

Time: 1.30 Hrs.

Standard 11 MATHEMATICS

Marks: 45

Part - A

Choose the correct answer:

10 × 1 = 10

- The number of constant functions from a set containing m elements to a set containing n elements is
a) mn b) m c) n d) $m+n$
- If $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = \lceil x \rceil + \lfloor x \rfloor$, then the range is
a) $\{0, \pm 2, \pm 4, \pm 6, \dots\}$ b) \mathbb{N}
c) \mathbb{Z} d) $\{\pm 1, \pm 3, \pm 5, \dots\}$
- $(A \cup B' \cup C) \cap (A \cap B' \cap C')$ is equal to
a) $A \cup B' \cup C$ b) $A \cap B' \cap C'$ c) $(A \cap B') \cup C$ d) $(A \cup B') \cap C$
- $n(A - B)$ is equal to
a) $n(A) - n(A \cap B)$ b) $n(A) - n(B)$ c) $n(B - A)$ d) $n(B) - n(A)$
- If $\frac{|x-2|}{x-2} \geq 0$, then x belongs to
a) $[2, \infty)$ b) $(2, \infty)$ c) $(-\infty, 2)$ d) $(-2, \infty)$
- If $|x-a| < r < 0$ then
a) $-r < x-a < r$ b) $-r \leq x-a \leq r$ c) $a-r < x \leq a+r$ d) no solution of x
- The number of solutions of $x^2 + |x-1| = 1$ is
a) 1 b) 0 c) 2 d) 3
- $\frac{1}{\cos 80^\circ} - \frac{\sqrt{3}}{\sin 80^\circ} =$
a) $\sqrt{2}$ b) $\sqrt{3}$ c) 2 d) 4
- $\left(1 + \cos \frac{\pi}{8}\right) \left(1 + \cos \frac{3\pi}{8}\right) \left(1 + \cos \frac{5\pi}{8}\right) \left(1 + \cos \frac{7\pi}{8}\right) =$
a) $\frac{1}{8}$ b) $\frac{1}{2}$ c) $\frac{1}{\sqrt{3}}$ d) $\frac{1}{\sqrt{2}}$
- If $\tan 40^\circ = \lambda$, then $\frac{\tan 140^\circ - \tan 130^\circ}{1 + \tan 140^\circ \tan 130^\circ} =$
a) $\frac{1-\lambda^2}{\lambda}$ b) $\frac{1+\lambda^2}{\lambda}$ c) $1 + \frac{\lambda^2}{2\lambda}$ d) $1 - \frac{\lambda^2}{2\lambda}$

Part - B

Answer any 4 questions: (Question No. 16 is compulsory)

4 × 2 = 8

- Let $A = \{0, 1, 2, 3\}$ construct relations on A of the type Reflexive, not symmetric and not transitive.
- Solve: $|4x-5| \geq -2$
- If $P(A)$ denotes the power set of A , then find $n(P(P(P(\phi))))$.

14) Find the value of $\tan(1050^\circ)$.

15) Find the value of $\cot\left(\frac{-15\pi}{4}\right)$.

16) Solve: $x = \sqrt{x+20}$ for $x \in \mathbb{R}$.

Part - C

4×3=12

Answer any 4 questions: (Question No. 22 is compulsory)

17) Prove that $\log\left(\frac{a^2}{bc}\right) + \log\left(\frac{b^2}{ac}\right) + \log\left(\frac{c^2}{ab}\right) = 0$.

18) Resolve into partial fractions: $\frac{x+12}{(x+1)^2(x-2)}$

19) If $f: \mathbb{R} - \{-1, 1\} \rightarrow \mathbb{R}$ is defined by $f(x) = \frac{x}{x^2-1}$, verify whether f is one to one or not.

20) If $\sin x = \frac{4}{5}$ (in I quadrant) and $\cos y = \frac{-12}{13}$ (in II quadrant) then find $\sin(x-y)$.

21) Determine whether the given function is even, odd or neither $\sin^2 x - 2\cos^2 x - \cos x$.

22) Find the domain of $\frac{1}{1-2\sin x}$.

Part - D

Answer all the questions:

3×5=15

23) On the set of natural numbers. Let R be the relation defined by aRb if $2a+3b = 30$. Write down the relation by listing all the pairs. Check whether it is (i) Reflexive (ii) Symmetric (iii) Transitive (iv) Equivalence relation.

(OR)

If $f, g: \mathbb{R} \rightarrow \mathbb{R}$ are defined by $f(x) = x+|x|$ and $g(x) = x-|x|$, find $g \circ f$ and $f \circ g$.

24) If one root of $K(x-1)^2 = 5x-7$ is double of the other root show that $K = 2$ or $K = -25$.

(OR)

Find the square root of $7-4\sqrt{3}$.

25) If $\sin \theta = \frac{3}{5}$ and the angle θ is in the second quadrant then find the values of other five trigonometric function.

(OR)

Find the value of $\sin\left(22\frac{1}{2}^\circ\right)$.
