CHAPTER 1

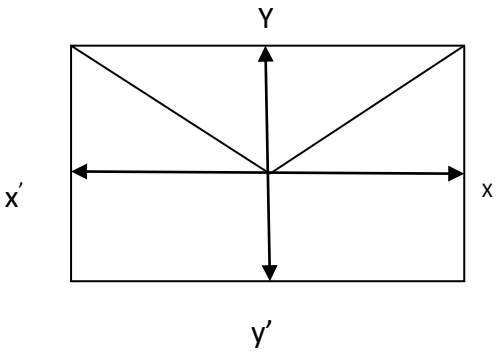
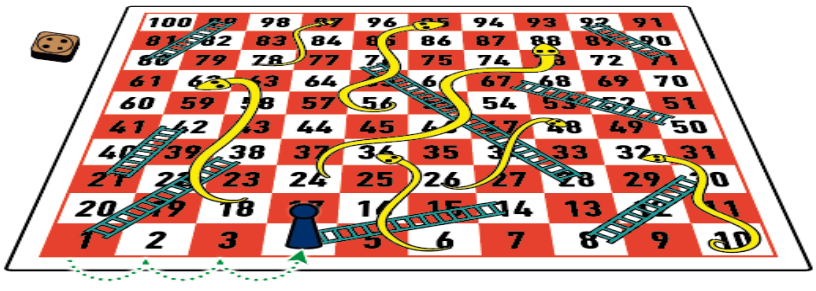
RELATION & FUNCTION

CASE STUDY QUESTIONS

	READ THE PASSAGE GIVEN BELOW AND ANSWER THE QUESTIONS
CASE1	A company conducted interview under 2 different categories-male and Female. Totally there were 100 participants. Among all of them finally three from Category 1 and two from Category 2 were selected for the final race. Ravi forms two sets M and F with these participants for his college project. Let M = {m1,m2,m3} F = {f1,f2} where M represents the set of males selected and F the set of females who were selected for the final. Ravi decides to explore these sets for various types of relations and functions  **1.** Ravi wishes to form all the relations possible from M to F. How many such relations are possible? a. 2^6 b. 2^5 c. 0 d. 2^3 **2.** Let R: M→M be defined by R = {(x,y): x and y are of same sex}, Then this relation R is a. Equivalence b. Reflexive only c. Reflexive and symmetric but not transitive d. Reflexive and transitive but not symmetric **3.** Ravi wants to know among those relations, how many functions can be formed from M to F? a. 2^2 b. 2^{12} c. 3^2 d. 2^3 **4.** Let R: M→F be defined by R = { (m1,m1), (m2,f2),(m3,f1)}, then R is a. Injective b. Surjective c. Neither Surjective nor Injective d. Surjective and Injective

<table>
<tr><td></td><td>5. Ravi wants to find the number of injective functions from M to F. How many numbers of injective functions are possible?
a. 0 b. 2! c. 3! d. 0!</td></tr>
<tr><td>CASE2</td><td>A relation R on a set A is said to be an equivalence relation on A if it is
• Reflexive i.e., (a, a) ∈ R ∀ a ∈ A.
• Symmetric i.e., (a, b) ∈ R ⇒ (b, a) ∈ R ∀ a, b ∈ A.
• Transitive i.e., (a, b) ∈ R and (b, c) ∈ R ⇒ (a, c) ∈ R ∀ a, b, c ∈A. Based on the above information, answer the following questions
1. If the relation R = {(1, 1), (1, 2), (1, 3), (2, 2), (2, 3), (3, 1), (3, 2), (3, 3)} defined on the set A = {1, 2, 3}, then R is
(a) reflexive (b) symmetric
(c) transitive (d) equivalence
2. If the relation R = {(1, 2), (2, 1), (1, 3), (3, 1)} defined on the set A = {1, 2, 3}, then R is
(a) reflexive (b) symmetric
(c) transitive (d) equivalence
3. If the relation R on the set N of all natural numbers defined as R = {(x, y) : y = x + 5 and (x < 4), then R is
(a) reflexive (b) symmetric
(c) transitive (d) equivalence</td></tr>
<tr><td>CASE 3</td><td>There are two small libraries A and B .Both the libraries have four books each. Library A has different books for science students whereas library B has different books for non-science students.
No of pages of each book of both the libraries is given in the table given below Library A
<table>
<tr><td>Books of various subjects</td><td>Page count</td></tr>
<tr><td>Maths</td><td>132</td></tr>
<tr><td>Physics</td><td>140</td></tr>
<tr><td>Chemistry</td><td>160</td></tr>
<tr><td>Biology</td><td>165</td></tr>
</table>
Library B
<table>
<tr><td>Books of various subjects</td><td>Page count</td></tr>
<tr><td>Economics</td><td>145</td></tr>
</table></td></tr>
</table>

