CLASS-XII (2014-2015)

QUESTION WISE BREAK UP

Type of Question	**Mark per Question**	**Total No. of Questions**	**Total Marks**
VSA	**1**	**6**	**06**
LA-I	**4**	**13**	**52**
LA-II	**6**	**7**	**42**
Total 26			**100**

1. *No chapter wise weightage. Care to be taken to cover all the chapters.*
2. ***The above template is only a sample. Suitable internal variations may be made for generating similar templates keeping the overall weightage to different form of questions and typology of questions same***

CHAPTERWISE MARKS in this Model Question Paper _Cl-XII (CBSE)

Sr. No	TOPICS	MARKS				
		V SA (1M)	LA-I (4M)	L A-II (6M)	Total Marks	
1 a	Relation & Function	1	-	-	1	10
1 b	Binary operation		1		4	
1 c	Inverse Trig. Func	1	1 OR	-	5	
2.a	Matrices	1+1+		1	8	13
b	Determinant	1	1	-	5	
3.a.	Continuity, Differentiability		1 + 1+ 1	-	12	44
b.	Applications Of Derivative		1	1 OR	10	
c.	Indefinite Integral		1 OR	-	8	
	Definite Integral		1	-		
d	Applications Of Integrals		-	1	6	
e	Differential Equations		1+1		8	
4.a	Vectors	1	1 OR	1	11	17
b	Three Dimensional Geometry			1 OR	6	
5.	Linear Programming		-	1	6	
6.	Probability		1 OR	1	10	
	TOTAL	6	13	7	100	

[Model Test–09(Q)/XII (14-15)_20th Nov'14] MODEL TEST (Pre-Board_Cl-XII_CBSE) [FM–100 /Time–180 min.]

General Instructions :

i) All questions are compulsory.

ii) The question paper consists of **26** questions divided into three sections **A, B** and **C**. Section **A** comprises of **6** questions of **one** mark each, Section **B** comprises of **13** questions of **four** marks each and section **C** comprises of **07** questions of **six** marks each.

iii) All questions in Section **A** are to be answered in **one** word, **one** sentence or as per the exact requirement of the question.

iv) There is no overall choice. However, internal choice has been provided in **04** questions of **four** marks each and **02** questions of **six** marks each. You have to attempt only one of the alternatives in all such questions.

v) Use of calculator is **not** permitted. You may use logarithmic tables, if required.

Section-A (01 mark each)

1. Show that the relation R in $\mathbb{R}$ defined as $R=\{(a, b) : a \le b\}$ is reflexive and transitive but not symmetric.

2. Simplify: $\tan^{-1}\left[\frac{a.\cos x - b.\sin x}{b.\cos x + a.\sin x}\right]$, if $\frac{a}{b}.\tan x > -1$.

3. If $x\begin{bmatrix}2\\3\end{bmatrix} + y\begin{bmatrix}-1\\1\end{bmatrix} = \begin{bmatrix}10\\5\end{bmatrix}$, find the values of x and y.

4. If a, b, c are three non-zero real numbers , then find the inverse of the matrix $A=\begin{bmatrix}a&0&0\\0&b&0\\0&0&c\end{bmatrix}$.

5. Find the area of the triangle whose vertices are (3, 8), (–4, 2) and (5, 1). (**using Determinant**).

6. Find the equation of the line passing through the point (1, 2, 3) and parallel to the vector $\left(3\hat{i}+2\hat{j}-2\hat{k}\right)$.

Section-B (04 marks each)

7. Let $f : \mathbb{N}\to\mathbb{R}$ be a function defined as $f(x) = 4x^2 + 12x + 15$. Show that $f : \mathbb{N}\to S$, where S is the range of f, is invertible. Find the inverse of f.

8. Solve for x : $\tan^{-1}2x + \tan^{-1}3x = \frac{\pi}{4}$.

OR,

Evaluate : $\cos(2\cos^{-1}x + \sin^{-1}x)$ at $x = 1/5$, where $0 \le \cos^{-1}x \le \pi \quad and \quad -\frac{\pi}{2} \le \cos^{-1}x \le \frac{\pi}{2}$

9. Prove that, $\begin{vmatrix}a & b & ax+by\\ b & c & bx+cy\\ ax+by & bx+cy & 0\end{vmatrix} = (b^2-ac)(ax^2+2bxy+cy^2)$

10. A function f is defined by $f(x)=\begin{cases}x, & \text{if } x\le 1\\ 5, & \text{if } x>1\end{cases}$. Is f is continuous at x = 0 ? At x =1 ? At x = 2 ?

