ASIA ENGLISH SCHOOL		1st Term Exam September 2009-10
Secondary /Higher Secondary Section		Date :12-09-09
Asia Campus, Drive-in Road, Ahmedabad-380054		Time : 2 Hours
Std : XI Sci	**Sub : Maths**	Total Marks : 50

Roll No. _____

SECTION – A **[7]**

(1) If $f:[0,1]\to[0,1]$ and $g:[0,1]\to[0,1]$ be two functions defined by $f(x)=\frac{1-x}{1+x}$ and $g(x)=4x(1-x)\ 0\le x\le 1$ then gof is _____

[a] $\frac{8x(1-x)}{(1+x)^2}$ [b] $\frac{8(1-x)x}{(1+x)^2}$

[c] $\frac{8}{(1+x)^2}$ [d] $\frac{8[1-x]}{(1+x)^2}$

(2) Let $A=\{x:x$ is a prime factor of 240$\}$

$B=\{x:x$ is the sum of any two prime factors of 240$\}$

Then

[a] $5\in A\cap B$ [b] $7\in A\cap B$ [c] $8\in A\cap B$ [d] $8\in A\cup B$

(3) Given that abc= -1, then the value of the determinant $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix}$ is :

[a] abc [b] 2abc [c] positive [d] 0

(4) If $f(x)=x^2-4x+5$ & $A=\begin{bmatrix}1 & 2\\ 4 & 3\end{bmatrix}$ then f(A) is equal to,

[a] $\begin{bmatrix}0 & 4\\ 8 & 8\end{bmatrix}$ [b] $\begin{bmatrix}2 & 1\\ 2 & 0\end{bmatrix}$

[c] $\begin{bmatrix}1 & 1\\ 1 & 0\end{bmatrix}$ [d] $\begin{bmatrix}8 & 4\\ 8 & 0\end{bmatrix}$

(5) If $\frac{1+3+5+.....+n\ terms}{1+2+3+.....+n\ terms}=\frac{12}{7}$ then n is equal to

[a] 6 [b] $[\sqrt{7}]^9$ [c] 7^{18} [d] none of these

(6) The set of zeroes of log $|\sin x|$ is _____

[a] [-1, 1] [b] [0,1]

[c] $\left\{2k\pi\pm\frac{\pi}{2}/k,z\right\}$ [d] $\{k\pi;k,z\}$

(7) For any $x\in R-\left\{2k\pi\pm\frac{\pi}{2};k\in z\right\}$, $y=\sec x$ _____ is not possible

[a] -1 [b] 3.5 [c] -2.7 [d] 0.2

SECTION – B **[8]**

(8) If $f(x)=\frac{x}{x-1}=\frac{1}{y}$, *find* $f(y)$

(9) Prove that $A\cap[B\cup C]=(A\cap B)\cup(A\cap C)$

(P.T.O.)

(10) If $A = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ and $A(adj\ A) = k \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then find k.

(11) If $x = -9$ is root of $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0$, then find other roots.

(12) Find a G.P. of positive numbers whose first terms 4 and fifth terms is 324.

(13) Find the range of $3 - 5\sec^2 x$

(14) Find the set of zeroes of $\cot(5x - 2004)$

(15) Find the principal period of $\tan\left(\frac{15 - x}{2}\right)$

SECTION – C [10]

(16) Solve : $4x - 3y = 11xy,\ 2x - 5y = 9xy$

(17) $f : R \to R,\ f(x) = 2x - 3,\ g : R \to R,\ g(x) = \frac{x + 3}{2}$ prove that f and g are inverse functions of each other.

(18) 3 + 33 + 303 + 30003+ …… up to n terms.

(19) State one of the distribution law and prove second low.

(20) Prove : $\cot^2 x - 1 = m^2 - \cos ec^2 x \cdot \cot^3 x \cdot sec x = (2 - m^2)^{3/2}$; where $0 < x < \frac{\pi}{2}$

SECTION – D [15]

(21) Construct a truth – table for $(p \to q) \vee \sim(q \to r) \to (p \to r)$

(22) Using the principle of mathematical induction prove

$p(n) : 1 + \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} + \ldots\ldots\ldots + \frac{1}{\sqrt{n}} > \sqrt{n},\ n \in N$

(23) Solve $x - 2y - z = 7,\ x - 3y = 11, 2x - 3y = 1$ by using Matrices.

(24) In a class of 60 students,

(1) 30 students have passed in Mathematics
(2) 25 students have passed in Biology.
(3) 17 students have passed in Chemistry.
(4) 12 students have passed only in maths.
(5) 10 students have passed in both maths & biology.

Then (1) How many students have passed in three subjects.
(2) How many students have pass only in chemistry and biology.

(25) Show that $\begin{vmatrix} 1 - a^2 - b^2 & 2ab & -2b \\ 2ab & 1 - a^2 - b^2 & 2a \\ 2b & -2a & 1 - a^2 - b^2 \end{vmatrix} = (1 + a^2 + b^2)^3$

SECTION – E [10]

(26) $f : z \to z,\ f(n) = (-1)^n n$ find f^{-1}

(27) (1) If $\frac{\sin A}{\sin B} = \sqrt{2},\ \ \frac{\tan A}{\tan B} = \sqrt{3}$, and A, B $\in \left(0, \frac{\pi}{2}\right)$, then find A and B

(2) $\frac{1^2}{2} + \frac{1^2 + 2^2}{3} + \frac{1^2 + 2^2 + 3^2}{4} + \ldots\ldots$ up to n terms.

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