	<table><tr><td>Accountancy</td><td>149</td></tr><tr><td>History</td><td>154</td></tr><tr><td>Geography</td><td>170</td></tr></table> Let $R1$={($Maths$,$Physics$),($Chemistry$,$Biology$)} be a relation on A and $R2$={(Economics ,Accountancy),(Economics ,History), (Accountancy, History)} be a relation B . On the basis of the information given above the information, answer the following:
Q3.1.	The relation $R1$ on A is (A) Reflexive only (B) Symmetric only (C) Reflexive and transitive (D) Transitive only
Q3.2.	Let { (Maths ,Maths), (physics, physics) (chemistry, chemistry), (biology ,biology)} be a relation defined in a different manner on A then the relation is (A) Reflexive only (B) Identity only (C) Reflexive and identity only (D) Neither reflexive nor Transitive only
Q3.3.	As library A has four different books that is n(A)= 4 then what will be no of reflexive relations that can be defined on A (A) 2^{12} (B) 2^{6} (C) 1 (D) None of these
Q3.4.	What will be the no of reflexive and symmetric relations that can be defined on B? (A) 2^{12} (B) 2^{6} (C) 10 (D) None of these
CASE 4	The math teacher of class XII dictates a math problem as follows. Draw the graph of the function, f of x is equal to modulus of x plus three minus one in the closed interval -3 to +3' ' Three students **R**akesh, **S**ravya and **N**avya have interpreted the same dictation in three different ways and they have noted the function as f(x)= |x +3-1|, f(x)=|x|+3-1 and f(x)=|x+3|-1 respectively. All three have drawn the graphs correctly for their respective functions. Based on the above information answer the following**.**
Q4.1	Sravya ' s graph in ' V shape ' with vertex (A) (-3,1)

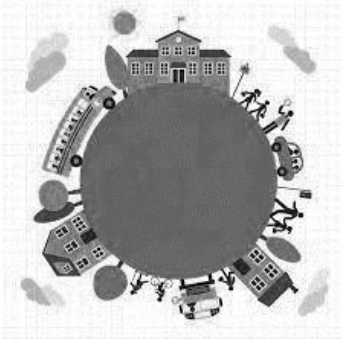
	(B) (3,-1) (C) (0,2) (D)(2,0)
Q4.2	Observe the adjacent figure. This is the graph of  (A) Rakesh (B) Sravya (C) Navya (D)None of these
Q4.3	The distance between the vertices of the graphs of Rakesh and Navys graphs is (A) 1 (B) $\sqrt{2}$ (C) $\sqrt{3}$ (D)0
Q4.4	The function f(x)=$f(x) = \begin{cases} -x-4, & x \le -3 \\ x+2, & x > -3 \end{cases}$ is the another form of the function (A) Rakesh (B) Sravya (C) Navya (D)None of these
CASE 5	Sonia and Deepa were playing snakes& ladder at home during Covid-19 lockdown. While rolling the dice Sonia's Brother Ravi observed that the possible outcomes on rolling the dice are $\{1,2,3,4,5,6\}$ 
	Let A be the set of players and B be the set of outcomes of a throw i.e. $A=\{S,D\}$ and

