Standard 11
MATHEMATICS

Time: 1.30 Hrs.

Marks: 45

Part - A

Choose the correct answer:

10×1=10

1) 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

2) If $f : R \to R$ defined by $f(x) = \lceil x \rceil + \lfloor x \rfloor$, then the range is

   a) $\{0, \pm2, \pm4, \pm6, \ldots\}$ b) N

   c) Z   d) $\{\pm1, \pm3, \pm5, \ldots\}$

3) $(A \cup B' \cup C) \cap (A \cap B' \cap C')$ is equal to

   a) $A \cup B' \cup C$ b) $A \cap B' \cap C'$ c) $(A \cap B') \cup C$ d) $(A \cup B') \cap C$

4) $n(A - B)$ is equal to

   a) $n(A) - n(A \cap B)$ b) $n(A) - n(B)$ c) $n(B - A)$ d) $n(B) - n(A)$

5) If $\dfrac{|x - 2|}{x - 2} \geq 0$, then x belongs to

   a) $[2, \infty)$ b) $(2, \infty)$ c) $(-\infty, 2)$ d) $(-2, \infty)$

6) 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

7) The number of solutions of $x^2 + |x - 1| = 1$ is

   a) 1   b) 0   c) 2   d) 3

8) $\dfrac{1}{\cos 80^\circ} - \dfrac{\sqrt{3}}{\sin 80^\circ} =$

   a) $\sqrt{2}$ b) $\sqrt{3}$ c) 2   d) 4

9) $\left(1 + \cos\dfrac{\pi}{8}\right)\left(1 + \cos\dfrac{3\pi}{8}\right)\left(1 + \cos\dfrac{5\pi}{8}\right)\left(1 + \cos\dfrac{7\pi}{8}\right) =$

   a) $\dfrac{1}{8}$ b) $\dfrac{1}{2}$ c) $\dfrac{1}{\sqrt{3}}$ d) $\dfrac{1}{\sqrt{2}}$

10) If $\tan 40^\circ = \lambda$, then $\dfrac{\tan 140^\circ - \tan 130^\circ}{1 + \tan 140^\circ \tan 130^\circ} =$

    a) $\dfrac{1 - \lambda^2}{\lambda}$ b) $\dfrac{1 + \lambda^2}{\lambda}$ c) $1 + \dfrac{\lambda^2}{2\lambda}$ d) $1 - \dfrac{\lambda^2}{2\lambda}$

Part - B

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

4×2=8

11) Let $A = \{0, 1, 2, 3\}$ construct relations on A of the type Reflexive, not symmetric and not transitive.

12) Solve: $|4x - 5| \geq -2$

13) If P(A) denotes the power set of A, then find $n(P(P(P(\phi))))$.

14) Find the value of $\tan(1050°)$.

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

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

Part - C

4×3=12

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

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

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

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

20) If $\sin x = \dfrac{4}{5}$ (in I quadrant) and $\cos y = \dfrac{-12}{13}$ (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 $\dfrac{1}{1-2\sin x}$.

Part - D

3×5=15

Answer all the questions:

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) Equivalance relation.

(OR)

If $f, g : R \to R$ are defined by $f(x) = x+|x|$ and $g(x) = x-|x|$, find gof and fog.

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

(OR)

Find the value of $\sin\left(22\dfrac{1}{2}°\right)$.