11. If $x=\frac{1}{z}$ and $y=f(x)$ then prove that $\frac{d^2f}{dx^2}=2z^3\frac{dy}{dz}+z^4\frac{d^2y}{dz^2}$.

12. If $\sin y = x.\sin(a + y)$, prove that, $\frac{dy}{dx}=\frac{\sin^2(a+y)}{\sin a}$ [$a \ne n\pi$, n = 0, 1, 2, ….]

13. A ladder AB of length 5 metres, moves with its end A on a horizontal plane and end B on a wall perpendicular to the horizontal plane. If A moves at the rate of 2 m/sec and is at a distance of 4 metres from the wall, then how fast the end B will descend ?

14. Evaluate : $\int \frac{dx}{(x+1)(x+2)(x+3)}$ OR, Evaluate : $\int (x+1)\sqrt{\frac{x+2}{x-2}}dx$.

15. Evaluate : $\int_0^{\frac{\pi}{4}} \frac{\sin x + \cos x}{9+16\sin 2x}dx$.

16. Find the particular solution of the following differential equation : $\frac{dy}{dx} + 2y\tan x = \sin x$

$when\ x = \frac{\pi}{3}\ y = 0$

17. Prove that the differential equation $\cos\left(\frac{y}{x}\right)\left(x\frac{dy}{dx} - y\right) = x$, is homogeneous and solve it.

18. Three vectors $\vec{a} = \left(\hat{i}+4\hat{j}+2\hat{k}\right)$, $\vec{b} = \left(3\hat{i}-2\hat{j}+7\hat{k}\right)$ and $\vec{c} = \left(2\hat{i}-\hat{j}+4\hat{k}\right)$ are given. Find a vector perpendicular to both of $\vec{a}$ and $\vec{b}$ and $\vec{c}.\vec{d} = 15$.

OR

Express the vector $\vec{a} = \left(5\hat{i}-2\hat{j}+5\hat{k}\right)$ as sum of two vectors such that one is parallel to the vector $\vec{b} = \left(3\hat{i}+\hat{k}\right)$ and the other is perpendicular to $\vec{b}$.

19. A die is tossed thrice. Find the probability of getting an odd number at least once .

OR,

Five cards are drawn successively with replacement from a well-shuffled deck of 52 cards. What is the probability that (i) all the five cards are spades? (ii) only 3 cards are spades?

<u>Section-C</u> (06 marks each)

20. If matrix $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, show that : $A^2 - 4A - 5I_3 = 0$ and hence find A^{-1}.

21. A light post is to be kept in vertical position by a stretched straight wire from the top of the post to the ground. The wire has to clear a wall of 6 metres high and 4 metres from the post. What is the smallest length of the wire that can serve the purpose ?

OR,

A wire of length ℓ is divided into two parts. First part was given the shape of a square and the other part was given the shape of a circle. Find the lengths of the parts, so as to make the sum of the areas of the square and the circle minimum.

22. Using integration, find the area of the region enclosed between the curves $x^2 + y^2 = 4$ and $x^2 + y^2 - 2x = 0$.

23. Find the area of the triangle with vertices A (1, 1, 2), B (2, 3, 5) and C (1, 5, 5).

24. Find the image of the point (1, 6, 3) in the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$.

OR,

Find the equation of the plane through the line of intersection of the planes $x + y + z = 1$ and $2x + 3y + 4z = 5$ which is perpendicular to the plane $x - y + z = 0$

25. A merchant plans to sell two types of personal computers – a desktop model and a portable model that will cost ₹ 25000 and ₹40000 respectively. He estimates that the total monthly demand of computers will not exceed 250 units. Determine the number of units of each type of computers which the merchant should stock to get maximum profit if he does not want to invest more than ₹70 lakhs and if his profit on the desktop model is ₹4500 and on portable model is ₹5000.

26. Of the students in a college, it is known that 60% reside in hostel and 40% are day scholars (not residing in hostel). Previous year results report that 30% of all students who reside in hostel attain A grade and 20% of day scholars attain A grade in their annual examination. At the end of the year, one student is chosen at random from the college and he has an A grade, what is the probability that the student resides in hostel ?

"The true order of learning should be,
***first**, what is necessary ;*
***second**, what is useful;*
and
***third**, what is ornamental ".*

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