DESIGN QUESTION PAPER

CLASS X

SUBJECT : MATHEMATICS

TIME ; 3 HOURS **FULL MARKS : 80**

1. WEIGHTAGE TO OBJECTIVES :

Objectives	**Knowledge**	**Understanding**	**Application**	**Skill**	**Total**
Percentage of Marks	37	45	12	6	100
Marks	30	36	9	5	80

2. Weightage to Forms of Questions

Forms of Questions	**Long Answer (LA)**	**Short Answer 1 (SA I)**	**Short Answer 2 (SA II)**	**Short Answer 3 (SA III)**	**Very Short Answer (VSA)**	**Objective (O)**	**Total**
Number of Question	5	3	6	5	8	5	32
Marks Allotted	27	12	18	10	8	5	80
Estimated Time (in Mins)	70	33	36	20	13	8	180

3. Weightage to Contents

UNIT / CAHPTER/SL No.	NAME OF CHAPTER	MARKS
I	Number System, Polynomials and Factorization	14
II	Pair of Linear Equations in two variables, Quadratic Equations and Arithmetic Progression (AP)	14
III	Triangles, Circles and Construction	15
IV	Trigonometric Ratios, Height and Distances, and Co-ordinate Geometry	15
V	Mensuration	10
VI	Statistics and Probability	10
VII	Trading and Demat Account	2

Section of Option : No

Scheme of Option : Internal option must be given in Essay / Long Answer type questions testing the same objective.

Difficulty Level: Difficult: 20%, Average : 60%, Easy : 20%

SAMPLE BLUE PRINT

Subject : Mathematics **Full Marks** : 80
Class : X **Time** : 3 hours

Sl. No.	Objective	KNOWLEDGE						UNDERSTANDING/COMPREHENSION						APPLICATION/EXPRESSION						SKILL		TOTAL
		E/LA	SA I	SA II	SA III	VSA	O	E/LA	SA I	SA II	SA III	VSA	O	E/LA	SA I	SA II	SA III	VSA	O	E/LA	SA III	
1.	Number System, Polynomials and Factorization		4(1)		2(1)	1(1)				3(1)	2(1)	1(1)	1(1)									14(7)
2.	Pair of Linear Equations in two variables, Quadratic Equations and Arithmetic Progression (AP)			3(1)							2(1)	1(1)	1(1)		4(1)						3(1)	14(6)
3.	Triangles, Circles and Construction	6(1)			2(1)	1(1)		3(1)*					1(1)							2(0)*		15(5)
4.	Trigonometric Ratios, Height and Distances, and Co-ordinate Geometry			3(1)		1(1)			4(1)		2(1)			5(1)								15(5)
5.	Mensuration			3(1)			1(1)	5(1)				1(1)										10(4)
6.	Statistics and Probability					1(1)		6(1)		3(1)												10(3)
7.	Trading and Demat Account					1(1)	1(1)															2(2)
	SUB TOTAL	6(1)	4(1)	9(3)	4(2)	5(5)	2(2)	14(3)*	4(1)	6(2)	6(3)	3(3)	3(3)	5(1)	4(1)					2(0)*	3(1)	80((32)
	TOTAL	30(14)						36(15)						9(2)						5(1)		

Figures within brackets indicate the number of questions and figures outside the brackets indicate marks.
***Denotes that marks have been combined to form one question**
This blue print is only for the following sample questions. It will vary from question paper to question paper.

Summary

Essay/ Long answer (E/LA)	5 questions	27 marks
Short Answer (SA I)	3 questions	12 marks
Short Answer (SA II)	6 questions	18 marks
Short Answer (SA III)	5 questions	10 marks
Very Short Answer (VSA)	8 questions	8 marks
Objective Type (O)	5 questions	5 marks

SAMPLE QUESTION PAPER
MATHEMATICS
CLASS - X

TIME : 3 HRS **FULL MARK : 80**

Attempt all questions.

For question nos. 1 to 5, write the letter corresponding to the correct answer. The figures in the right margin indicate full marks for the questions.

