

CUET Mathematics Test

Chapter: Relations, Functions, and Inverse Trigonometric Functions

General Instructions

1. Total Questions: **20**
2. Duration: **60 Minutes**
3. All questions are compulsory.
4. Each question carries **5 marks**.
5. For each correct answer: **+5 marks**.
6. For each incorrect answer: **-1 mark**.
7. No negative marking for unanswered questions.
8. Use of calculator or electronic devices is strictly prohibited.
9. Choose the most appropriate answer from the given options.

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1. Let R be a relation on the set of natural numbers \mathbb{N} defined by $R = \{(a, b) : a + 3b = 12\}$.
The domain of R is:
(A) $\{3, 6, 9\}$
(B) $\{1, 2, 3\}$
(C) $\{3, 4, 9\}$
(D) $\{2, 4, 6\}$
2. A relation R on set $A = \{1, 2, 3\}$ is defined as $R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 1)\}$. This relation is:
(A) Reflexive and Transitive but not Symmetric
(B) Reflexive and Symmetric but not Transitive
(C) Equivalence Relation
(D) Symmetric and Transitive but not Reflexive
3. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = x^4$. Then f is:
(A) One-one and Onto
(B) Many-one and Onto
(C) One-one but not Onto
(D) Neither One-one nor Onto
4. The total number of equivalence relations that can be defined on the set $S = \{1, 2, 3\}$ is:
(A) 2
(B) 3
(C) 5
(D) 8
5. If $f : A \rightarrow B$ is an onto function such that $n(A) = 5$ and $n(B) = 4$, the number of such functions is:
(A) 4^5
(B) 240
(C) 120
(D) 60
6. The principal value of $\cos^{-1}\left(\cos \frac{7\pi}{6}\right)$ is:
(A) $\frac{7\pi}{6}$
(B) $\frac{5\pi}{6}$
(C) $\frac{\pi}{6}$
(D) $-\frac{\pi}{6}$
7. The domain of the function defined by $f(x) = \sin^{-1} \sqrt{x-1}$ is:
(A) $[1, 2]$
(B) $[0, 1]$
(C) $[-1, 1]$
(D) $[1, \infty)$
8. If $\sin^{-1} x = y$, then which of the following is correct?
(A) $0 \leq y \leq \pi$
(B) $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
(C) $0 < y < \pi$
(D) $-\frac{\pi}{2} < y < \frac{\pi}{2}$
9. The value of $\tan^{-1}(\sqrt{3}) - \sec^{-1}(-2)$ is:
(A) π
(B) $-\frac{\pi}{3}$

- (C) $\frac{\pi}{3}$
 (D) $\frac{2\pi}{3}$
10. Let $A = \{1, 2, 3, 4\}$. A relation $R = \{(1, 2), (2, 2), (1, 1), (4, 4), (1, 3), (3, 3), (3, 2)\}$ is given. R is:
 (A) Reflexive and symmetric but not transitive
 (B) Reflexive and transitive but not symmetric
 (C) Symmetric and transitive but not reflexive
 (D) An equivalence relation
11. Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = 3x$. Then f is:
 (A) One-one and Onto
 (B) Many-one and Onto
 (C) One-one but not Onto
 (D) Neither One-one nor Onto
12. The range of $\cot^{-1} x$ is:
 (A) $(0, \pi)$
 (B) $[0, \pi]$
 (C) $(-\frac{\pi}{2}, \frac{\pi}{2})$
 (D) $[-\frac{\pi}{2}, \frac{\pi}{2}] \setminus \{0\}$
13. The number of bijective functions from set A to itself, if A contains n elements, is:
 (A) n^2
 (B) 2^n
 (C) $n!$
 (D) n^n
14. If $\tan^{-1} x + \tan^{-1} y = \frac{\pi}{4}$ where $xy < 1$, then $x + y + xy$ is equal to:
 (A) 0
 (B) 1
 (C) $\pi/4$
 (D) $1 - xy$
15. The value of $\sin\left(\frac{\pi}{3} - \sin^{-1}\left(-\frac{1}{2}\right)\right)$ is:
 (A) $1/2$
 (B) $1/3$
 (C) $1/4$
 (D) 1
16. A relation R is defined on \mathbb{Z} by aRb if and only if $a - b$ is divisible by n . This relation is:
 (A) Only reflexive
 (B) Only symmetric
 (C) Only transitive
 (D) Equivalence relation
17. The domain of $\sec^{-1} x$ is:
 (A) \mathbb{R}
 (B) $\mathbb{R} \setminus (-1, 1)$
 (C) $[-1, 1]$
 (D) $(-\infty, \infty)$
18. If a function $f : \{1, 2, 3\} \rightarrow \{a, b, c\}$ is one-one, then it must be:
 (A) Into

- (B) Constant
- (C) Onto
- (D) Many-one

19. The value of $\cos^{-1}\left(\frac{1}{2}\right) + 2\sin^{-1}\left(\frac{1}{2}\right)$ is:

- (A) $\frac{\pi}{3}$
- (B) $\frac{2\pi}{3}$
- (C) $\frac{3\pi}{4}$
- (D) $\frac{5\pi}{6}$

20. Let L be the set of all lines in a plane and R be the relation in L defined as $R = \{(L_1, L_2) : L_1 \text{ is perpendicular to } L_2\}$. Then R is:

- (A) Reflexive
- (B) Symmetric
- (C) Transitive
- (D) Equivalence

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