Topic 1 : Types of Relations.

1. Let $P = \{(x, y) \mid x^2 + y^2 = 1, x, y \in R\}$. Then, P is
   (a) Reflexive (b) Symmetric
   (c) Transitive (d) Anti-symmetric
2. For real numbers x and y, we write $x R y \Leftrightarrow x - y + \sqrt{2}$ is an irrational number. Then, the relation R is
   (a) Reflexive (b) Symmetric
   (c) Transitive (d) None of these
3. Let L denote the set of all straight lines in a plane. Let a relation R be defined by $\alpha R \beta \Leftrightarrow \alpha \perp \beta, \alpha, \beta \in L$. Then, R is
   (a) Reflexive (b) Symmetric
   (c) Transitive (d) None of these
4. Let S be the set of all real numbers. Then, the relation $R = \{(a, b) : 1 + ab > 0\}$ on S is
   (a) Reflexive and symmetric but not transitive
   (b) Reflexive and transitive but not symmetric
   (c) Symmetric, transitive but not reflexive
   (d) Reflexive, transitive and symmetric
5. Let R be a relation on the set N be defined by $\{(x, y) \mid x, y \in N, 2x + y = 41\}$. Then, R is
   (a) Reflexive (b) Symmetric
   (c) Transitive (d) None of these
6. Let $A = \{1, 2, 3\}$ and $B = \{2, 4, 6, 8\}$.
   Consider the rule $f : A \to B, f(x) = 2x \ \forall \ x \in A$. The domain, codomain and range of *f* respectively are
   (a) {1, 2, 3}, {2, 4, 6}, {2, 4, 6, 8}
   (b) {1, 2, 3}, {2, 4, 6, 8}, {2, 4, 6}
   (c) {2, 4, 6, 8}, {2, 4, 6, 7}, {1, 2, 3}
   (d) {2, 4, 6}, {2, 4, 6, 8}, {1, 2, 3}
7. The relation "less than" in the set of natural numbers is :
   (a) only symmetric (b) only transitive
   (c) only reflexive (d) equivalence relation
8. Let R and S be two non-void relations in a set A. Which of the following statements is not true.
   (a) R and S transitive $\Rightarrow$ $R \cup S$ is transitive
   (b) R and S transitive $\Rightarrow$ $R \cap S$ is transitive
   (c) R and S symmetric $\Rightarrow$ $R \cup S$ is symmetric
   (d) R and S reflexive $\Rightarrow$ $R \cap S$ is reflexive
9. 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
10. Let A be the non-empty set of children in a family. The relation 'x is brother of y' in A is:
    (a) reflexive (b) symmetric
    (c) transitive (d) None of these
11. Let A = {1, 2, 3, 4} and let R = {(2, 2), (3, 3), (4, 4), (1, 2)} be a relation on A. Then R is:
    (a) reflexive (b) symmetric
    (c) transitive (d) None of these
12. If R is a relation in a set A such that $(a, a) \in R$ for every $a \in A$, then the relation R is called
    (a) symmetric (b) reflexive
    (c) transitive (d) symmetric or transitive
13. A relation R in a set A is called empty relation, if
    (a) no element of A is related to any element of A
    (b) every element of A is related to every element of A
    (c) some elements of A are related to some elements of A
    (d) None of the above
14. A relation R in a set A is called universal relation, if
    (a) each element of A is not related to every element of A
    (b) no element of A is related to any element of A
    (c) each element of A is related to every element of A
    (d) None of the above
15. A relation R in a set A is said to be an equivalence relation, if R is
    (a) symmetric only (b) reflexive only
    (c) transitive only (d) All of these
16. Let *R* = {(3, 3) (5, 5), (9, 9), (12, 12), (5, 12), (3, 9), (3, 12), (3, 5)} be a relation on the set *A* = {3, 5, 9, 12}. Then, *R* is:
    (a) reflexive, symmetric but not transitive.
    (b) symmetric, transitive but not reflexive.
    (c) an equivalence relation.
    (d) reflexive, transitive but not symmetric.
17. A relation R in a set A is called transitive, if for all $a_1, a_2, a_3 \in A$, $(a_1, a_2) \in R$ and $(a_2, a_3) \in R$ implies
    (a) $(a_2, a_1) \in R$ (b) $(a_1, a_3) \in R$
    (c) $(a_3, a_1) \in R$ (d) $(a_3, a_2) \in R$
18. If $R = \{(x, y) :$ x is father of y$\}$, then R is
    (a) reflexive but not symmetric
    (b) symmetric and transitive
    (c) neither reflexive nor symmetric nor transitive
    (d) Symmetric but not reflexive
19. If $R = \{(x, y) :$ x is exactly 7 cm taller than y$\}$, then R is
    (a) not symmetric
    (b) reflexive
    (c) symmetric but not transitive
    (d) an equivalence relation
20. If $R = \{(x, y) :$ x is wife of y$\}$, then R is
    (a) reflexive (b) symmetric
    (c) transitive (d) an equivalence relation
21. Let R be the relation in the set Z of all integers defined by $R = \{(x, y) : x - y$ is an integer$\}$. Then R is
    (a) reflexive (b) symmetric
    (c) transitive (d) an equivalence relation
22. 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)}.
    (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 equivalence relation

Ans.

1	(b)
2	(a)
3	(b)
4	(a)
5	(d)
6	(b)
7	(b)
8	(a)
9	(b)
10	(c)
11	(c)
12	(b)
13	(a)
14	(c)
15	(d)
16	(d)
17	(b)
18	(c)
19	(a)
20	(c)
21	(d)
22	(b)