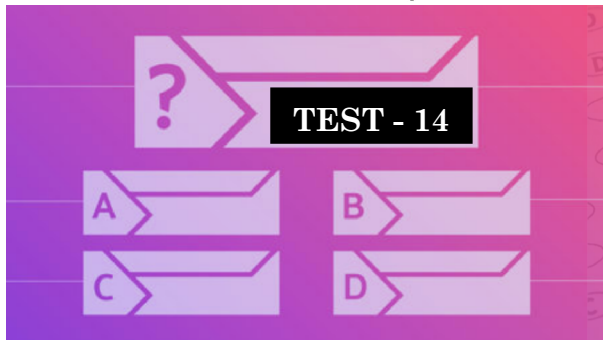




By O.P. GUPTA

MULTIPLE CHOICE TYPE QUESTIONS

For CBSE 2026 Exams - Mathematics (041) - Class 12

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$V = \frac{4}{3}\pi r^3$$

Topics : Relations & Functions

Max. Marks : 20

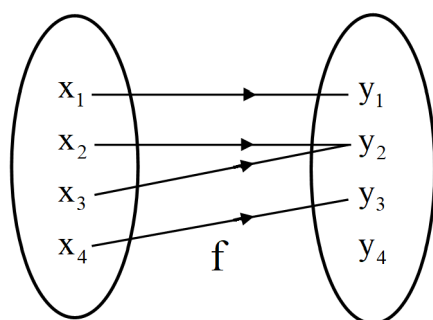
☑ **Select the correct option in the followings. Each question carries 1 mark.**

- Q01. The relation R in the set $\{1, 2, 3\}$ given by $R = \{(1, 2), (2, 1), (1, 1), (2, 2)\}$ is
 (a) symmetric and transitive, but not reflexive
 (b) reflexive and symmetric, but not transitive
 (c) symmetric, but neither reflexive nor transitive
 (d) an equivalence relation
- Q02. The function $f : \mathbb{R} \rightarrow [-1, 1]$ defined by $f(x) = \cos x$ is
 (a) both one-one and onto
 (b) not one-one, but onto
 (c) one-one, but not onto
 (d) neither one-one, nor onto
- Q03. A relation in a set A is called _____ relation, if each element of A is related to itself.
 (a) reflexive (b) non-reflexive (c) identity (d) None of these
- Q04. A relation R on a set A is called _____, if $(a_1, a_2) \in R$ and $(a_2, a_3) \in R$ implies that $(a_1, a_3) \in R$ for $a_1, a_2, a_3 \in A$.
 (a) symmetric (b) transitive (c) reflexive (d) None of these
- Q05. A relation R in a set A is called _____, if $(a_1, a_2) \in R$ implies $(a_2, a_1) \in R \quad \forall a_1, a_2 \in A$.
 (a) symmetric (b) transitive (c) reflexive (d) equivalence
- Q06. How many reflexive relations are possible in a set A whose $n(A) = 3$?
 (a) 8 (b) 64 (c) 2 (d) 512
- Q07. How many non-reflexive relations are possible in a set A whose $n(A) = 3$?
 (a) 448 (b) 64 (c) 2 (d) 512
- Q08. A relation R in the set $S = \{1, 2, 3\}$ is defined as $R = \{(1, 1), (1, 2), (2, 2), (3, 3)\}$. Which element (s) of relation R be removed to make R an equivalence relation?
 (a) (1, 1) (b) (1, 2) (c) (2, 2) (d) (3, 3)
- Q09. An equivalence relation R in the set A divides it into equivalence classes A_1, A_2, A_3 . What is the value of $A_1 \cup A_2 \cup A_3$?
 (a) A (b) ϕ (c) $A \times A \times A$ (d) None of these
- Q10. An equivalence relation R in A divides it into equivalence classes A_1, A_2, A_3 . What is the value of $A_1 \cap A_2 \cap A_3$?

- (a) A (b) ϕ (c) $A \times A \times A$ (d) None of these
- Q11. If $f = \{(1, 2), (2, 4), (3, 1), (4, k)\}$ is a one-one function from set A to A, where $A = \{1, 2, 3, 4\}$, then
 (a) $k = 1$ (b) $k = 2$ (c) $k = 3$ (d) $k = 4$
- Q12. Let $A = \{1, 3, 5\}$. Then the number of one-one functions defined on A is
 (a) 1 (b) 2 (c) 3 (d) 6
- Q13. Let $A = \{1, 2\}$ and $B = \{3, 4, 5\}$. Then the number of functions defined from A to B is
 (a) 8 (b) 9 (c) 6 (d) 1
- Q14. Consider non-empty set consisting of children in a family and a relation R is defined as aRb , if 'a' is a brother of 'b'. Then R is
 (a) Transitive but not symmetric
 (b) Symmetric but not transitive
 (c) Neither symmetric nor transitive
 (d) Both symmetric and transitive
- Q15. The relation $R = \{(1, 2)\}$ on $A = \{1, 2, 3\}$ is
 (a) Reflexive only
 (b) Symmetric only
 (c) Transitive only
 (d) Symmetric but not reflexive
- Q16. Let $A = \{1, 2, 3, 4\}$ and $R = \{(1, 1), (2, 2), (3, 3), (4, 4), (1, 2), (2, 1)\}$ be defined on set A. Then the equivalence classes of [1] is
 (a) $\{1, 2\}$ (b) $\{1, 2, 3\}$ (c) $\{1, 2, 3, 4\}$ (d) $\{1, 2\}$
- Q17. If $f: R \rightarrow A$, given by $f(x) = x^2 - 2x + 2$ is onto function, then the set A is
 (a) $(1, \infty)$ (b) $[1, \infty)$ (c) $(-\infty, 0)$ (d) $(0, \infty)$
- Q18. Let N be the set of natural numbers and the function $f: N \rightarrow N$ be defined by $f(n) = 2n + 3 \forall n \in N$. Then f is
 (a) surjective (b) injective (c) bijective (d) None of these