	$B=\{1,2,3,4,5,6\}$. Answer the following questions using the above information.
5.1	Answer the following questions using the above information. 1) Let R be a relation on B defined as $R=\{(a,b):b\,is\,divisible\,by\,a\}$, then R is a) Reflexive and transitive but not symmetric. b) Reflexive and symmetric but not transitive. c) Not reflexive but symmetric and transitive. d) An equivalence relation.
5.2	2) Ravi wants to know about the functions from A to B. How many functions are possible ? a) 6^2 b) 2^6 c) $6!$ d) 2^{12}
5.3	3) Let R be a relation on B defined by $R=\{(1,2),(2,2),(1,3),(3,4),(3,1),(4,3),(5,5)\}$, then R is a) Symmetric b) Reflexive c) Transitive d)None of these
5.4	4) Ravi wants to know the number of relations possible from A to B. How many relations are possible from A to B? a) 6^2 b) 2^6 c) $6!$ d) 2^{12}.
5.5	5) Let f be a relation from B to B defined by $f=\{(1,1),(2,2),(3,3),(4,4),(5,5),(6,6),(1,2)\}$, then f is a) Symmetric b) Reflexive and transitive c) Transitive and symmetric d)Equivalence relation
CASE 6	The students of Class 12 of a school planned to plant saplings along straight lines, parallel to each other to one side of the playground ensuring that they had enough play area. Let us assume that they planted one of the rows of the sapling along the line $y=2x+4$. Let **L** be the set of all lines which are parallel to each other in ground and R be a relation in **L**. Answer the following questions using the above information:
6.1	i. Let R be defined by $R=\{(L_1,L_2):L_1 \parallel L_2, where\, L_1,L_2 \in L\}$, then R is a) Equivalence relation b) Only reflexive relation c) Not reflexive

	Symmetric but not transitive.
6.2	ii. Let $R=\{(L_1,L_2): L_1 \perp L_2, where\, L_1, L_2 \in L\}$, then which of the following is true ? a) R is symmetric but neither reflexive nor transitive. b) R is reflexive and transitive but not symmetric. c) R is reflexive but neither symmetric nor transitive. d) R is an equivalence relation.
6.3	iii. The function $f: R \to R$ be defined by $f(x)=2x+4$ is a) Bijective b) Injective but not surjective. c) Neither injective nor surjective Surjective but not injective
6.4	iv. What is the range of the function $f: R \to R; f(x)=2x+4$ a) R b) Z c) W d) N
6.5	v. Let $R=\{(L_1,L_2): L_1 \parallel L_2, \& L_1: y=2x+4\}$ then which of the following can be taken as L_2 ? a) $2x-2y+5=0$ b) $2x-y+5=0$. c) $2x+2y+7=0$ d) $x+y=5$

Case 7	**CASE STUDY BASED QUESTIONS**  In two different societies, there are some school going students – including girls as well as boys. Satish forms two sets with these students, as his college project. Let A= $\{a_1, a_2, a_3, a_4, a_5\}$ and B = $\{b_1, b_2 b_3, b_4,\}$ where a_i 's and b_i 's are the school going students of first and second society respect Satish decides to explore these sets for various types of relations and functions. Using information given above, answer the following :
7.1	(i) Satish wishes to know the number of reflexive relations defined on set A. How many relations are possible? (a) 0 (b) 2^5 (c) 2^{10} (d) 2^{20}
7.2	(ii) Let R : A→A, R= {(x, y) : x and y are students of same sex } . Then relation R is (a) reflexive only (b) reflexive and symmetric but not transitive (c) reflexive and transitive but not symmetric (d) an equivalence relation
7.3	(iii) Satish and his friend Rajat are interested to know the number of symmetric relations defined on both the sets A and B, separately. Satish decides to find the symmetric relation on set A, while Rajat decides to find the symmetric relation on set B. What is difference between their results? (a) 1024 (b) $2^{10}(15)$ (c) $2^{10}(31)$ (d) $2^{10}(63)$

