JEE MAIN : CHAPTER WISE TEST-1

SUBJECT :- MATHEMATICS **DATE**.....

CLASS :- 12th **NAME**.....

CHAPTER :- RELATION **SECTION**.....

(SECTION A)

1. If A = {a, b}, B = {c, d}, C = {d, e}, then {(a, c), (a, d), (a, e), (b, c), (b, d), (b, e)} is equal to
(A) $A \cap (B \cup C)$ (B) $A \cup (B \cap C)$
(C) $A \times (B \cup C)$ (D) $A \times (B \cap C)$

2. Let X = {1, 2, 3, 4, 5} and Y = {1, 3, 5, 7, 9}. Which of the following is not a relation from X to Y
(A) $R_1 = \{(x, y) \mid y = 2 + x, x \in X, y \in Y\}$
(B) $R_2 = \{(1, 1), (2, 1), (3, 3), (4, 3), (5, 5)\}$
(C) $R_3 = \{(1, 1), (1, 3) (3, 5), (3, 7), (5, 7)\}$
(D) $R_4 = \{(1, 3), (2, 5), (2, 4), (7, 9)\}$

3. Which one of the following relations on R is equivalence relation-
(A) $x R_1 y \Leftrightarrow x^2 = y^2$
(B) $x R_2 y \Leftrightarrow x \geq y$
(C) $x R_3 y \Leftrightarrow x \mid y$ (x divides y)
(D) $x R_4 y \Leftrightarrow x < y$

4. In the set *A* = {1, 2, 3, 4, 5}, a relation *R* is defined by
R = {(*x*, *y*)| *x*, *y* $\in$ *A* and *x* < *y*}. Then *R* is
(A) Reflexive (B) Symmetric
(C) Transitive (D) None of these

5. Let *A* be the non-void set of the children in a family. The relation '*x* is a brother of *y*' on *A* is
(A) Reflexive
(B) Symmetric
(C) Symmetric and transitive
(D) None of these

6. 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

7. The void relation on a set *A* is
(A) Reflexive
(B) Symmetric and transitive
(C) Reflexive and symmetric
(D) Reflexive and transitive

8. Let R_1 be a relation defined by $R_1 = \{(a,b) \mid a \geq b, a, b \in R\}$. Then R_1 is
(A) An equivalence relation on *R*
(B) Reflexive, transitive but not symmetric
(C) Symmetric, Transitive but not reflexive
(D) Neither transitive not reflexive but symmetric

9. Let R_1 be a relation defined by $R_1 = \{(a, b)| a \geq b ; a, b \in R\}$. Then R_1 is
(A) An equivalence relation on R
(B) Reflexive, transitive but not symmetric
(C) Symmetric, Transitive but not reflexive
(D) Neither transitive nor reflexive but symmetric

10. Let *R* and *S* be two equivalence relations on a set *A*. Then
(A) $R \cup S$ is an equivalence relation on *A*
(B) $R \cap S$ is an equivalence relation on *A*
(C) $R - S$ is an equivalence relation on *A*
(D) None of these

11. Let *R* = {(1, 3), (2, 2), (3, 2)} and *S* = {(2, 1), (3, 2), (2, 3)} be two relations on set *A* = {1, 2, 3}. Then *RoS* =
(A) {(1, 3), (2, 2), (3, 2), (2, 1), (2, 3)}
(B) {(3, 2), (1, 3)}
(C) {(2, 3), (3, 2), (2, 2)}
(D) {(2, 3), (3, 2)}

12. 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

13. Let *R* be a relation over the set *N* × *N* and it is defined by $(a,b)R(c,d) \Rightarrow a + d = b + c.$ Then *R* is
(A) Reflexive only
(B) Symmetric only
(C) Transitive only
(D) An equivalence relation

14. Let
$R = \{(3,3),(6,6),(9,9),(12,12),(6,12),(3,9),(3,12),(3,6)\}$
be a relation on the set $A = \{3,6,9,12\}$. The relation is
(A) An equivalence relation
(B) Reflexive and symmetric only
(C) Reflexive and transitive only
(D) Reflexive only

15. Let *R* = {(1, 3), (4, 2), (2, 4), (2, 3), (3, 1)} be a relation on the set *A* = {1, 2, 3, 4}. The relation *R* is
(A) Reflexive (B) Transitive
(C) Not symmetric (D) A function

16. The number of reflexive relations of a set with four elements is equal to
(A) 2^{16} (B) 2^{12}
(C) 2^{8} (D) 2^{4}

17. 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

18. If *A* is the set of even natural numbers less than 8 and *B* is the set of prime numbers less than 7, then the number of relations from *A* to *B* is
(A) 2^{9} (B) 9^{2}
(C) 3^{2} (D) 2^{9-1}

19. Consider the following :
1. If $R = \{(a, b) \in N \times N : a \text{ divides } b \text{ in } N\}$ then the relation R is reflexive and symmetric but not transitive.
2. If $A = \{1, 2, 3, 4, 5, 6\}$ and $R = \{(S_1, S_2) : S_1, S_2 \text{ are subsets of A, } S_1 \not\subset S_2\}$, then the relation R is not reflexive, not symmetric and not transitive.
Which of the statements is/are correct ?
(A) 1 only (B) 2 only
(C) Both 1 and 2 (D) Neither 1 nor 2

20. Let *R* and *S* be two non-void relations on a set *A*. Which of the following statements is false
(A) *R* and *S* are transitive $\Rightarrow R \cup S$ is transitive
(B) *R* and *S* are transitive $\Rightarrow R \cap S$ is transitive
(C) *R* and *S* are symmetric $\Rightarrow R \cup S$ is symmetric
(D) *R* and *S* are reflexive $\Rightarrow R \cap S$ is reflexive

(SECTION B)

21. If R is relation 'is greater than' from A = {2, 3, 4, 5, 6} to B = {2, 5, 6} write the number of elements of R.

22. Let A = {1, 2}, B = {0} then number of possible relations from A to B

23. If A is the set of even natural numbers less than 8 and B is the set of prime numbers less than 7, then the number of relations from A to B is

24. R, S are relations from $N \times N$ to $Z \times Z$ by,
$R = \{(x - y, y - x) : x, y \in N\}$
$S = \{(x - y, x + y) : x, y \in Z\}$
Then number of elements in $R \cap S$

25. If the number of relations on a finite set A having 'n' elements is 2^{16}, then 'n' equal to

26. If A ={ 1,2,3} ,R ={ (1,2),(1,1),(2,3)} Then minimum number of elements may be adjoined with the elements of R so that it may become transitive is

27. Given the relation R = = {(1, 2), (2, 3)} on the set A = {1, 2, 3}, the minimum number of ordered pairs which when added to R make it an equivalence relation is-

28. 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'. Then number of elements in R is-

29. If R be a relation '<' from A = {1, 2, 3, 4} to B = {1, 3, 5} i.e. (a, b) Î R iff a < b, then number of elements in ROR^{-1} is-

30. Let S be the set of integers, for a, b Î S, a R b if and only if | a – b | < 1 then how many elements in R?