साधना देवी विद्यापीठ

Punjabi Colony (Dharampur) Samastipur. 848101 (Bihar)

Half Yearly Examination- 2018-19

Class :- X
Sub :- Maths

Time :- 3hrs
F.M. :-100

Sec - A

Question numbers 1 to 8 carry 1 marks each

1. Find HCF of the numbers 1405, 1465 and 1530 by Euclid's division algorithm.
2. If α and β are the zeros of the polynomial $2y^2 + 7y + 5$, write the value $a + b + ab$
3. At what point will the line represented by $x-y = 8$ intersect y - axis ?
4. Prove that $5-\sqrt{3}$ is an irrational number .
5. In a right triangle ABC right angle at C, if $\tan A = 1$, then verify that $2 \sin A \cos A = 1$.
6. If $\sin\theta + \cos\theta = \sqrt{2} \sin(90-\theta)$, Determine $\cot\theta$.
7. In $\triangle$ ABC, if x and y are points on AB and AC respectively such that $\frac{AX}{XB} = \frac{3}{4}$, AY = 5cm and yc = 9cm , then whether xy and Bc are parallel or not.
8. If $(1+\cos A)(1-\cos A) = \frac{3}{4}$, find the value of secA.

Sec - B

Question numbers 9 to 16 carry 2 marks each

9. If $3\cos\theta = 1$ find the value of $\frac{6\sin^2\theta + \tan^2\theta}{4\cos\theta}$
10. In equilateral $\triangle$ABC, point E lies on CA such that BE$\perp$CA
    Find $AB^2 + BC^2 + CA^2$ in terms BE^2.
11. In a rectangle ABCD, E is a point on AB such that $AE = \frac{3}{4}AB$. If AB = 16m and AD = 5 m then find the length of DE.
12. The sum of a two digit number and the number obtained by reversing the order of its digits is 165. If the digits differ by 3. Find the number.
13. Find the roots of the equation $4x^2 + 4\sqrt{3}x + 3 = 0$
14. Solve $\frac{3x+2y}{xy} = 1, \frac{4x-2y}{xy} = 13$
15. Divide x^3-3x^2+3x-6 by $x^2 - x + 1$
16. IF HCF of 120 and 130 cm be expressed in the form $3x + 4$, find x.

Sec - C

Question numbers 17 to 20 carry 4 marks each

17. Prove that only one of the numbers n-1, n+1 or n + 3 is divisible by 3.
    where n is any positive integer.
18. If α and β are the zeros of the polynomial x^2-5x+k and $\alpha-\beta = -1$, Find the value of K.
19. Solve graphically the following pair of linear equations.
    $2y - 3x = 14$ $\quad$ $2x + 3y = 8$

    Hence , shade the region enclosed by these line and y - axis .
20. If A,B,C are the interior angles of ABC show that
    (i) $\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$ $\quad$ (ii) $\cos\frac{B+C}{2} = \sin\frac{A}{2}$

Sec - D

Question numbers 21 to 32 carry 5 marks each

21. If 0.3528 is expressed in the form $\frac{P}{2^m 5^n}$ find the smallest values of n , m and p.

22. For what value of x both the polynomials x^2-3x+2 and x^2-6x+5 become zero ?
23. IF $x = r \sin A \cos C$, $Y = r \sin A \sin C$ and $z = r \cos A$, Prove that $r^2 = x^2 + y^2 + z^2$
24. The ratio of the areas of two similar triangles are equal to the ratio of the squares of any two corresponding sides.
25. Students of a class are made to stand in rows. If one student is extra in a row, there would be 2 rows less. If one student is less in a row there would be 3 rows more. Find the number of students in the class.
26. In a trapezium, show that any line drawn parallel to the parallel sides of the trapezium, divides the non-parallel sides proportionally.
27. Prove that the ratio of the areas of two similar triangle is equal to the square of the ratio of their corresponding sides.
28. Prove that.
$\sin^2\theta \cdot \tan\theta + \cos^2\theta \cdot \cot\theta + 2 \sin\theta \cdot \cos\theta = \tan\theta + \cot\theta$
29. Prove that.
$\frac{\tan\theta}{\sec\theta - 1} + \frac{\tan\theta}{\sec\theta + 1} = 2 \operatorname{cosec}\theta$
30. Solve of the following system of equation by the method of cross- multiplication.

$bx + cy = a + b.$
$ax\left(\frac{1}{a-b} - \frac{1}{a+b}\right) + cy\left(\frac{1}{b-a} - \frac{1}{b+a}\right) = \frac{2a}{a+b}$

Ans: x =a/b and y = b/c

$bx + cy = a + b$ ..... (1)
$bx - cy = a - b$ ..... (2)

31. $a\cos^3\theta + 3a\cos\theta\sin^2\theta = m$
$a\sin^3\theta + 3a\cos^2\theta\sin\theta = n$
Prove that
$(m+n)^{\frac{2}{3}} + (m-n)^{\frac{2}{3}} = 2a^{\frac{2}{3}}$
32. If two triangles are equiangular, Prove that the ratio of the corresponding sides is same as the ratio of the corresponding altitudes.

Prove that in any triangle the sum of the squares of any two sides is equal to twice the square of half the third side together with twice the square of the median.