7.4	(iv) Let R : A→ B, R= {(a_1,b_1), (a_1,b_2), (a_2,b_1), (a_3,b_3), (a_4,b_2), (a_5,b_2)} , then R is (a) neither one-one nor onto (b) one-one but, not onto (c) only onto, but not one-one (d) not a function
7.5	(v) To help Satish in his project, Rajat decides to form onto function from set A to B. How many such functions are possible? (a) 342 (b) 240 (c) 729 (d) 1024
CASE 8	Raji visited the Exhibition along with her family. The Exhibition had a huge swing, which attracted many children. Raji found that the swing traced the path of a Parabola as given by y =x^2 . Answer the following questions using the above information. 
8.1	1. Let f: $R \rightarrow R$ be defined by (x) = x^2 is a. Neither Surjective nor Injective b. Surjective c. Injective d. Bijective
8.2	2. Let f: $N \rightarrow N$ be defined by (x) = x^2 is a. Surjective but not Injective b. Surjective c. Injective d. Bijective
8.3	3. Let f: {1,2,3,….}→{1,4,9,….} be defined by $f(x)$ = x^2 is a. Bijective b. Surjective but not Injective c. Injective but Surjective d. Neither Surjective nor Injective
8.4	4. Let : → R be defined by $f(x)$ = x^2 . Range of the function among the following is a. {1, 4, 9, 16,…} b. {1, 4, 8, 9, 10,…} c. {1, 4, 9, 15, 16,…} d. {1, 4, 8, 16,…
8.5	5. The function f: Z→Z defined by (x) = x^2 is a. Neither Injective nor Surjective b. Injective c. Surjective d. Bijective
CASE 9	Manikanta and Sharmila are studying in the Kendriya vidyalaya in Guwahati. The distance from Manikanata's house to the school is same as distance from Sharmila's house to the school. If the houses are taken as a set of points and KV is taken as origin, then answer the below questions based on the given information; (M for Manikanata's house and S for Sharmila's house**)**

	
9.1	(i) The relation R is given by R={(M,S): Distance of point M from origin is same as distance of point S from origin } is (A) Reflexive,SymmetricandTransitive (B) Reflexive, Symmetric and not Transitive (C) Neither reflexive nor Symmetric (D) Not an equivalence relation
9.2	(ii) Suppose Dheeraj's house is also at the same time distance from KV then (A) OM≠ OS (B) OM ≠ OD (c) OS≠ OD (D) OM =OS=OD
9.3	(iii) If the distance from Manikanata, Sharmila and Dheeraj houses from KV are same, then the points form a (A) Rectangle (B) Square (C) Circle (D) Triangle
9.4	(iv) Let R= {(0, 3), (0, 0), (3, 0)}, then the point which does not lie on the circle is (A) (0, 3) (B) (0, 0) (C) (3, 0) (D) None of these

CASE 10	Priya and Surya are playing monopoly in their house during COVID. While rolling the dice their mother Chandrika noted the possible outcomes of the throw every time belongs to the set {1,2,3,4,5,6}. Let A denote the set of players and B be the set of all possible outcomes. Then A={P,S} , B={1,2,3,4,5,6}.Then answer the below questions based on the given information: 
10.1	(i) Let R: B→B be defined by R=(a,b) both a and b are either odd or even}, then R is (A) Equivalence relation (B) Not reflexive but symmetric, transitive (C) Reflexive, Symmetric and not transitive (D) Reflexive, transitive but not symmetric
10.2	(ii) Chandrika wants to know the number of functions for A to B. How many number of functions are possible? (A) 6^2 (B) 2^6 (C) 6! (D) 2^{12}
10.3	(iii) Let R be a relation on B defined by R={(1,2), (2,2), (1,3), (3,4), (3,1), (4,3), (5,5)}. Then R is (A) Symmetric (B) Reflexive (C) Transitive (D) None of these
10.4	(iv) Let R: B→B be defined by R={(1,1), (1,2), (2,2), (3,3),(4,,4), (5,5), (6,6)} then R is (A) Symmetric (B) Reflexive and Transitive (C) Transitive and Symmetric (D) Equivalence Relation
CASE 11	A general election of Lok Sabha is a gigantic exercise. About 911 million people were eligible to vote and voter turnout was about 67%, the highest ever

