a lattice? Justify. 		3						
7	421	Find the complement of each element in D_{42} with the relation divisibility.		2						

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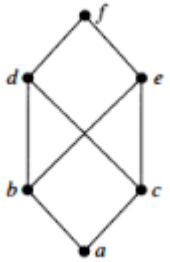
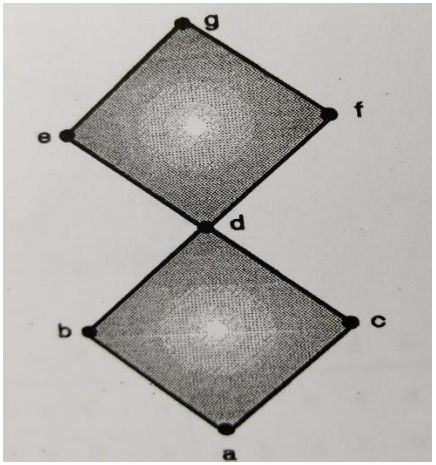
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	422	Determine whether the poset represents by the following Hasse diagram is lattice or not. Justify your answer. 		3						
7	423	Which of the following diagram in the figure represents a lattice? Justify. 		3						

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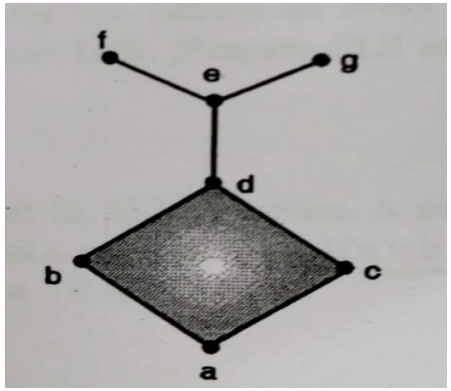
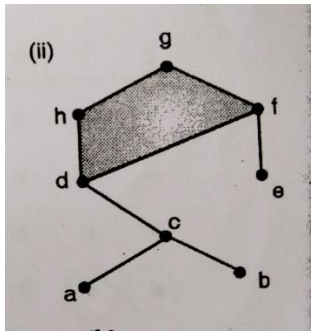
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	424	Which of the following diagram in the figure represents a lattice? Justify. 		3						
7	425	Check whether the following Hasse diagram represents a lattice? 		3						

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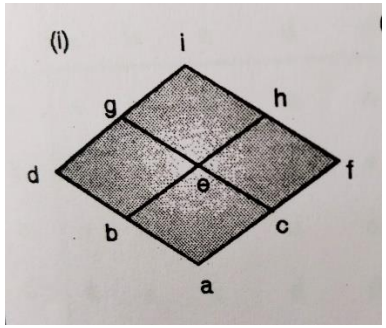
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	426	Check whether the following Hasse diagram represents a lattice? 		3						
7	427	Let $(D_{30}, \mid)$ denote the Poset of all divisors of 30. (a) Is D_{30} a lattice? Explain. (b) Is D_{30}a complemented lattice? Explain. (c) Is D_{30}a distributive lattice? Explain. (d) Is D_{30}a Boolean Algebra? Explain.		4						
7	428	Determine whether D_{66} under the relation 'division' is a distributive lattice or not.		5						
7	429	Show that the set of all divisors of 70 under the relation 'divides' is a lattice.		4						

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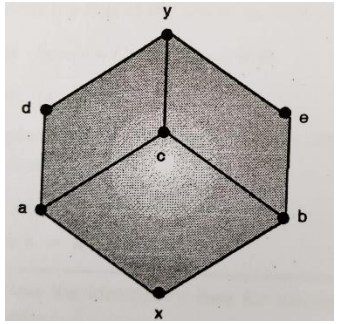
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	430	Let $A = \{1, 2, 3, 4, 6, 9, 12, 18, 36\}$ and the relation is divisibility on A. (i)Prove that R is a Partial Order relation. (ii)Draw Hasse Diagram of R (iii) Also prove that it is a Lattice or not.		4						
7	431	Consider the lattice L in figure. Determine whether or not each of the following is a sublattice of L. $L_1 = \{x, a, b, y\}$, $L_2 = \{x, a, e, y\}$ 		4						

