	CHAPTER 1 RELATION & FUNCTIONS ASSERTION & REASON QUESTIONS
SL.NO.	QUESTION
	Choose the correct option in the following questions of Assertion – Reason Questions. (a) Both A and R are correct; R is the correct explanation of A. (b) Both A and R are correct; R is not the correct explanation of A. (c) A is correct; R is incorrect. (d) R is correct; A is incorrect
1	Assertion (A) Let A = {a, b, c}, B = {4, 5, 6, 7} and let f = {(a, 4), (c, 5), (b, 7)} be a function from A to B. Then f is one-one. Reason (R) f is bijective function
2	Assertion (A) if n (A) = 5 and n(B) = 4The number of relation from set A to B is 20 Reason (R) The number of subset of A X B is 2^{20}
3	Assertion(A) T is the set of triangle such that {(T1, T2) : T1 is congruent to T2}. Then R is an equivalence relation. Reason(R) Any relation R is an equivalence relation, if it is reflexive, symmetric and transitive
4	Assertion(A) the function f : R →R, given by f (x) = 2x, is one-one and onto. Reason(R) A function f : X →Y is said to be one-one and onto (or bijective), if f is both one-one and onto.
5	Assertion(A) The relation R on the set N×N, defined by (a, b) R (c, d) ⇔ a+d = b+c for all (a, b), (c, d) ∈ N×N is an equivalence relation. Reason (R) Any relation R is an equivalence relation, if it is reflexive, symmetric and transitive.
6	Assertion: If f:R→ R defined by f(x)=sin x is a bijection. Reason: If f is both one- one and onto. It is bijection.
7	Assertion: Let L be the set of all lines in a plane and R be the relations in L defined as R= {(L_1, L2): L_1 is perpendicular to L_2}.This relation is not equivalence relation. Reason: A relation is said to be equivalence relation, if it is reflexive, symmetric and

	transitive
8	Assertion:Domain and range of the relation R={(x,y):$x-2y$=0} defined on the set A={1,2,3,4} are respectively {1,2,3,4} and {2,4,6,8} Reason: Domain and Range of a relation R are respectively the sets {a: a ∈A and (a, b)∈R} and {b: b ∈A and (a, b)∈R}
9	Assertion: The Greatest integer Function $f:R\rightarrow R$ is given by (x)=[x] is not onto. Reason: A function $f:A\rightarrow B$ is said to be injective if $f(a)=f(b)\Longrightarrow a=b$
10	Assertion: For two sets A=R-{3} and B=R-{1} defined a function f: A→B as f(x) = $\frac{x-2}{x-3}$is bijective Reason: A function f:A→B is said to be surjective if for all y ∈B,∃, x∈A such that f(x)=y
11	Assertion (A): The relation R in the set $A=\{1,2,3,4,5,6\}$ defined as $R=\{(a,b): b\, is\, divisible\, by\, a\}$ is not an equivalence relation. Reason (R) : The relation R will be an equivalence relation, if it is reflexive, symmetric and transitive.
12	Assertion (A): If $A=\{x\in Z:0\le x\le 12\}$ and R is the relation in A given by $R=\{(a,b):a=b\}$, then the set of all elements related to 1 is $\{1,2\}$. Reason (R) : If R_1 and R_2 are equivalence relation in a set A, then $R_1\cap R_2$ is an equivalence relation.
13	Q3. Assertion (A): Let $f:R\rightarrow R$ be defined by $f(x)=x^2+1$, then the pre-image of 17 are ± 4. Reason (R) : A function $f:A\rightarrow B$ is called one-one function, if distinct elements of A have distinct images in B.
14	Assertion (A): Let a relation R defined from $A=\{1,2,5,6\}$ to itself as $R=\{(1,1),(1,6),(6,1)\}$, then R is symmetric relation. Reason (R) : A relation R in set A is said to be symmetric $(a,b)\in R\Rightarrow(b,a)\in R, a,b\in A$.
15	Assertion (A): The modulus function $f:R\rightarrow R$ be given by $f(x)=\|x\|$, is neither one-

