

## **BLUE PRINT : SA-I (X) : MATHEMATICS**

<b>Unit/Topic</b>	<b>MCQ (1 mark)</b>	<b>Short answer (2 marks)</b>	<b>Short answer (3 marks)</b>	<b>Long answer (4 marks)</b>	<b>Total</b>
<b>Number System</b> Real numbers	--	4(2)	3(1)	4(1)	<b>11(4)</b>
<b>Algebra</b>  Polynomials, Pair of Linear Equations in two variables	1(1)	4(2)	6(2)	12(3)	<b>23(8)</b>
<b>Geometry</b>  Triangles	1(1)	2(1)	6(2)	8(2)	<b>17(6)</b>
<b>Trigonometry</b>	1(1)	--	9(3)	12(3)	<b>22(7)</b>
<b>Statistics</b>	1(1)	2(1)	6(2)	8(2)	<b>17(6)</b>
<b>Total</b>	4(4)	12(6)	30(10)	44(11)	<b>90(31)</b>

# SAMPLE PAPER – II

**Class – X**  
**Subject: Mathematics**

**Max. Marks: 90**  
**Time Allowed: 3 hrs**

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**General Instruction:**

- (i) All questions are compulsory.
  - (ii) The question paper consists of 31 questions divided into four sections A, B, C and D.
  - (iii) Section A contains 4 multiple-choice questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 11 questions of 4 marks each.
  - (iv) Use of calculator is not permitted.
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## SECTION – A

1. If one of the zero of the quadratic polynomial  $x^2 + 3x + k$  is 2, then find the value of k.
2. If  $\tan 9\theta = \cot \theta$  and  $9\theta < 90^\circ$ , then find the value of  $\operatorname{cosec} 5\theta$ .
3. Weights of 40 eggs were recorded as given below:

<b>Weights (in gms)</b>	85 – 89	90 – 94	95 – 99	100 – 104	105- 109
<b>No. of eggs</b>	10	12	15	4	2

Find the lower limit of the modal class is

4.  $\triangle ABC \sim \triangle DEF$  and their areas be, respectively,  $64 \text{ cm}^2$  and  $121 \text{ cm}^2$ . If  $EF = 15.4 \text{ cm}$ , find  $BC$ .

## SECTION – B

5. Use Euclid's division algorithm to show that any positive odd integer is of the form  $4q + 1$  or  $4q + 3$ , where  $q$  is some integer.
6. Show that  $12^n$  cannot end with the digit 0 or 5 for any natural number  $n$ .
7. In  $\triangle PQR$ ,  $S$  is any point on  $QR$  such that  $\angle RSP = \angle RPQ$ . Prove that  $RS \times RQ = RP^2$ .
8. Mean of the following data is 21.5. Find the missing value of  $k$ .

<b>x</b>	5	15	25	35	45
<b>f</b>	6	4	3	k	2

9. If  $-1$  is one of the zeroes of the polynomial  $p(x) = 3x^3 - 5x^2 - 11x - 3$ , find the other two zeroes.
10. Three angles of a triangle are  $x$ ,  $y$  and  $40^\circ$ . The difference between the two angles  $x$  and  $y$  is  $30^\circ$ . Find  $x$  and  $y$ .

## SECTION – C

11. Prove that  $5 - \sqrt{3}$  is an irrational number.
12. If  $\alpha, \beta$  are the zeroes of the polynomials  $f(x) = x^2 - 2x + 5$ , then find the quadratic polynomial whose zeroes are  $\alpha + \beta$  and  $\frac{1}{\alpha} + \frac{1}{\beta}$

13. The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is Rs 105 and for a journey of 15 km, the charge paid is Rs 155. What are the fixed charges and the charge per km? How much does a person have to pay for travelling a distance of 25 km? What do you prefer Public transport or taxi? Why?

14. Prove that  $\frac{\sin A}{\cot A + \operatorname{cosec} A} = 2 + \frac{\sin A}{\cot A - \operatorname{cosec} A}$ .

15. If  $(\tan \theta + \sin \theta) = m$  and  $(\tan \theta - \sin \theta) = n$  prove that  $(m^2 - n^2)^2 = 16mn$

16. Find the mean marks by step deviation method from the following data:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of students	4	10	18	28	40	70

17. Find the mode of the following frequency distribution:

Marks	Less than 20	Less than 40	Less than 60	Less than 80	Less than 100
Number of students	4	10	28	36	50

18. If  $\sec \theta + \tan \theta = m$ , show that  $\left(\frac{m^2 - 1}{m^2 + 1}\right) = \sin \theta$

19. Diagonals of a trapezium ABCD with  $AB \parallel CD$  intersects at O. If  $AB = 2CD$ , find the ratio of areas of triangles AOB and COD.

20. Prove that the area of an equilateral triangle described on the hypotenuse of a right angled triangle is equal to the sum of the areas of the equilateral triangles drawn on the other two sides of the triangle.

### SECTION – D

21. State and prove converse of Basic Proportionality theorem..

22. If  $\operatorname{cosec} \theta - \sin \theta = m$  and  $\sec \theta - \cos \theta = n$ , prove that  $(m^2 n)^{2/3} + (mn^2)^{2/3} = 1$

23. If d is the HCF of 56 and 72, find x, y satisfying  $d = 56x + 72y$ . Also show that x and y are not unique.

24. If the median of the distribution given below is 14.4, find the values of x and y.

C. I.	0 – 6	6 – 12	12 – 18	18 – 24	24 – 30	Total
F	4	x	5	y	1	20

25. If two zeroes of the polynomial  $3x^4 + 6x^3 - 2x^2 - 10x - 5$  are  $\sqrt{\frac{5}{3}}$  and  $-\sqrt{\frac{5}{3}}$ , find the other zeroes of the polynomial.

26. The triangular sign board is used to display “SAVE ENVIRONMENT”. Find the coordinates of the vertices of the triangle formed by the lines  $4x - 3y + 4 = 0$ ;  $4x + 3y - 20 = 0$  and y-axis. Which value depicted by this?

27. If the polynomial  $x^4 - 6x^3 + 16x^2 - 25x + 10$  is divided by another polynomial  $x^2 - 2x + k$ , the remainder comes out to be  $x + a$ , find  $k$  and  $a$ .

28. Prove that “In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

29. Prove that:  $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \sec A + \tan A$ .

30. Draw more than ogive for the following frequency distribution:

<b>Heights (in cms)</b>	145-150	150-155	155-160	160-165	165-170	170-175
<b>Number of persons</b>	8	10	9	15	10	8

Also find the median from the graph..

31. Evaluate: 
$$\frac{\sin^2 45^\circ + \frac{3}{4} \cos ec^2 30^\circ - \cos 60^\circ + \tan^2 60^\circ}{\sin^2 30^\circ + \cos^2 60^\circ + \frac{1}{2} \sec^2 45^\circ}$$

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