Pre-Board Test Series- II - 2015
Class XII

Duration: 2.5 Hour **Max. Mark 100**

General Instructions:

1. All questions are compulsory.
2. The question paper consist of 29 questions divided into three sections A, B and C Section A comprises of 10 questions of one mark each, section B comprises of 12 questions of four marks each and section C comprises of 7 questions of six marks each.
3. All questions in Section A are to be answered in one word, one sentence or as per the exact requirement of the question.
4. There is no overall choice. However, internal choice has been provided in 4 questions of four marks each and 2 questions of six mark each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted. You may ask for logarithmic tables, if required.

Section-A

1. If 4x + 4y – λz =0 is the equation of the plane through the origin that contains the line $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z}{4}$,find the value of '**λ**'**.**

2. If f :**R**→**R**be defined f(x)=$(3-x^3)^{1/3,}$ then find *fof(x)*..

3. Differentiate:$\frac{\sin x}{x}$ $w.r.t.$ $'y'$.

4. If a*b=$\sqrt{a.b}\forall\ a,b\ \in R^+$ find the identity element, show that every element is inverse of itself.

5. If A is the matrix of order 3 then find the value of$\left|(adj(adj(adj))\right|$ if |A| = 3.

6. Evaluate:$\left[\sec^{-1} x + \sin^{-1}\left(\frac{1}{x}\right)\right]$.

7. If A=$\begin{bmatrix} 1527 & 8365 & 92 \\ 26 & 7382 & 8 \\ 77020 & 728 & 90 \end{bmatrix}$, and then find *k*.

8. If $\underset{a}{\rightarrow} = 2\hat{} + 6j\hat{}$,$\underset{b}{\rightarrow} = 5i\hat{} + 15j\hat{}$ $\underset{c}{\rightarrow} = 4i\hat{} + 12j\hat{}$.and find$\left[\underset{a}{\rightarrow}\ \underset{b}{\rightarrow}\ \underset{c}{\rightarrow}\right]$.

9. Write the Integrating Factor(I.F.) for the linear differential equation $(y^2-1)+2xy.\frac{dy}{dx}=\frac{2}{y^2-1}\frac{dy}{dx}$

10. $\int \frac{x}{y^{\circ}}dy.$

Section-B

11. Find the value of $\sin^{-1}\left[cot\left[\sin^{-1}\sqrt{\left(\frac{2-\sqrt{3}}{4}\right)}+\cos^{-1}\frac{\sqrt{12}}{4}+\sin^{-1}\frac{1}{\sqrt{2}}\right]\right].$

OR

Prove that : $4\tan^{-1}\left[\frac{1}{5}\right]-\tan^{-1}\left[\frac{1}{70}\right]+\tan^{-1}\left[\frac{1}{99}\right]=\frac{\pi}{4}.$

12. Using properties of determinants prove that: $\begin{vmatrix}(b+c)^2 & a^2 & bc\\ (c+a)^2 & b^2 & ca\\ (a+b)^2 & c^2 & ab\end{vmatrix}=(a-b)(b-c)(c-a)(a+b+c)(a^2+b^2+c^2)/$

13. Find the value of a and b if f(x) = $\begin{cases} -2\sin x \quad x\leq-\frac{\pi}{2} \\ a\sin x+b-\frac{\pi}{2}<x<\frac{\pi}{2}\ is\ continuous\ at\ x=\pm\frac{\pi}{2} \\ \cos x\ x\mp\frac{\pi}{2}\end{cases}$

14. If y=$\sin^{-1}\left(\frac{4\sin x+3\ cps\ x}{5}\right)$ $show\ that\ \frac{dy}{dx}=1.$

OR

If x^2-xy+y^2=a^2 show that $\left(\frac{d^2y}{dx^2}\right)=\frac{6a^2}{(x-2y)^3}$

15. Prove that y=$\frac{4\sin\theta}{2+cos\theta}-\theta$ is an increasing function in 0, $\left[0,\frac{\pi}{2}\right]$.

16. Evaluate:$\int\sqrt{1+\cot x\ dx}$.How entropy of youth is integrating day by day? Give two points only.

OR

Evaluate:$\int\frac{x^2+sin^2x}{1+x^2}sec^2x\ dx$ *How entropy of youth is integrating day by day? Give twopoints only.*

17. Solve:$x\frac{dy}{dx} = y(logx - \log y + 1)$.

18. For any three vectors *a*, *b*, and *c* prove that $\left[\vec{a} + \vec{b}\ \vec{b} + \vec{c}\ \vec{c} + \vec{a}\right] = 2\left[\vec{a}\,\vec{b}\,\vec{c}\right]$

19. If plane $x - y + z = 7$ is $4\sqrt{3}$ units far from point $(-3, 5, \lambda)$, then what is the value of λ?

OR

Show that the lines $\frac{x-1}{2} = \frac{y+1}{-1} = \frac{z}{3}$ and $\frac{x}{2} = \frac{y-2}{-1} = \frac{-z+1}{-3} = \frac{x-1}{2} = \frac{y+1}{-1} = \frac{z}{3}$ are lying on a plane/are coplanar.

20. A bag contains 4 balls. Two balls are drawn at random, and are found to be blue. What is the probability that 50% balls were blue in colour in that bag?Ball is associated in most of the outdoor and indoor games, how one can enhance Mathslearning by playing games. Give in brief.

21. Let $f : R \to R$ be defined as $f(x) = 10x + 7$ find the function $g : R \to R$ such that $gof = fog = I_R$.

22. Find the value of *x*, *y*, *z* if the matrix ', A=$\begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$satisfy the equation A A=I.

Section-C

23. A card being lost from a deck of 52 playing card. From the remaining cards two card drawn and found both were diamond cards. Find the probability that the lost card was a card other than diamond.

24. Show that the lines $\frac{x+4}{3} = \frac{y+6}{5} = \frac{z-1}{-2}$ and $3x - 2y + z + 5 = 0 = 2x + 3y + 4z - 4$ are

coplanar.
Find the point of intersection and the equation of the plane in which they lie.

OR

Find the distance of the point (2, 3, 4) from the plane $3x + 2y + 2z + 5 = 0$ measured parallel to theline $\frac{x+3}{3} = \frac{y-2}{6} = \frac{z}{2}$.

25. Given two matrix A=$\begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ $and\ B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$ $verify\ that\ BA = 6I.$

Use the result to solvethe system:2x+3y+4z=17

Y+2z=17

26. Using integration find the area of the region between the curves $x^2 = 4y$ and $x^2 - 4 = y$. Draw the rough sketch and shade the region.

27. Find the equation of tangents to the curve y = cos(x+y), $-2\pi \leq z \leq 2\pi$that are parallel to the line $x + 2y = 0$.

OR

A rectangular sheet of width 1 m is folded in such a way that its one corner is touching the edge of other side find the length of minimum size of creases.

28. Solve the differential equation$x\frac{dy}{dx} + y - x + xy\cot x = 0; x \neq 0$

29. The manager of an oil refinery must decide on the optimal mix of two possible blending processes of which the inputs & outputs per production run, are as follows:

	Input		**Output**	
Process	Crude A	Crude B	Gasoline P	Gasoline Q
1	5	3	5	8
2	4	5	4	4

The max. Crude A & B available are 200 & 150 units resp. Market requirements are at least100 & 80 units P & Q respectively .The profit from process 1 & process 2 are Rs.300/- &Rs 400/- resp. Formulate LPP & solve for maximizing the profit. A greedy petrol pump owner is mixing kerosene in petrol. What value you will suggest him to stop such crime on your level best.