	one nor onto Reason (R) : The signum function $f: R \to R$ given by $f(x)=\begin{cases} 1, & if\ x>0 \\ 0 & if\ x=0 \\ -1 & if\ x<0 \end{cases}$ is bijective.
16	ASSERTION – The relation R given by R={(1,3),(4,2),(2,4),(2,3),(3,1)} on a set A={1,2,3,4} is symmetric. REASON – For symmetric relation $R=R^{-1}$
17	ASSERTION - let T be the set of all triangles in a plane with R being a relation in T given by R = {(T1,T2): T1 is similer to T2}. R is an equivalence relation. REASON- A reflexive symmetric and transitive relation is an equivalence relation.
18	ASSERTION- Let f : R → R defind as f(x) = [x] where [.] represents greatest integer function then f is not one- one. REASON- A function f is one -one if f(α) = f (β) implies α = β
19	ASSERTION- Number of all on to functions from the set {1,2,3,4} to itself is 24. REASON – On to functions from the set { 1,2,3,.....n} to itself is simply a permutation on n symbols namely 1,2,3....n is n^2!
20	ASSERTION- If A = {1,2} then no of reflexive relations on A is 4 . REASON – No of reflexive relations define on a set of n elements is $2^{n(n-1)}$
21	Assertion (A) : If n(A) =p and n(B) =q then the number of relations from A to B is 2^{pq}. Reason (R) : A relation from A to B is a subset of A×B.
22	Assertion(A): Domain and Range of a relation R={(x,y):x-2y=0} defined on the set A=(1,2,3,4} are respectively {1,2,3,4} and {2,4,6,8} Reason: Domain and Range of a relation R are respectively the sets {a:a∈A and (a,b) ∈ R} and {b: b∈A and (a,b) ∈R}
23	Assertion (A): ArelationR={(1,1),(1,3),(1.5),(3,1)(3,3),(3,5)}definedonthesetA={1,3,5}istransitive. Reason(R): A relation R on the set A symmetric if (a, b) ∈ R and (a, c) ∈ R ⇒ (a,c) ∈R
24	Let R be the relation in the set of integers Z given by R= {(a, b): 2 divides a-b} Assertion (A): R is a reflexive relation. Reason (R): A relation is said to be reflexive if xRx, ∀x∈Z
25	Consider the function f: R→R defined as f(x) =x/x²+1. Assertion (A): f(x) is not one-one. Reason (R): f(x) is not onto.
26	Assertion (A): The relation R on the set N x N, defined by (a, b) R (c, d) ↔ a+d = b+c for all (a, b), (c, d) ∈N x N is an equivalence relation.

	Reason (R): Any relation R is an equivalence, if it is reflexive, symmetric and transitive
27	Assertion (A): $f(x) = 1 + x^2$ is a one to one function from $R^+ \to R$, Reason (R): Every strictly monotonic function is a one to one function.
28	Let W be the set of words in the English dictionary. A relation R is defined on W as R = {(x, y) ∈W x W such that x and y have at least one letter in common} Assertion (A): R is reflexive. Reason (R): R is symmetric.
29	Consider the set A = {1, 3, 5}. Assertion (A): The number of reflexive relations on set A is 2^9. Reason (R): A relation is said to be reflexive if xRx, ∀ x ∈ A.
30	Consider the function f : R → R defined as $f(x) = x^3$ Assertion (A): f(x) is one – one function. Reason (R): f(x) is one – one function if co-domain = range.
31	Assertion (A) If n (A) =p and n (B) = q then the number of relations from A toB is 2^{pq}. Reason(R) A relation from A to B is a subset of A x B.
32	Assertion (A) If n (A) =m, then the number of reflexive relations on A is m Reason(R) A relation R on the set A is reflexive if (a, a) a A
33	Assertion (A) A relation R ={ (1,1),(1,2),(2,2),(2,3)(3,3)}defined on the set A={1,2,3} is reflexive. Reason(R) A relation R on the set A is reflexive if (a,a) belongs to A, for all a belongs to A
34	Assertion (A) : A={1,2,3},B={4,5,6,7} ,f={(1,4),(2,5),(3,6)} is a function from A to B.Then f is one-one Reason(R) : A function f is one –one if distinct elements of A have distinct images in B.
35	Assertion (A): n(A) =5, n(B) =5 and f : A B is one-one then f is bijection

	Reason(R): Ifn(A)=n(B)theneveryone-onefunctionfromAtoBis onto
36	Assertion: A relation R = {1,1} in the set A = {1,2,3} is a reflexive relation. Reasoning: To be reflexive (a, a) $\in \mathrm{R}$, $\forall$ a $\in \mathrm{A}$
37	Assertion: A relation R = {1,2} in the set A = {1,2,3} is a transitive relation. Reasoning: To be transitive (a, b) $\in \mathrm{R}$ and (b, c) $\in \mathrm{R} \Rightarrow (\mathrm{a}, \mathrm{c}) \in \mathrm{R}$
38	Assertion: A relation R = {(1,2), (2,1), (1,1), (2,2), (3,3)} in the set A = {1,2,3} is an equivalence relation. Reasoning: To be symmetric (a, b) $\in \mathrm{R} \Rightarrow (\mathrm{b}, \mathrm{a}) \in \mathrm{R}$
39	Assertion: A function f: R → R defined by f(x) = $\|\mathrm{x}\|$ is not onto. Reasoning: Range of f = R.
40	Assertion: A function f: R → R defined by f(x) = e^{x} is not onto. Reasoning: Range of f ≠R (Codomain).
41	Assertion: Every equivalence relation is reflexive also. Reason: Every reflexive relation is equivalence relation.
42	Assertion: A relation from set A to B is a subset of A x B. Reason: ∅ is subset of every set.
43	Assertion: A one – one function f: {1,2,3,4,5} → {1,2,3,4,5} is onto. Reason: A one – one function from an arbitrary set X to itself is always onto.
44	Assertion: A function f : N → N given by f(x) = x^2 is onto. Reason: A function f : X → Y is said to be onto if every element of Y is image of some element of X under f.
45	Assertion: The relation R in the set {x ϵ Z : -1 < x < 13} defined as R = {(a,b) : a – b is an integer} is symmetric. Reason: A relation R in a set A is called reflexive if every element of set A is related to itself.
46	Let R be the relation in the set of integers $\mathbb{Z}$ given by R={(a,b):2 divides a-b} A: R is a reflexive relation R: A relation is said to be reflexive if xRx,x$\forall\mathbb{Z}$
47	If A={1,2,3}, B={4,5,6} and f={(1,4),(2,5),(3,6)} is a function from A to B A: f(x) is one-one function