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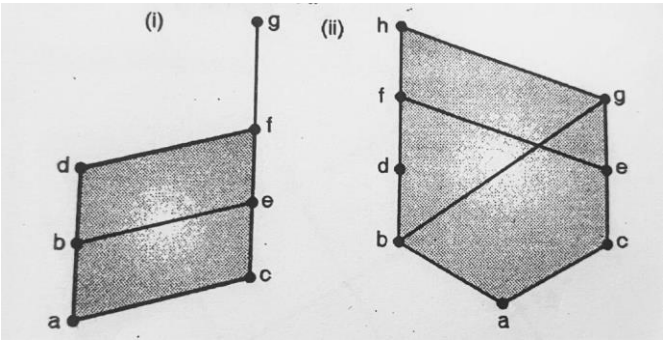
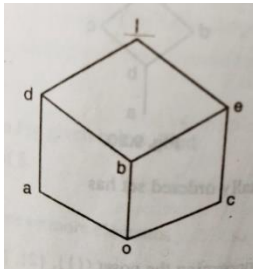
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	432	Determine whether the posets with Hasse diagrams given below are lattice or not. If it is lattice then any of them is bounded lattice or not? 		4						
7	433	Find the complement of each element in D_{20} under the relation ‘divides’.		3						
7	434	Consider the lattice L find (a) Find complement of a and b, if they exists. (b) Is L distributive? Complemented? 		4						

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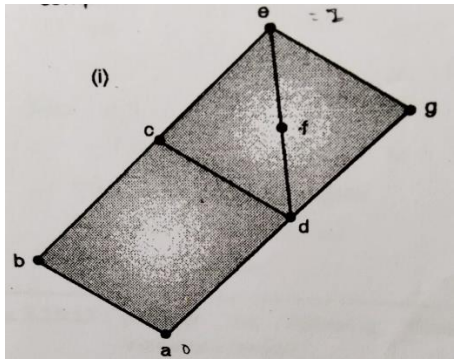
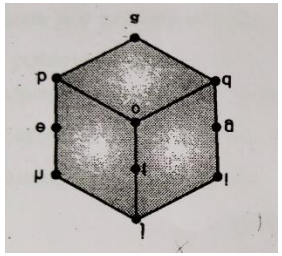
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	435	Check whether the lattice is distributive, complemented or both. Justify your answer. 		4						
7	436	Determine whether the following posets is Boolean algebras. Justify your answer. $A = \{1, 2, 3, 6\}$ with divisibility.		4						
7	437	Determine whether the following Hasse Diagram represent Boolean Algebra. 		4						

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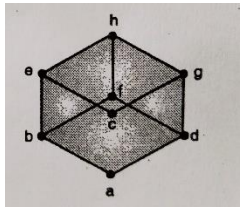
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	438	Is D_{75} with the relation "divisibility" a Boolean algebra? Justify your answers.		4						
7	439	Is D_{70} with the relation "divisibility" a Boolean algebra? Justify your answers.		4						
7	440	Determine whether the following Hasse Diagram represent Boolean Algebra. 		4						

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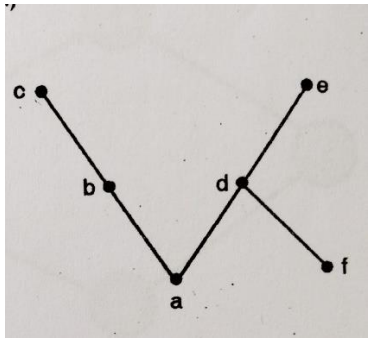
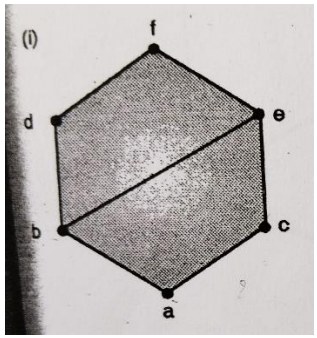
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	441	Determine whether the following posets represents Boolean algebra. 		4						
7	442	Determine whether the following posets represents Boolean algebra. 		4						

