CLASS-XII (CBSE) (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 Paper (CBSE)

Sr. No	TOPICS	MARKS				
		V SA(1M)	S A (4M)	L A (6M)	Total Marks	
1 a)	Relation & Function	1	1	Nil	5	10
1 b)	Binary operation					
1 c)	Inverse Trig. Func	1	1 OR	Nil	5	
2.a)	Matrices	**1+1+1**		1	9	13
b)	Determinant		**1 OR**	Nil	4	
3.a.	Continuity, Differentiability	Nil	**1 + 1 OR**	Nil	8	44
b.	Applications Of Derivative	Nil	1 +1	1 OR	14	
c.	Integrals	Nil	**1 + 1**	Nil	8	
d	Applications Of Integrals	Nil	Nil	1 OR	6	
e	Differential Equations	Nil	1+1		8	
4.a	Vectors	1	1	1	11	17
b	Three Dimensional Geometry			1	6	
5.	Linear Programming	Nil	Nil	1		6
6.	Probability	Nil	1 OR	1		10
	TOTAL	6	13	7		100

[Model Test–07(Q)/XII (14-15)_ 19th Dec'14] MODEL TEST [FM–100 /Time–180 min.]

(Pre- CBSE Board's Exam'15_)

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 calculators is **not** permitted. You may use logarithmic tables, if required

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Section-A (01 mark each)

1. Which of the following represents a function $f : R \to R$? Why?
   a) $y = x^2$ b) $y^2 = x$

2. Find the principal value of $\sin^{-1}\left(\sin\frac{4\pi}{3}\right)$.

3. For what value of x, is the matrix $\begin{bmatrix} 3-2x & x+1 \\ 2 & 4 \end{bmatrix}$ is singular ?

4. If matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and $A^2 = kA$, then find the value of k.

5. If A is a invertible matrix of order 3×3, then express $|A^{-1}|$ in terms of $|A|$.

6. Find the direction ratios of the line $6x - 1 = 2x + 3 = 5 - z$.

Section-B (04 marks each)

7. Show that the relation S in the set $A = \{x \in Z : 0 \le x \le 12\}$ given by $S = \{(a, b) : a, b \in Z, |a - b| \text{ is divisible by } 4\}$ is an equivalence relation. Find the set of all elements related to 1.

8. Express $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right)$, $-\frac{\pi}{2} < x < \frac{3\pi}{2}$ in the simplest form.

OR,

Solve: $\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$

9. Prove that, $\begin{vmatrix} 1+a^2 & ab & ac \\ ab & 1+b^2 & bc \\ ca & cb & 1+c^2 \end{vmatrix} = (1+a^2+b^2+c^2)$.

OR,

Prove that, $\begin{vmatrix} 2bc-a^2 & c^2 & b^2 \\ c^2 & 2ca-b^2 & a^2 \\ b^2 & a^2 & 2ab-c^2 \end{vmatrix} = (a^3+b^3+c^3-3abc)^2$

10. Discuss the continuity of the function f(x) given by $f(x) = \begin{cases} \frac{\frac{1}{e^x}-1}{\frac{1}{e^x}+1}, & x \neq 0 \\ 0, & x = 0 \end{cases}$ at x=0.

11. If y = a.cos(log x) + b sin(log x), (a, b are constant), prove that, $x^2.\frac{d^2y}{dx^2} + x.\frac{dy}{dx} + y = 0.$

OR

If $x = a.\sin t \ \ and \ \ y = a\left(\cos t + \log\tan\frac{t}{2}\right)$, find, $\frac{d^2y}{dx^2}$.

12. Using differential find the approximate value of $\sqrt[3]{63}$.

13. A particle moves along the curve $2x^3 - 3y + 3 = 0$. Find the points on the curve at which the ordinate is changing twice as fast as the abscissa of the points.

14. Evaluate: $\int \frac{dx}{x\left(x^5+1\right)}$

15. Evaluate : $\int_0^4 \left(|x|+|x-2|+|x-4|\right) dx$

16. Solve the following differential equation: $(x^3+y^3).dy - x^2y.dx = 0$

17. Solve the differential equation : $(\tan^{-1}y - x)\,dy = (1+y^2)dx$.

18. For non-zero vectors $\vec{a}$, $\vec{b}$, $\vec{c}$, show that, $\left(\vec{a}-\vec{b}\right)$, $\left(\vec{b}-\vec{c}\right)$, $\left(\vec{c}-\vec{a}\right)$ are always coplanar.

19. A die is thrown again and again until three sixes are obtained. Find the probability of obtaining the third six in the sixth throw of the die.

OR,

An instructor has a question bank consisting of 300 easy True/False questions, 200 difficult True/False questions, 500 easy multiple choice questions and 400 difficult multiple choice questions. If a question is selected at random from the question bank, what is the probability that it will be an easy question given that it is a multiple choice question?

Section-C (06 marks each)

20. Find the area of the circle $4x^2 + 4y^2 = 9$ which is interior to the parabola $x^2 = 4y$.

OR,

Using integration, find the area of the triangle ABC, coordinates of whose vertices are A (4, 1), B (6, 6) and C (8, 4).

21. Using matrix method, solve the following system of equation $x + y + z = 6$, $x + 2z = 7$, $3x+y+z=12$.

22. Vectors $\vec{a}$, $\vec{b}$ *and* $\vec{c}$ are such that $\vec{a}+\vec{b}+\vec{c}=\vec{0}$ and $|\vec{a}|=3$, $|\vec{b}|=5$ and $|\vec{c}|=7$. Find the angle between $\vec{a}$ and $\vec{b}$.

23. Show that of all the rectangles with a given perimeter, the square has the largest area.

OR,

Show that the right circular cone of least curved surface and given volume has an altitude equal to $\sqrt{2}$ times the radius of the base.

24. Find the coordinates of the foot of the perpendicular & the perpendicular distance of the point P(3, 2, 1) from the plane 2x-y+z+1=0. Find also, the image of the point in the plane.

25. Bag I contains 3 red & 4 black balls & BagII contains 5 red & 6 black balls. One ball is drawn at random from one of the bags & is found to be red. Find the probability that it was drawn from Bag II.

26. A factory makes tennis rackets and cricket bats. A tennis racket takes 1.5 hours of machine time and 3 hours of craftman's time in its making while a cricket bat takes 3 hours of machine time and 1 hour of craftman's time. In a day the factory has the availability of not more than 42 hours of machine time and 24 hours of craftman's time. If the profit on a racket and on a bat is ₹20 and ₹ 10 respectively, find the number of tennis rackets and crickets bats that the factory must manufacture to earn the maximum profit. Make it as an L.P.P. and solve graphically.

"Success is never an Accident.
It is the result of Right Decision at the Right Time."

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