	R: f(x) is onto function
48	Consider a set A={a,b,c}. A: the no of reflexive relations on the set A is 2^9 R: the relation is said to be reflexive if xRx,x∀A
49	Let a function f: : ℝ → ℝ defined by $f(x)=x^2$ A: f is many-one R: f(-x)=f(x)= x^2, x∀ℝ
50	Let W be the set of words in English dictionary. A relation R is defined on W asR= $\{(x,y)\in W\times W$ such that x and y have at least one letter in common $\}$ Assertion:R is reflexive. Reason: R is symmetric.
51	Assertion: The function $f(x)$ given by $f(x)=\sin^{-1}\left[\log\left(x+\sqrt{x^2+1}\right)\right]$ is an odd function. Reason: The composition of two odd function is an odd function. (a) 1 (b) 2 (c) 3 (d) 4
52	Assertion: Every function can be uniquely expressed as the sum of an even function and an odd function. Reason: The set of values of parameter a for which the function $f(x)$ defined as $f(x)=\tan(\sin x)+\frac{x^2}{a}$ on the set $[-3,3]$ is an odd function is, $[9,\infty)$ (a) 1 (b) 2 (c) 3 (d) 4
53	Assertion: If $ad-bc\neq 0$, then $f(x)=\frac{ax+b}{cx+d}$ cannot attain the value $\left\{\frac{a}{c}\right\}$ Reason: The domain of the function $g(x)=\frac{b-dx}{cx-a}$ is $R-\left\{\frac{a}{c}\right\}$ (a) 1 (b) 2 (c) 3 (d) 4
54	Assertion: $f(x)=\|x-2\|+\|x-3\|+\|x-5\|$ is an odd function for all values of x between 3 and 5. Reason: $f(-x)=-f(x)$ for all odd functions. a) 1 (b) 2 (c) 3 (d) 4
55	Assertion: The domain of definition of the function $f(x)=e^{2x}+\cos^{-1}\left(\frac{x}{2}-1\right)$ is $(0,1)\cup(1,2)\cup(2,3)\cup(3,4)$ Reason: The domain of $\cos^{-1}\left(\frac{x}{2}-1\right)$ is $(0,4)$ a) 1 (b) 2 (c) 3 (d) 4
56	A : If the set A contains 5 elements and the set B contains 6 elements , then the number

	of one-one and onto mappings from A to B is 0 R: If A and B are two non empty finite sets containing m elements and n elements respectively , then the number of one-one and onto mappings from A to B is $n!$ if m= n and 0 if $m \neq n$
57	A :The function $f(x) = \|x\|$ is not one -one. R :The function $f(x) = \|x\|$ is onto.
58	A: A relation R ={ (1,1),(1,2),(2,2), (2,3) , (3,3) }defined on the set A ={ 1,2,3} is reflexive. R: A relation R on the set A is reflexive if $(a,a) \in R$, $\forall a \in A$
59	A:Let $f : X \to Y$ be a function. Define a relation R on X given by $R = \{(a,b) : f(a) = f(b)\}$. Then R is equivalence relation. R: R is not symmetric.
60	If $f : R \to R$ is an injective function such that range of $f = \{a\}$, then the number of elements in A is 1. R: f is one – one function so different element of A has different images.

ANSWER KEY

1	C	16	D	31	A	46	A
2	D	17	A	32	D	47	B
3	A	18	A	33	A	48	A
4	A	19	C	34	A	49	A
5	A	20	A	35	A	50	B
6	D	21	A	36	D	51	A
7	A	22	D	37	A	52	B
8	D	23	C	38	B	53	A

9	B	24	A	39	C	54	B
10	B	25	B	40	A	55	C
11	A	26	A	41	C	56	A
12	D	27	A	42	B	57	A
13	B	28	B	43	C	58	D
14	A	29	D	44	D	59	C
15	C	30	C	45	B	60	A

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