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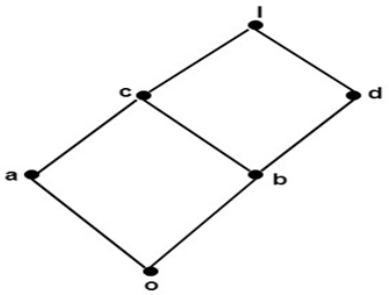
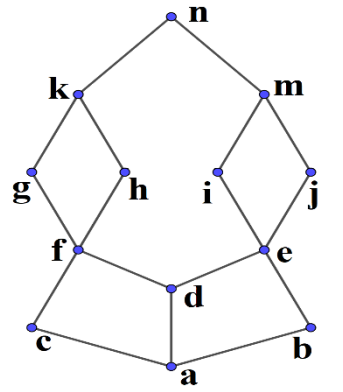
Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
7	443	Check whether the following is Distributive, Complemented and Bounded Lattice or not. Is it a Boolean Algebra? 		3							
7	444	Determine whether the following Hasse diagram represent Lattice or not. 		5							
7	445	Let A lattice $(A, \leq)$, where $A = \{1, 2, 4, 5, 8, 9\}$ and $\leq$ denotes the usual "less than or equality" relation. Find $4 \wedge (5 \vee 9)$ and $(2 \vee (2 \wedge 8)) \wedge 4$. Is this lattice a Boolean Algebra?		4							

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
7	446	Prove that $(S_{66}, \mid)$ is a Boolean Algebra. Where, S_{66} is the set of all divisors of 66.		4						
7	447	Is D_{42} with the relation "divisibility" a Boolean algebra? Justify your answers.		5						
8	448	_____ is not a binary operation on the set of natural numbers.	difference	1	addition	product	difference	none		
8	449	(G,*)=_____?	{-1,1}	1	{0,1}	{-1,1}	{0,-1}	{1}		
8	450	_____ is not a binary operation on $\mathbb{Z}$.	/	1	+	-	*	/		
8	451	For any set S if a*b=b*a, ∀a,b∈S then * is said to be _____ on S.	commutative	1	closed	associative	distributive	commutative		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
8	452	If a*(b*c) =(a*b) *c ∀a,b,c ∈ S then * is said to be _____ on S.	associative	1	closed	commutative	associative	distributive		
8	453	For any set S there exist b∈S such that a*b=e for some a∈S then b is called which element of a? Where, e is an identity element on S.	an inverse	1	an inverse	an identity	a unit	a proper		
8	454	Let G={1, -1,i,-i} is group under multiplication then how many elements are self-invertible in G?	2	1	1	2	3	4		
8	455	What is the identity element in the group $G = \{2, 4, 6, 8\}$ under multiplication modulo 10?	6	1	3	2	1	6	5	4
8	456	Let G= {1, -1, i,-i} is group under multiplication then the inverse of i is _____.	-i	1	1	-1	i	-i		
8	457	Which of the following is/are Monoid but not Group? **Sr. No. Sets Binary Operation** 1) $\mathbb{Z}$ $a * b = a \cdot b$ 2) $\mathbb{N}$ $a * b = a^b$ 3) $\mathbb{N}$ $a * b = lcm\{a, b\}$ 4) $\mathbb{Z}_n$ $a * b = a +_n b$ 5) $\{1, -1, i, -i\}$ $a * b = a \cdot b$	Any two	1	Any one	Any two	Any three	Any four	All of above	none