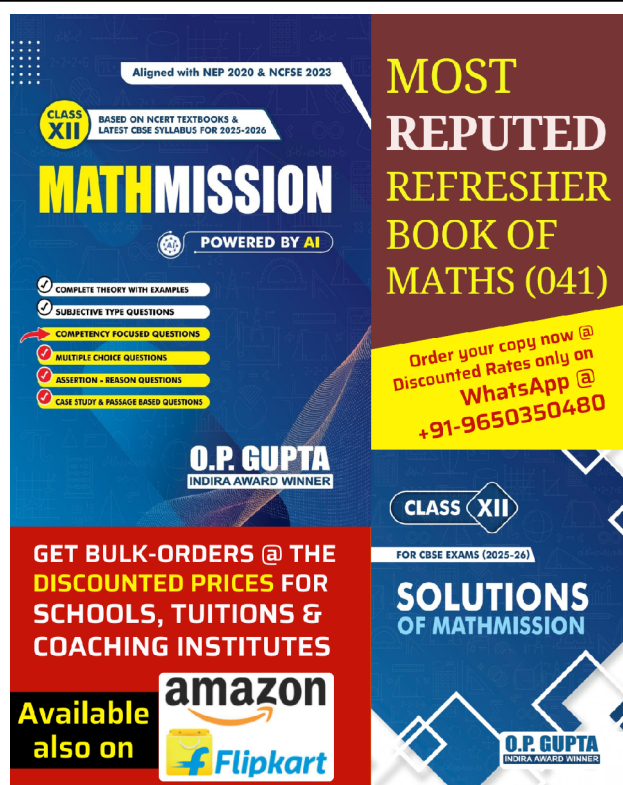
Question numbers 19 and 20 are Assertion and Reason based questions. Two statements are given, one labelled **Assertion (A)** and the other labelled **Reason (R)**. Select the correct answer from the codes (a), (b), (c) and (d) as given below.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true and Reason (R) is **not** the correct explanation of Assertion (A).
 (c) Assertion (A) is true but Reason (R) is false.
 (d) Assertion (A) is false but Reason (R) is true.
- Q19. **Assertion (A)** : Consider two sets $X = \{1, 3, 5, 7\}$ and $Y = \{0, 2, 4, 6, 8\}$. Then total number of one-one functions defined from X to Y is 120.
Reason (R) : If $n(X) = m$ and $n(Y) = n$, then number of one-one functions defined from the set X to set Y is ${}^n P_m$, where $m \leq n$.
- Q20. **Assertion (A)** : A function f shown below by the arrow diagram, is one-one.



Reason (R) : A function $f : A \rightarrow B$ is one-one if $f(\alpha) = f(\beta)$ implies $\alpha = \beta$ for all $\alpha, \beta \in A$.

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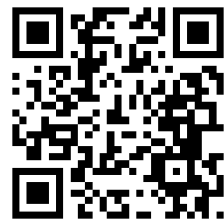
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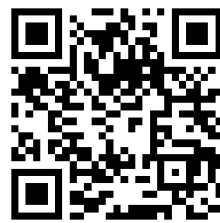
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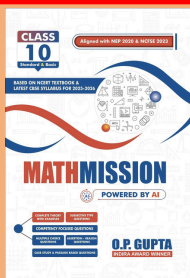
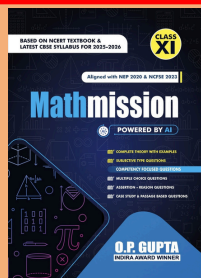
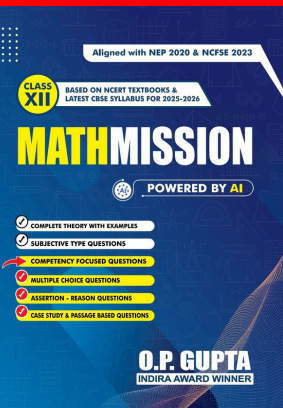
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