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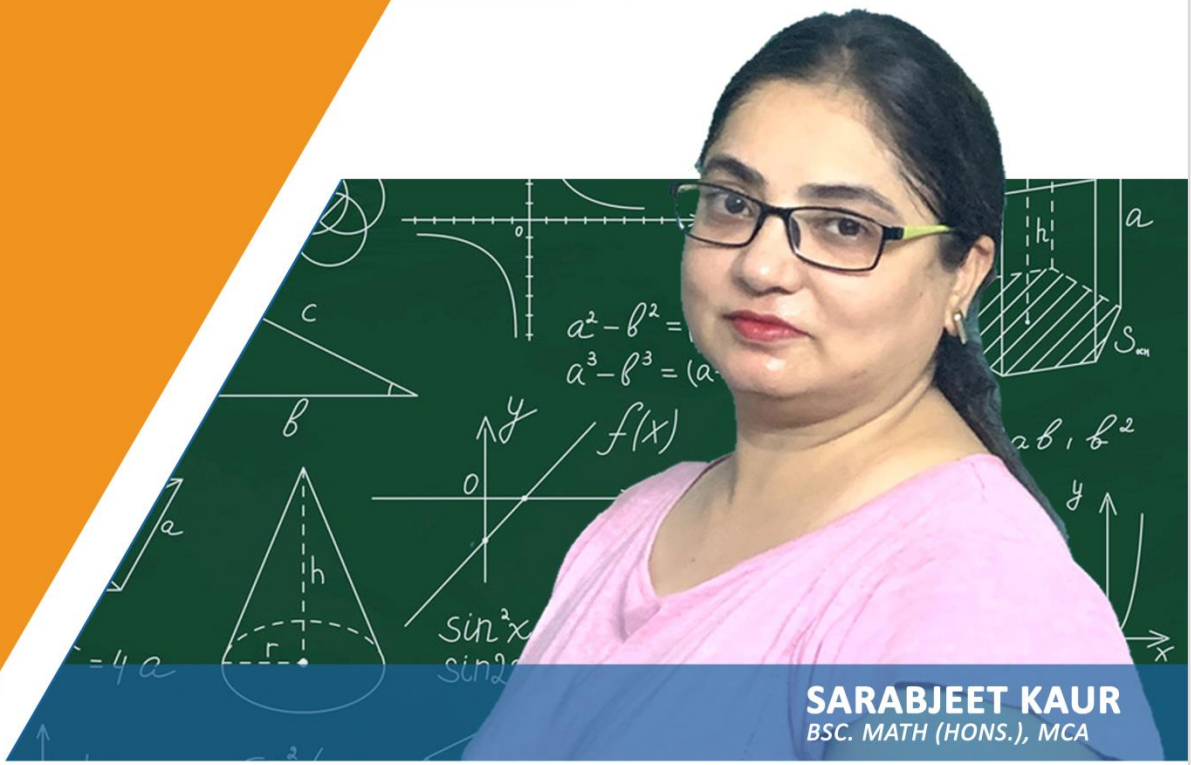

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BSC. MATH (HONS.), MCA

GRADE 12TH MATHS

CHAPTER 1

RELATION AND FUNCTION

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OBJECTIVE TYPE QUESTIONS (1 MARK)

1. Let R be a relation on the set L of lines defined by $l_1 R\, l_2$ if l_1 is perpendicular to l_2, then relation R is
(a) reflexive and symmetric (b) symmetric and transitive
(c) equivalence relation (d) symmetric

2. Given triangles with sides T_1 : 3, 4, 5; T_2 : 5, 12, 13; T_3 : 6, 8, 10; T_4 : 4, 7, 9 and a relation R in set of triangles defined as $R = \{(\Delta_1, \Delta_2) : \Delta_1 \text{ is similar to } \Delta_2\}$. Which triangles belong to the same equivalence class?
(a) T_1 and T_2 (b) T_2 and T_3 (c) T_1 and T_3 (d) T_1 and T_4.

3. Given set A = {1, 2, 3} and a relation R = {(1, 2), (2, 1)}, the relation R will be
(a) reflexive if (1, 1) is added (b) symmetric if (2, 3) is added
(c) transitive if (1, 1) is added (d) symmetric if (3, 2) is added

4. Given set A = {a, b, c}. An identity relation in set A is
(a) R = {(a, b), (a, c)} (b) R = {(a, a), (b, b), (c, c)}
(c) R = {(a, a), (b, b), (c, c), (a, c)} (d) R = {(c, a), (b, a), (a, a)}

5. A relation S in the set of real numbers is defined as $xSy \Rightarrow x - y + \sqrt{3}$ is an irrational number, then relation S is
(a) reflexive (b) reflexive and symmetric (c) transitive (d) symmetric and transitive

6. Let R be a relation on the set N of natural numbers defined by nRm if n divides m. Then R is
(a) Reflexive and symmetric (b) Transitive and symmetric
(c) Equivalence (d) Reflexive, transitive but not symmetric

7. Let L denote the set of all straight lines in a plane. Let a relation R be defined by l R m if and only if l is perpendicular to m for all $l, m \in$ L. Then R is
(a) reflexive (b) symmetric **(c)** transitive (d) none of these

8. Let N be the set of natural numbers and the function f : N → N be defined by f (n) = 2n + 3 $\forall n \in$ N. Then f is
(a) surjective (b) injective **(c)** bijective (d) none of these