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
8	458	Let G=(ℤ6, +6) is an Abelian group then the inverse element of 4 is _____.	2	1	0	1	2	3		
8	459	This is an abelian group $\{-3n: n \in Z\}$ under? (I). Division (II) Subtraction (III) Addition (IV) Multiplication	ONLY III	1	ONLY I	ONLY II	ONLY III	ONLY IV	I AND II ONLY	II AND III ONLY
8	460	The number of elements in the symmetric group S_3 is _____.	6	1	4	6	24	9		
8	461	How many elements are self-invertible in S_3 (the set of all permutations on three symbols 1, 2 & 3)?	4	1	4	1	2	3	All elements	none
8	462	Let S3= {I, (1 2), (1 3), (2 3), (1 2 3), (1 3 2)} be a group with respect to composition of function. The inverse of (1 2 3) is _____.	(1 3 2)	1	(1 2)	(2 3)	(1 3 2)	(1 2 3)		
8	463	Which of the following is group under multiplication?	Q-{0}	1	Q	Q-{0}	Q-{1}	Q-{0,1}		

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
8	464	Let A = {a,b}. The composition table of A is defined as * | a | b a | b | b b | a | a Then the algebraic system (A,*) is _____.	Groupoid	1	Groupoid	Semigroup	Monoid	Group	Abelian group	None of these
8	465	Let $(Z,*)$ be a group with the binary operation $a * b = a + b + 1,\ \forall\ a, b \in Z$ then inverse of a is	$-a-2$	1	$-a-4$	$-a-2$	$-a-1$	$-a+1$	$-a-3$	$a+2$
8	466	Let A be the set of all non-singular matrices over real numbers and let $*$ be the matrix multiplication operator. Then	$<A, *>$ is a group but not an abelian group	1	A is closed under $*$ but $<A, *>$ is not a semi group	$<A, *>$ is a semigroup but not a monoid	$<A, *>$ is a group but not an abelian group	$<A, *>$ is a semi group but not a group	$<A, *>$ is a monoid but not a group	$<A, *>$ is not a group

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
8	467	Consider the binary operation * defined on a set of ordered pairs of real numbers as (a,b)*(c,d) = (ad+bc,bd). Moreover it is Associative, then (1,2)*(3,4)*(3,5) is equal to	(74,40)	1	(59, 30)	(110,105)	(40,74)	(74, 40)		
8	468	Let G be the set of the form $G = \{\begin{bmatrix} a & b \\ c & d \end{bmatrix} / ad - cb \neq 0 \ \& \ a,b,c,d \in R\}$is a group under matrix multiplication, then what is the identity element for the given set?	$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$	1	$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$	$\begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}$	$\begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$	$\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$	$\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$	
8	469	The set of all positive rational number forms an abelian group under the composition defined by a * b = $\frac{ab}{3}$, then what is the inverse element of this group?	$\frac{9}{a}$	1	$\frac{3}{ab}$	$\frac{a}{b}$	$\frac{a}{9}$	$\frac{9}{a}$		
8	470	Let S_3 (the set of all permutations on three symbols 1, 2 & 3) is a finitenon-Abelian group with respect to composition of permutation and $f_1 = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 2 \end{pmatrix}, f_2 = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \end{pmatrix}$, $f_3 = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \end{pmatrix}, f_4 = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \end{pmatrix}, f_5 = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{pmatrix}, I = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \end{pmatrix}$then what is the value of $f_1(f_4 f_5) =$ _____ $and\ (f_2 f_3) f_5 =$ _____	I, I	1	f_2, I	f_2, f_3	I, I	I, f_2		
8	471	Show that ($Z_5 - \{0\}, X_5$) is group.		4						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
8	472	Show that the set of square roots of unity forms a group under multiplication.		4						
8	473	Show that the set of fourth roots of unity forms an Abelian group under multiplication.		4						
8	474	The algebraic structure (G,*) is $G=\{(a,b)/a,b\in R\}$ and * is a binary operation defined as $(a,b)*(c,d)=(ac,bc+d)$ for all $(a,b),(c,d)\in G.$ Determine whether (G,*) is a Monoid or not. If yes then clearly specify the identity element.		3						
8	475	Let $*$ be a binary operation on set of real number R defined by a $*$ b = a + b + 2ab. Determine whether the set of real number R is a group or not with respect to given operation '*'.		3						
8	476	Let G={0,1,2,3,4,5} show that (G,$+_6$) is an abelian group		4						
8	477	Check whether (Z_8,$+_8$) is a group or not.		4						
8	478	Check whether the set of non-zero complex numbers C_0 form an infinite abelian group or not with respect to multiplication composition.		4						
8	479	Prove that the set {0,1,2,3,4} is a finite abelian group under addition modulo 5 as binary operation.		3						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6	
8	480	Show that the set of cube roots of unity forms a group under multiplication.		4							
8	481	find all the subgroups of $(Z_4, +_4)$		3							
8	482	Show that $H = \{loga : a \in Q, a > 0\}$ is a subgroup of $G = (R, +)$.		3							
8	483	Consider the group $< Z_4, +_4 >$. Check whether the following are subgroup of $< Z_4, +_4 >$ or not with valid reason. If yes, then prove that it is a subgroup of $< Z_4, +_4 >$. (a) $H_1 = \{0, 1\}$ (b) $H_2 = \{0, 2\}$ (c) $H_3 = \{0, 3\}$		4							
8	484	Show that (3Z, +) is a subgroup of (Z, +).		3							
8	485	Show that (Z_5, X_5) is a monoid but not group.		3							
8	486	Show that the set of all positive rational number forms an abelian group under the composition defined by a * b = ab/2 .		5							

