Tsl11M

Tenkasi District

Common First Mid Term Test - 2024

Standard 11

MATHEMATICS

Time: 1.30 Hrs. Marks: 45

I. Choose the best: **10×1=10**

1) If $n[(A\times B)\cap(A\times C)] = 8$ and $n(B\cap C) = 2$ then $n(A)$ =
   a) 6 b) 8 c) 16 d) 4

2) The range of the function $f(x) = |\lfloor x \rfloor - x|$, $x \in R$ is
   a) [0, 1] b) [0, 1) c) $[0, \infty)$ d) (0, 1)

3) The number of constant functions from the set containing m elts to the set containing n elts is
   a) mn b) m c) n d) m+n

4) The solution of $5x-1 < 24$ and $5x+1 > -24$ is
   a) (4, 5) b) (−5, −4) c) (−5, 5) d) (−5, 4)

5) If $\frac{Kx}{(x+2)(x-1)} = \frac{2}{x+2} + \frac{1}{x-1}$, then the value of K is
   a) 1 b) 2 c) 3 d) 4

6) The number of solutions of $x^2+|x-1| = 1$ is
   a) 1 b) 0 c) 2 d) 3

7) $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots\ldots \frac{R.H.S}{2} \cos 179^\circ =$
   a) 0 b) −1 c) 1 d) 89

8) If tan α and tan β are the roots of $x^2+ax+b = 0$ then $\frac{\sin(\alpha+\beta)}{\sin\alpha\sin\beta}$ is equal to
   a) $\frac{b}{a}$ b) $\frac{a}{b}$ c) $-\frac{a}{b}$ d) $-\frac{b}{a}$

9) If $\sin\alpha+\cos\alpha = b$ then $\sin 2\alpha$ is equal to
   a) b^2-1, if $b \le \sqrt{2}$ b) b^2-1, if $b > \sqrt{2}$
   c) b^2-1, if $b \ge 1$ d) b^2-1, if $b \ge \sqrt{2}$

10) 1 radian=
   a) 57° 17' 45" b) 57° 27' 45" c) 57° 07' 45" d) 57° 17' 35"

II. Answer 3 questions. Q.No. 14 is compulsory: **3×2=6**

11) If A = {1, 2, 3, 4} and B = {3, 4, 5, 6} find $n[(A\cup B)\times(A\cap B)\times(A\Delta B)]$.

12) Evaluate: $\left(\left((256)^{-\frac{1}{2}}\right)^{-\frac{1}{4}}\right)^3$

13) Find the value of $\sin 18^\circ$.

14) P.T $\frac{\sin 4x + \sin 2x}{\cos 4x + \cos 2x} = \tan 3x$.

III. Answer 3 questions. Q.No. 18 is compulsory: **3×3=9**

15) If $\sin x = \frac{15}{17}$ and $\cos y = \frac{12}{13}$, $0 < x < \frac{\pi}{2}$, $0 < y < \frac{\pi}{2}$. Find the value of $\sin(x+y)$.

16) If $a^2+b^2 = 7ab$, S.T $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}(\log a + \log b)$.

17) If one root of $K(x-1)^2 = 5x-7$ is double the other root. S.T K = 2 or -25.

18) Find the range of the function $f(x) = \frac{1}{1-3\cos x}$.

IV. Answer the following questions: **4×5=20**

19) If $A+B+C = 180^\circ$, P.T $\sin 2A+\sin 2B+\sin 2C = 4 \sin A \sin B \sin C$.

(OR)

From the curve $y = x$ draw, (i) $y = -x$ (ii) $y = 2x$ (iii) $y = x+1$ (iv) $y = \frac{1}{2}x + 1$ (v) $2x+y+3 = 0$.

20) Find all values of x for which $\frac{x^3(x-1)}{(x-2)} > 0$.

(OR)

In a survey of 5000 people in a town, it was found that 45% of the people know language A, 25% know language B, 10% know language C, 5% know language A and B, 4% know language B and C and 4% know language C and A. If 3% of the people know all three languages. Find number of people knows only language A.

21) Resolve the rational expression into partial fractions: $\frac{x+12}{(x+1)^2(x-2)}$

(OR)

In ΔABC, P.T $\tan\frac{A-B}{2} = \frac{a-b}{a+b}\cot\frac{C}{2}$.

22) Solve: $\sin\theta + \cos\theta = \sqrt{2}$

(OR)

Solve:

i) $\log_{5-x}(x^2-6x+65) = 2$

ii) $\log_8 x + \log_4 x + \log_2 x = 11$