	 Let I be the set of all citizens of India who were eligible to exercise their voting right in general election held in 2019. A relation 'R' is defined on I as follows: R = {($V1, V2$) :$V1, V2 \in I$ and both use their voting right in general election – 2019}
11.1	Two neighbors X and Y∈ I. X exercised his voting right while Y did not cast her vote in general election – 2019. Which of the following is true? A. (X,Y) ∈R B. (Y,X) ∈R C. (X,X) ∉R D. (X,Y) ∉R
11.2	Mr.'X' and his wife 'W'both exercised their voting right in general election -2019, Which of the following is true? A. both (X,W) and (W,X) ∈ R B. (X,W) ∈ R but (W,X) ∉ R C. both (X,W) and (W,X) ∉ R D. (W,X) ∈ R but (X,W) ∉ R
11.3	Three friends F1, F2 and F3 exercised their voting right in general election-2019, then which of the following is true? A. (F1,F2) ∈R, (F2,F3) ∈ R and (F1,F3) ∈ R B. (F1,F2) ∈ R, (F2,F3) ∈ R and (F1,F3) ∉ R C. (F1,F2) ∈ R, (F2,F2) ∈R but (F3,F3) ∉ R D. (F1,F2) ∉ R, (F2,F3) ∉ R and (F1,F3) ∉ R
11.4	Mr. Shyam exercised his voting right in General Election – 2019, then Mr. Shyam is related to which of the following? A. All those eligible voters who cast their votes B. Family members of Mr.Shyam C. All citizens of India D. Eligible voters of India
Case 12	Sherlin and Danju are playing Ludo at home during Covid-19. While rolling the dice, Sherlin's sister Raji observed and noted the possible outcomes of the throw every time belongs to set {1,2,3,4,5,6}. Let A be the set of players while B be the set of all

	possible outcomes. A = {S, D}, B = {1,2,3,4,5,6} 
12.1	Let $R{:}B{\rightarrow}B$ be defined by R = {(x,y): $yisdivisiblebyx$ } is A. Reflexive and transitive but not symmetric B. Reflexive and symmetric and not transitive C. Not reflexive but symmetric and transitive D. Equivalence
12.2	Raji wants to know the number of functions from A to B. How many number of functions are possible? A. 62 B. 26 C. 6! D. 212
12.3	Let R be a relation on B defined by R = {(1,2), (2,2), (1,3), (3,4), (3,1), (4,3), (5,5)}. Then R is A. Symmetric B. Reflexive C. Transitive D. None of these three
12.4	Raji wants to know the number of relations possible from A to B. How many numbers of relations are possible? A. 62 B. 26 C. 6! D. 212
CASE 13	CASE STUDY A relation R in the set A is called (i) reflexive if (a, a) $\in R$, for every a$\in A$ (ii) symmetric if (a, b) $\in R \Rightarrow (b,a) \in R$, for all a, b $\in A$ (iii) transitive if (a, b) $\in R$ and (b, c) $\in R \Rightarrow (a,c) \in R$, for all a, b, c $\in A$. Also, a relation R in the set A is called an equivalence relation if R is reflexive, symmetric and transitive.

	Based on above definition answer the following questions:
13.1	The relation R in the set {1,2,3} defined by R = {(1,1), (2,2), (3,3), (1,2), (2,3)} is (a) Reflexive (b) Symmetric (c) Transitive (d) An equivalence relation
13.2	The relation R in the set N of natural numbers defined by R = {(x, y): y = x+5 and x < 4} is (a) Reflexive (b) Symmetric (c) Transitive d)An equivalence relation
13.3	The relation R in the set {1,2,3} defined by R = {(3,2), (2,3)} is (a) Reflexive (b) Symmetric (c) Transitive (d) An equivalence relation
13.4	The relation R in the set A = {1,2,3,4,5,6} given by R = {(x, y): y is divisible by x} is (a) Reflexive and symmetric (b) Reflexive and transitive (c) symmetric and transitive (d) Reflexive and but not transitive
13.5	The relation R in the set {1,2,3,4} defined by R = {(1,1),(2,2),(3,3),(4,4)} is (a) Reflexive (b) Symmetric (c) Transitive (d) An equivalence relation
CASE 14	A function f :X→ Y is said to be one-one if for every $x_1, x_2 \in$ X, $f(x_1) = f(x_2) \Rightarrow x_1 = x_2$ and f is said to be onto if range of f = Y (codomain of f).

