

Series:

Code No. H1M101

Roll No.

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Candidates must write the Code No on the title page of the answer-book

1. Please check that this question paper contains 4 printed pages
2. Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
3. Please check that this question paper contains 30 questions.
4. Please write down the Serial Number of the question before attempting it.
5. 15 minute time has been allotted to read this question paper. During these time students are not allowed to write answers

**General Instruction:**

- (i) All questions are compulsory.
- (ii) This question paper contains 30 questions divided into four Sections A, B, C and D.
- (iii) Section A comprises of 6 questions of 1 mark each. Section B comprises of 6 questions of marks each. Section C comprises of 10 questions of 3 marks each and Section D comprises of 8 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choice has been provided.
- (v) Use of Calculators is not permitted

**Time : 3 hrs**

**Max. Marks: 80**

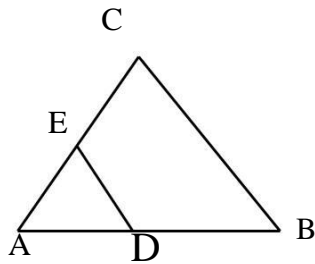
**MATHEMATICS**  
**CLASS X**

**SECTION A**

*Question numbers 1 to 6 carry 1 mark each*

1. What is the HCF of (26, 91) if LCM (26, 91) is 182 (1)
2. If the zeros of the polynomial  $x^2 - \frac{5}{2}x + k$  are reciprocal of each other, find the value of k. (1)
3. How many solutions does the pair of equations  $3x+4y+2=0$ ,  $4x=5y-13$  have? (1)
4. Write the common difference of the AP  $1, \frac{1-6b}{2b}, \frac{1-12b}{2b}$  (1)

5. In the figure  $DE \parallel BC$ , if  $AD = x+1$ ,  $DB = x-1$ ,  $AE = 2x$  and  $EC = x$ , find the value of  $x$  (1)



6. Find the value of  $\operatorname{cosec}(75^\circ + \theta) - \sec(15^\circ - \theta) - \tan(55^\circ + \theta) + \cot(35^\circ - \theta)$  (1)

### SECTION B

*Question numbers 7 to 12 carry 2 marks each*

7. State Euclid's division lemma and hence find the HCF of 56 and 96. (2)
8. Find the quadratic polynomial whose zeros are 3 and -5. Verify the relationship between the coefficients and the zeros of the polynomial. (2)
9. 15 years hence a man will be just 4 times as old as he was 15 years ago. Find his present age. (2)
10. If the 5th term of an AP is zero, show that its 33rd term is 4 times its 12th term. (2)
11.  $\triangle ABC$  is right angled at A and AD is perpendicular to BC. If  $BC = 13\text{cm}$  and  $AC = 5\text{cm}$ . Find the ratio of the areas of  $\triangle ABC$  and  $\triangle ADC$  (2)
12. If  $5\tan\theta = 4$ , show that (2)

$$\frac{5\tan\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta} = \frac{1}{6}$$

### SECTION C

*Question numbers 13 to 22 carry 3 marks each*

13. S.T. the square of any positive integer is either of the form  $3m$  or  $3m + 1$  for some integer  $m$ . (3)

14. The sum of the digits of a two digit number is 15. The number obtained by interchanging the digits exceeds the given number by 9. Find the number (3)

OR

Solve

$$\frac{44}{x+y} - \frac{30}{x-y} = 10 ;$$

$$\frac{55}{x+y} + \frac{40}{x-y} = 13 ; x+y \neq 0, x-y \neq 0$$

15. If  $\alpha$  and  $\beta$  are the zeros of the polynomial  $3x^2 - 4x - 7$ , then form a quadratic polynomial whose zeros are  $\frac{1}{\alpha}$  and  $\frac{1}{\beta}$ . (3)

16. Solve by the method of completing square method  $3x^2 - 4\sqrt{3}x + 4 = 0$  (3)

17. Is the following situation possible? The sum of the ages of two friends is 20 years. Four years ago, the product of their ages was 48. (3)

18. The sum of first  $n$  terms of an AP is  $5n^2 + 3n$ . If its  $m^{\text{th}}$  term is 168, find the value of  $m$ . Also find the 20<sup>th</sup> term of the AP. (3)

19. In  $\square ABC$  right angled at B and D is midpoint of the BC. Prove that  $AC^2 = 4AD^2 - 3AB^2$  (3)

OR

E is a point on the side AD produced of parallelogram ABCD and BE intersecting SC at F.

Show that  $\square ABE \sim \square CFB$ .

20. The diagonals of a trapezium ABCD, in which  $AB \parallel DC$  intersect at o. If  $AB = 2CD$ , then find the ratio of areas of triangles AOB and COD. (3)

21. P.T.  $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\operatorname{cosec}\theta$  (3)

22. The angle of elevation of a cloud from a point 20m above a lake is  $30^\circ$  and the angle of depression of its reflection in the lake is  $60^\circ$ . Find the height of the cloud. (3)

## SECTION D

*Question numbers 23 to 30 carry 4 marks each*

23. P.T.  $\sqrt{7}$  is an irrational and hence show that  $5+2\sqrt{7}$  is irrational (4)
24. Solve graphically the system of equation  $5x-y=7$ ,  $x-y+1=0$ . Shade the region bounded by these lines and y axis. Find the area bounded by these lines and the y axis. (4)
25. Solve the equation (4)
- $(-4) + (-1) + 2 + \dots\dots\dots x = 437$ .
26. From the top of a tower the angle of depression of an object on the horizontal ground is found to be  $60^\circ$ . On descending 20m vertically down from the top of the tower the angle of depression of the object is found to be  $30^\circ$ . Find the height of the tower. (4)

OR

From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are  $30^\circ$  and  $45^\circ$  respectively. If the bridge is at height of 3m from the banks, find the width of the river

27. P.T.  $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$

OR

P.T.  $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} + \frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} = \frac{2}{1 - 2\cos^2\theta}$  (4)

28. P.T. a line segment drawn parallel to one side of a triangle divides the other two sides in the same ratio. (4)
29. If P(9a-2, -b) divides the line segment joining. A(3a+1, -3) and B(8a, 5) in the ratio 3:1. Find the values of a and b. (4)
30. A train travels at a certain average speed for a distance of 63km and then travels a distance of 72km at an average speed of 6km/hr. more than its original speed. If it takes 3 hours to complete the journey. What is its original average speed? (4)