9. Set A has 3 elements and the set B has 4 elements. Then the number of injective mappings that can be defined from A to B is
(a) 144 (b) 12 **(c)** 24 (d) 64

10. Let f : R → R be defined by $f(x) = x^2 + 1$. Then, pre-images of 17 and – 3, respectively, are
(a) φ, {4, – 4} (b) {3, – 3}, φ **(c)** {4, –4}, φ (d) {4, – 4, {2, – 2}

11. For real numbers x and y, define xRy if and only if x – y + 2 is an irrational number. Then the relation R is
(a) reflexive (b) symmetric **(c)** transitive (d) none of these

12. Let T be the set of all triangles in the Euclidean plane, and let a relation R on T be defined as aRb if a is congruent to b $\forall$ a, b $\in$ T. Then R is
(a) reflexive but not transitive (b) transitive but not symmetric
(c) equivalence (d) none of these

13. Consider the non-empty set consisting of children in a family and a relation R defined as aRb if a is brother of b. Then R is
(a) symmetric but not transitive (b) transitive but not symmetric
(c) neither symmetric nor transitive (d) both symmetric and transitive

14. The maximum number of equivalence relations on the set A = {1, 2, 3} are
(a) 1 (b) 2 **(c)** 3 (d) 5

15. If a relation R on the set {1, 2, 3} be defined by R = {(1, 2)}, then R is
(a) reflexive (b) transitive **(c)** symmetric (d) none of these

16. Let us define a relation R in R as aRb if a $\geq$ b. Then R is
(a) an equivalence relation (b) reflexive, transitive but not symmetric
(c) symmetric, transitive but not reflexive (d) neither transitive nor reflexive but symmetric.

17. Let A = {1, 2, 3} and consider the relation R = {1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1,3)}. Then R is
(a) reflexive but not symmetric (b) reflexive but not transitive
(c) symmetric and transitive (d) neither symmetric, nor transitive

18. 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
(a) 720 (b) 120 **(c)** 0 (d) none of these

19. Let A = {1, 2, 3, ...n} and B = {a, b}. Then the number of surjections from A into B is
(a) $^nP_2$ (b) $2^n - 2$ **(c)** $2^n - 1$ (d) None of these

20. Let f : R $\rightarrow$ R be defined by $f(x) = \frac{1}{x}$. Then f is
(a) one-one (b) onto **(c)** bijective (d) f is not defined

21. Which of the following functions from Z into Z are bijections?
(a) $f(x) = x^3$ (b) $f(x) = x + 2$ **(c)** $f(x) = 2x + 1$ (d) $f(x) = x2 + 1$

22. Let f : [2, ∞) $\rightarrow$ R be the function defined by $f(x) = x^2 - 4x + 5$, then the range of f is
(a) R (b) [1, ∞) **(c)** [4, ∞) (d) [5, ∞)

23. Let f : N → R be the function defined by f (x) = $\frac{2x-1}{2}$ and g : Q → R be another function defined by g(x) = x + 2. Then (g o f)$\frac{3}{2}$ is

(a) 1 (b) 1 (c) $\frac{7}{2}$ (d) none of these

24. Let f : R → R be defined by $f(x)=\begin{cases} 2x : x > 3 \\ x^2 : 1 < x \le 3 \\ 3x : x \le 1 \end{cases}$. Then f (– 1) + f (2) + f (4) is

(a) 9 (b) 14 (c) 5 (d) none of these

25. Let the function 'f ' : N → N be defined by f(x) = 2x + 3, x ∈ N. Then 'f ' is
(a) not onto (b) bijective function (c) many-one, into function (d) none of these

26. A relation defined in a non-empty set A, having n elements, has
(a) n relations (b) 2 relations (c) n^2 relations (d) $2n^2$ relations

27. If f (x) = x^3 and g(x) = cos 3x , then fog is
(a) x^3. cos 3x (b) cos $3x^3$ (c) $\cos^3 3x$ (d) 3cos x^3.

28. A relation R in human beings defined as R = {(a, b) : a, b human beings ; a loves b} is
(a) reflexive (b) symmetric and transitive (c) equivalence (d) neither of these

29. Consider the set A = {1, 2, 3} and R be the smallest equivalence relation on A, then R = _____

30. The domain of the function f : R→R defined by f (x) = $\sqrt{x^2-3x+2}$ is _____.

31. The domain of the function f : R→R defined by f (x) = $\sqrt{4-x^2}$ is _____.

32. Consider the set A containing n elements. Then, the total number of injective functions from A onto itself is _____.

33. Let Z be the set of integers and R be the relation defined in Z such that aRb if a – b is divisible by 3. Then R partitions the set Z into _____ pairwise disjoint subsets.

34. Consider the set A = {1, 2, 3} and the relation R = {(1, 2), (1, 3)}. R is a _____relation.

35. Let the relation R be defined in N by aRb if 2a + 3b = 30. Then R = _____.

36. Let the relation R be defined on the set A = {1, 2, 3, 4, 5} by R = {(a, b) : $|a^2 - b^2| < 8$. Then R is given by _____.

37. Let R be a relation defined as R = {(x, x), (y, y), (z, z), (x, z)} in set A = {x, y, z} then R is _____ (reflexive/symmetric) relation.

38. Let A = {1, 2, 3, 4} and B = {a, b, c}. Then number of one-one functions from A to B are _____.

39. If n(a) = p, then number of bijective functions from set A to A are _____.

40. If f (x) = $\frac{x-1}{|x-1|}$, x($\neq$ 1) $\in$ R then range of 'f ' is _____.