	Based on above definition answer the following questions:
14.1	The function f: N → N given by $f(1) = f(2) = 1$ and $f(x) = x - 1$ for every $x > 2$ *is* (a) One-one but not onto (b) Onto but not one-one (c) One-one and onto d)Neither one-one nor onto
14.2	(i) The function $f : R \to R$ defined by $f(x) = 3x$ is (a) One-one but not onto (b) Onto but not one-one (c) One-one and onto (d) Neither one-one nor onto
14.3	The function f: N → N given by $f(x) = x^2$ is (a) One-one but not onto (b) Onto but not one-one (c) One-one and onto (d) Neither one-one nor onto
14.4	The function f: R → R given by $f(x) = x^2$ is (a) One-one but not onto (b) Onto but not one-one (c) One-one and onto (d) Neither one-one nor onto
14.5	The function f : N → $[3, \infty)$ defined by $f(x) = x^2 + x + 1$ is (a) One-one but not onto (b) Onto but not one-one (c) One-one and onto (d) Neither one-one nor onto
CASE 15	A relation R defined on a set A = {1,2, φ}is (i) reflexive if every element of A is related to itself.

	(ii) symmetric if (x,y) ϵ R implies that (y,x) ϵ R for all x,y ϵ A (iii) transitive if (x,y) ϵ R and (y,z) ϵ R imply that (x,z) ϵ R for all x,y,zϵ A.
15.1	Which of the following is reflexive relation? (A) {(1,1),(2,2)} (B) {(1,1),(2,2),(1,2),(2,1)} (C) {(1,1),(2,2),(2,1),(φ, φ)} (D) {}
15.2	Which is true among the following if R is reflexive relation. (A) $(\varphi, 2)$ ϵ R (B) $(\varphi, 1)\epsilon$ R (C) $(\varphi, 1)\epsilon$ R and $(\varphi, 2)$ ϵ R (D) $(\varphi, \varphi)\epsilon$ R
15.3	How many reflexive relations are possible on set A? (A) 3 (B) 64 (C) 9 (D) 27
15.4	Which is equivalence relation on given set? (A) {(1,1),(2,2),(1,2),(2,1)} (B) {(1,1),(2,2),(1,2),(2,1),(φ, φ)} (C)φ (D) {(φ, φ)}
CASE 16	Consider the mapping f : A → B is defined by f(x) = $(x - 1)/(x - 2)$ such that f is a bijection. Based on the above information, answer the following questions:
16.1	Domain of f is (A) R – {2} (B) R (C) R – {1, 2} (D) R – {0}
16.2	Range of f is (A) R

	(B) R – {1} (C) R – {0} (D) R – {1, 2}
16.3	If g : R – {2} → R – {1} is defined by g(x) = 2f(x) – 1, then g(x) in terms of x is (A) $(x + 2)/x$ (B) $(x + 1)/(x - 2)$ (C) $(x - 2)/x$ (D) $x/(x - 2)$
16.4	A function f(x) is said to be one-one if (A) $f(x_1) = f(x_2) \Rightarrow -x_1 = x_2$ (B) $f(-x_1) = f(-x_2) \Rightarrow -x_1 = x_2$ (C) $f(x_1) = f(x_2) \Rightarrow x_1 = x_2$ (D) None of these
CASE 17	A relation R on a set A is said to be an equivalence relation on A if it is • Reflexive i.e., $(a, a) \in R \; \forall \; a, b \in A$ • Symmetric i.e., $(a, b) \in R \; and \; (b, a) \in R \; \forall \; a, b \in A$ • Transitive i.e.,$(a, b) \in R \; and \; (b, a) \in R$ $\Rightarrow (a, c) \in \forall \; a, b, c \in A$ Based on the above information,answer the following questions.
17.1	If the relation $R =$ $\{(1,1), (1,2), (1,3), (2,2), (2,3), (3,1), (3,2), (3,3)\}$ defined on the set $A = \{1,2,3\}$, then R is (A) reflexive (B) symmetric (C) transitive (D) equivalence
17.2	If the relation $A = \{(1,2), (2,1), (1,3), (3,1)\}$ defined on the set $A = \{1,2,3\}$, then R is (A) reflexive (B) symmetric

