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Dept. of Mathematics 2021 – 2022
Class XII – Work Sheet – Relations and Functions

1	Which of the following is not an equivalence relation on Z? (a) $a\,R\,b \Leftrightarrow a+b$ is an even integer (b) $a\,R\,b \Leftrightarrow a-b$ is an even integer (c) $a\,R\,b \Leftrightarrow a<b$ (d) $a\,R\,b \Leftrightarrow a=b$
2	The relation 'R' in $N \times N$ such that $(a, b)\,R\,(c, d) \Leftrightarrow a+d=b+c$ is (a) reflexive but not symmetric (b) reflexive and transitive but not symmetric (c) an equivalence relation (d) None of these
3	Let $f(x)=[x]$ and $g(x)=x-[x]$, then which of the following functions is the zero function? (a) $(f+g)(x)$ (b) $(fg)(x)$ (c) $(f-g)(x)$ (d) $fog\,(x)$
4	R is a relation on the set Z of integers and it is given by $(x, y) \in R \Leftrightarrow \lvert x-y \rvert \leq 1$. Then R is (a) reflexive and transitive (b) reflexive and symmetric (c) symmetric and transitive (d) an equivalence relation.
5	Let R be the relation on the set $A=\{1, 2, 3, 4\}$ given by $R=\{(1, 2), (2, 2), (1, 1), (4, 4), (1, 3), (3, 3), (3, 2)\}$. Then, (a) R is reflexive and symmetric but not transitive. (b) R is reflexive and transitive but not symmetric. (c) R is symmetric and transitive but not reflexive. (d) R is an equivalence relation.
6	Let $f(x)=x^2$ and $g(x)=\sqrt{x}$, then (a) $(gof)(x)=\lvert x \rvert$ for all $x \in R$ (b) $(fog)(x)=x$ for all $x \in R$ (c) $(fog)(x)=(gof)(x)$ for all $x \in R$ (d) None of these
7	Let R be the relation defined on the set N of natural numbers by the rule the $x\,Ry$ iff $x+2y=8$, then domain of R is (a) $\{2, 4, 8\}$ (b) $\{2, 4, 6\}$ (c) $\{2, 4, 6, 8\}$ (d) $\{1, 2, 3, 4\}$
8	Let $R=\{(a, a), (b, b), (c, c), (a, b)\}$ be a relation on set $A=\{a, b, c\}$. Then, R is (a) identity relation (b) reflexive (c) symmetric (d) antisymmetric
9	If $A=\{1, 2, 3\}$, $B=\{1, 4, 6, 9\}$ and R is a relation from A to B defined by 'x' is greater than 'y'. The range of R is (a) $\{1, 4, 6, 9\}$ (b) $\{4, 6, 9\}$ (c) $\{1\}$ (d) None of these
10	The relation $R=\{(1, 1), (2, 2), (3, 3)\}$ on the set $\{1, 2, 3\}$ is (a) symmetric only (b) reflexive only (c) an equivalence relation (d) transitive only

11	Let A be a finite set containing n elements. The number of one-one functions that can be defined from A to B is (a) 2^n (b) n^n (c) $2n^2$ (d) $n!$
12	Let $A = \{1, 2, 3\}$ and $R = \{(1, 1), (2, 2), (1, 2), (2,1), (1, 3)\}$ then R is (a) reflexive (b) symmetric (c) transitive (d) None of these
13	Let $A = \{1, 2, 3\}$. Which of the following functions on A is invertible ? (a) $f = \{(1, 1), (2, 1), (3, 1)\}$ (b) $f = \{(1, 2), (2, 3), (3, 1)\}$ (c) $f = \{(1, 2), (2, 3), (3, 2)\}$ (d) $f = \{(1, 1), (2, 2), (3, 1)\}$
14	If R is relation on the set $A = \{1, 2, 3\}$ given by $R = \{(1, 1), (2, 2), (3, 3)\}$, then R is (a) reflexive (b) symmetric (c) transitive (d) all the three options
15	Let $f: R \to R$ be defined by the rule $f(x) = x^2 - 3x + 4$ for all $x \in R$, then $f^{-1}(2)$ is equal to (a) $(1, 2)$ (b) $[1, 2]$ (c) $\{1, 2\}$ (d) None of these
16	Let R be a relation on N defined by $x + 2y = 8$. The domain of R is (a) $\{2, 4, 8\}$ (b) $\{2, 4, 6, 8\}$ (c) $\{2, 4, 6\}$ (d) $\{1, 2, 3, 4\}$
17	Let $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$, then which of the following is a function from A to B? (a) $\{(1, 2), (1, 3), (2, 3), (3, 3)\}$ (b) $\{(1, 3), (2, 4)\}$ (c) $\{(1, 3), (2, 3), (3, 3)\}$ (d)$\{(1, 2), (2, 3), (3, 4), (3, 2)\}$.
18	Let $A = \{1, 2, 3\}$. Then, the number of equivalence relations containing $(1, 2)$ is (a) 1 (b) 2 (c) 3 (d) 4

Answers

1	A
2	C
3	D
4	B
5	B

6	A
7	B
8	B
9	C
10	C

11	D
12	D
13	B
14	D
15	C

16	C
17	C
18	B