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
8	487	Show that S_2 (the set of all permutations on two symbols 1 & 2) is a group oforder 2 with respect to composition of permutation.		3						
8	488	Show that S_3 (the set of all permutations on three symbols 1, 2 & 3) is a finitenon-Abelian group of order 6 with respect to composition of permutation.		3						
8	489	Show that the set of rational numbers excluding zero is an Abelian group under multiplication. i.e., $(Q^*, \times)$ is an Abelian group.		3						
8	490	Show that $G = \{\begin{bmatrix} a & b \\ c & d \end{bmatrix} / ad - cb \neq 0 \ \& \ a, b, c, d \in R\}$ is a group under matrixmultiplication.		5						
8	491	Show that G = $\left\{\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}, \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}, \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}\right\}$ is an Abelian group under matrix multiplication.		5						
8	492	Show that integral multiplies of 5 generates a subgroup of additive group of integers.		5						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
8	493	If G is the set of four special bilinear functions f_1, f_2, f_3, f_4 on the set of complex numbers defined by $f_1(z) = z, \quad f_2(z) = -z, \quad f_3(z) = \frac{1}{z}, \quad f_4(z) = -\frac{1}{z}$ then G forms a finite abelian group of order 4 with respect to composition known as composite of two functions.		3						
8	494	Let G={1,2,3,4,5,6} then show that (G,X_7) is an abelian group.		5						
8	495	Show that the set G = {a + b√2 /a, b ∈ Q} is a group with respect to addition.		4						
8	496	Show that $G = \{\begin{bmatrix} \cos a & -\sin a \\ \sin a & cos\ a \end{bmatrix} / a \in R\}$ is a group under matrix multiplication.		5						
8	497	R={0°, 60°, 120°, 180°, 240°, 300°}. a*b= overall angular rotation corresponding to successive rotation a and then by b. Show that (R, *) is group.		5						

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Unit No.	Sr. No.	Question_text	Answer_ text	Marks	Option1	Option2	Option 3	Option 4	Option5	Option 6
8	498	The set Q_1 of all rational numbers other than 1 with operation $*$ defined by $a * b = a + b - ab$ is an abelian group.		5						