	(C) transitive (D) equivalence
17.3	If the relation R on the set N of all natural numbers defined as $R = \{(x, y) : y = x + 5 \; and \; x < 4\}$, then R is (A) reflexive (B) symmetric (C) transitive (D) equivalence
17.4	If the relation R on the set$A = \{1,2,3, \ldots \ldots \ldots \ldots \ldots, 13,14\}$, defined as $R = \{(x, y) : 3x - y = 0\}$, then R is (A) reflexive (B) symmetric (C) transitive (D) not equivalence
CASE 18	In a village a giant fair is being conducted every year. It is center of entertainment of many nearby villagers also. A toy-train is center of attraction of all the children. Madhav and his family visited the famous fair and noticed that the path of the train is a circle. If we write the path as a function of x then it is of the form f(x)=$\sqrt{4 - x^2}$ answer the following questions using the information given above.
18.1	Let f:$\mathbb{Z} \to \mathbb{Z}$ be defined as f(x)=$\sqrt{4 - x^2}$, then f is (a) Surjective (b) Injective (c) Bijective (d) None of the above.
18.2	Let f:$[-2,2] \to [0,2]$ be defined as f(x)= f(x)=$\sqrt{4 - x^2}$, then f is (a) Surjective (b) Injective (c) Bijective (d) None of the above.
18.3	Let f:$R \to R$ be defined as f(x)=$\sqrt{4 - x^2}$, then range is (a) [0,2] (b) {0,2} (c) (0,2)

	(d) $\mathbb{Z}$
18.4	Let f:$\mathbb{N} \to \mathbb{R}$ be defined as f(x)=$\sqrt{4-x^2}$, then domain is (a) [0,2] (b) {1,2,3,4} (c) {1,2} (d) (1,4)
18.5	If center of the path of the toy-train is origin, and position of Madhav in the train w.r.to origin is taken as (a,b). then at a certain moment if a=1, then find the value of b. (a) b=$\sqrt{3}$ (b) b=-$\sqrt{3}$ (c) b=$\pm\sqrt{3}$ d)b is any point on the path
CASE 19	On a leisure day a family of three members is playing ludo. Suman, Hari and Madhav are playing the game as a tournament. They will play it in for round. At the end the winner will be announced. Let A be the collection of the players and B be the collection of the outcomes. The A={S,H,M} and B={1,2,3,4,5,6} Answer the following questions based on the above data
19.1	How many elements are there in A × B (a) 18 (b) 3^6 (c) 9 (d) 6^3
19.2	How many relations can be formed from A to B? (a) 2^9 (b) 2^6 (c) 2^{18} d)2^{216}
19.3	Madhav is looking for maximum no. of one-one functions from A to B (a) 3 (b) 120 (c) 12 (d) 3^6
19.4	How many surjective functions are there from A to B? (a) 3 (b) 12 (c) 0

	(d) 6^3
19.5	If R={ (1,1),(2,2),(3,3),(5,5)} , then R is (a) Reflexive (b) Reflexive but not symmetric (c) Symmetric and transitive (d) None of these.

ANSWERS

1.1	A	2.1	A	3.1	D	4.1	D	5.1	A	6.1	A	7.1	d	8.1	a
1.2	A	2.2	B	3.2	C	4.2	D	5.2	A	6.2	A	7.2	d	8.2	c
1.3	D	2.3	C	3.3	A	4.3	B	5.3	D	6.3	A	7.3	c	8.3	a
1.4	B			3.4	B	4.4	C	5.4	D	6.4	A	7.4	d	8.4	a
1.5	A							5.5	B	6.5	B	7.5	b	8.5	a

9.1	A	10.1	A	11.1	D	12.1	A	13.1	A	14.1	B	15.1	C
9.2	D	10.2	A	11.2	A	12.2	A	13.2	C	14.2	C	15.2	D
9.3	C	10.3	D	11.3	A	12.3	D	13.3	B	14.3	A	15.3	B
9.4	B	10.4	B	11.4	A	12.4	D	13.4	B	14.4	D	15.4	B
								13.5	D	14.5	C		

16.1	A	17.1	A	18.1	D	19.1	A
16.2	B	17.2	B	18.2	C	19.2	C
16.3	D	17.3	C	18.3	A	19.3	B
16.4	C	17.4	D	18.4	C	19.4	C
				18.5	C	19.5	C

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