1. The number of days within which the stock exchange is supposed to resolve dispute at their end is
   (A) 10 (B) 15 (C) 20 (D) 30 1
2. The remainder when $4x^3 + 4x^2 + x - 4$ is divided by $2x - 1$
   (A) 2 (B) -2 (C) 4 (D) - 4 1
3. The sum of the first n terms of the AP whose first term is 1 and common difference is 2 is :
   (A) 3n (B) 2n - 1 (C) n^2 (D) $n(n + 1)$ 1
4. A point P is at a distance of 13 cm from the centre of a circle. If the radius of the circle is 5 cm, the length of the tangent from P to the circle is 1
   (A) 12 cm (B) 13 cm (C)15 cm (D) 18 cm
5. The volume of the hemisphere of radius r is 1
   (A) $\frac{4}{3}\pi r^3$ (B) $\frac{1}{3}\pi r^3$ (C) $\frac{2}{3}\pi r^3$ (D) $4\pi r^3$
6. Write the statement of Euclid's Division Lemma. 1
7. What is the first term of the quotient when $2x^3 + x^2 - 3x + 5$ is divided by $1 - 3x + x^2$? 1
8. Write down the quadratic equation whose roots are 2 and -3. 1
9. Write the full form of SCORES. 1
10. How many tangents can be drawn to a circle through a point lying outside the circle ? 1
11. Write down the formula to find the area of a triangle whose vertices are (x_1,y_1), (x_2,y_2) and (x_3,y_3). 1
12. Find the area of a circle whose radius is 7 cm. 1
13. Define mode of a frequency distribution. 1
14. If x,y,z are real numbers, $x \neq 0$, and $xy = xz$, prove that $y = z$. 2
15. Prove that $x^n - y^n$ is divisible by $x+y$ only when n is even. 2
16. The n^{th} term of a sequence is given by $a_n = 5n-3$. Show that the sequence is an AP. 2
17. State Pythagoras theorem and also its converse. 2
18. If Cos A = $\frac{3}{5}$, calculate Sin A and Tan A. 2
19. Show that the square of an odd integer is of the form 8k + 1. 3

20. Solve the quadratic equation $ax^2 + bx + c = 0$, $(a \neq 0)$ by the method of completing square. 3

21. Solve graphically :

$2x + 3y = 5$

$5x - 4y + 22 = 0$ 3

22. In a right triangle ABC, right angled at B, Prove that $\sin A = \cos(90^0 - A)$ and $\cos A = \sin(90^0 - A)$. 3

23. Prove that the area of a sector of sectorial angle **Ø** and radius r is $\frac{\pi r^2 \theta}{360}$. 3

24. Find the lower quartile of the following distribution of marks. **3**

Marks	No. of students
0-4	10
4-8	12
8-12	18
12-14	7
14-18	5
18-20	8
20-25	4
25 and above	6

25. Show that $a^3 + b^3 + c^3 - 3abc = \frac{1}{2}(a+b+c)\{(a-b)^2 + (b-c)^2 + (c-a)^2\}$ **4**

26. The ratio of incomes of two persons is 9:7 and the ratio of their expenditures is 4:3.1f each of them saves Rs. 5000 per month, find their monthly incomes. 4

27. Find the area of the quadrilateral whose vertices are (1,1), (3,4), (5,-2) and (4, -7) taken in order. 4

Or,

If three consecutive vertices of a parm are A(1, -2), B(3, 6) and C(5, 10), find its fourth vertex.

28. Construct a triangle similar to the triangle ABC with its side's equal to $\frac{3}{5}$ of the corresponding sides of the ABC. Write the steps of construction also. **5**.

Or,

Divide a line AB in the ratio 2:3. Write the steps of construction also.

29. A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff of height h. At a point on the plane, the angle of elevation of the bottom of the flagstaff is α and that of the top of the flagstaff is β . Prove that the height of the tower is $\frac{h \tan\alpha}{\tan\beta - \tan\alpha}$. **5**

30. A metallic sphere of radius 9 cm is melted and recast to form a cylinder of radius 3 cm. Find the curved surface area of the cylinder. **5**

31. State and prove Basic Proportionality Theorem. **6**

Or,

Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

32. Find the mean and median of the following distribution : **6**

Class	Frequency
30 - 40	12
40 - 50	18
50 - 60	20
60 - 70	15
70 - 80	12
80 - 90	11
90 -100	6
100 - 110	4
110 - 120	2
Total	100