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Class – X (SA-1)

Paper prepared by :

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Subject: Mathematics

TIME: 3 to 3½ HOURS

MAX MARKS: 80

GENERAL INSTRUCTIONS:

1. All questions are compulsory.
2. The question paper consists of thirty four questions divided into four sections A, B, C & D. Section A comprises of ten questions of 01 marks each, Section B comprises of eight questions of 02 marks each, Section C comprises of ten questions of 03 marks each and section D comprises of six questions of 04 marks each.
3. All questions in section A are multiple choice questions where you are to select one correct option out of given four.
4. There is no overall choice. However internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 04 mark each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

Section – ‘A’ (carry one mark each)

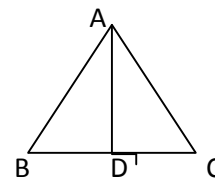
1. According to the Euclid’s division algorithm $a = bq + r$ if $r = 0$, then HCF of given number is:
a) a b) b c) q d) none of these
2. if -5 and 2 are the zeroes of the polynoimil, then required polynomial is
a) x^2+5x+2 b) x^2-5x-2
c) $x^2+3x-10$ d) $x^2-3x+10$
3. if $\sqrt{3} \tan 2\theta - 3 = 0$ then $\theta =$
a) 45° b) 30° c) 60° d) NOT
4. The decimal expansion $\frac{147}{120}$ will terminate after how many places of decimals?
a) 1 b) 2 c) 3 d) will not terminate

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5. What is the value of k for which the system $2x+3y=5$, $6x+ky=15$ has infinitely many solutions:
 - a) 8
 - b) ∓ 3
 - c) 9
 - d) NOT
6. Relation between mean, median and mode is :
 - a) $Mode = 2 Median - 3 Mean$
 - b) $Median = 2 Mode + 3 Mean$
 - c) $Mode = 3 Median - 2 Mean$
 - d) $Mode = 3 Median + 2 Mean$
7. Which measure of central tendency is given by x coordinate of the point of intersection of the more than ogive and less than ogive.
 - a) Mean
 - b) Median
 - c) mode
 - d) All of these
8. What is the nature of the graph of the system of the linear equation which is inconsistent?
 - a) Intersecting lines
 - b) dependent line
 - c) parallel lines
 - d) Parabola
9. If $\sec A = \operatorname{cosec} B = \frac{15}{7}$, then $A + B =$
 - a) Zero
 - b) 90°
 - c) $< 90^\circ$
 - d) $> 90^\circ$
10. ABC and BDE are two equilateral triangles such that D is the mid pt. of BC. Ratio of the area of the triangles ABC and BDE is
 - a) 2 : 1
 - b) 1 : 2
 - c) 4 : 1
 - d) 1 : 4

Section - 'B' (carry two marks each)

11. Why the number 6^n cannot end with 0 or 5.
12. m, n are zeroes of the quadratic equation $ax^2 - 5x + c$. Find the value of a and c if $m + n = m.n = 10$.
13. Show that any straight line parallel to the parallel sides of a trapezium cuts the other two sides proportionally. Or
 In the adjoining figure, $AD \perp BC$ & $\frac{BD}{DA} = \frac{DA}{DC}$.
 Prove that ΔABC is a right Δ .
14. Find the median when mean = 20 and mode = 18.
15. If $\sec 5A = \operatorname{cosec} (A - 36^\circ)$, when $5A$ is an acute angle, find the value of A .



16. Find the LCM and HCF of 40, 36 and 126 by applying factorization method.
17. If α, β are the zeroes of the polynomial $x^2 - 5x + 3$, find the value of $\alpha + \beta - \alpha\beta$.
18. The perimeters of two similar triangles are 54cm & 18cm respectively. If one side of the first triangle is 18cm , what is the corresponding side of the other triangle.

Section - 'C' (carry three marks each)

19. Show that the square of any positive even integer is of the form $2q$ & every positive odd integer is of the form $2q + 1$
20. Show that $5 - 3\sqrt{2}$ is an irrational number.

Or

Show that $2 + \sqrt{3}$ is irrational number.

21. If α & β are the zeroes of polynomial $x^2 - 6x + k$. find k such that $(\alpha + \beta)^2 - 2\alpha\beta = 24$.
22. The sum of the digits of a two digit no. is 12. The no. obtained by interchanging the digits exceeds the given no. by 18. Find the no.

Or

A railway half ticket cost half the full fare & the reservation charge is the same on half ticket as on full ticket. One reserved first class ticket from Bombay to Ahmadabad costs Rs. 216 & one full & one half reserved first class tickets cost Rs. 327. What is the basic first class full fare & what is the reservation charge.

23. Prove that the area of the equilateral Δ described on the side of a square is half the area of equilateral Δ described on its diagonals.
24. Find the mean with the following given data:

| <i>Class Interval</i> | <i>Frequency</i> |
|-----------------------|------------------|
| 0 - 6 | 6 |
| 6 - 12 | 8 |
| 12 - 18 | 10 |
| 18 - 24 | 9 |
| 24 - 30 | 7 |

Or

| <i>Class Interval</i> | <i>Frequency</i> |
|-----------------------|------------------|
| 0 – 8 | 8 |
| 8 – 16 | 10 |
| 16 – 24 | 15 |
| 24 – 32 | 9 |
| 32 – 40 | 8 |

19. The following distribution gives the daily income of 50 workers of a factory.

| <i>Daily Income (in Rs.)</i> | <i>No. of workers.</i> |
|------------------------------|------------------------|
| 100 – 120 | 12 |
| 120 – 140 | 14 |
| 140 – 160 | 8 |
| 160 – 180 | 6 |
| 180 – 200 | 10 |

Convert the distribution above to a more than type cumulative frequency distribution, and draw its Ogive.

20. PQR is a right-angled triangle, having $\angle Q = 90^\circ$, If $QS = SR$, Show that $PR^2 = 4 PS^2 - 3 PQ^2$

21. The median of the following data is 32.5.

Find x and y .

| <i>Class Interval</i> | <i>Frequency</i> |
|-----------------------|-------------------|
| 0 – 10 | x |
| 10 – 20 | 5 |
| 20 – 30 | 9 |
| 30 – 40 | 12 |
| 40 – 50 | y |
| 50 – 60 | 3 |
| 60 – 70 | 2 |
| | <i>Total = 40</i> |

22. A point D is on the side BC of an equilateral triangle ABC such that $DC = \frac{1}{4} BC$. Prove that $AD^2 = 13CD^2$

Section - 'D' (carry four marks each)

29. Obtain all the zeroes of the polynomial $x^4 - 7x^3 + 17x^2 - 17x + 6$. If two of its zeroes are 3 & 1.
30. D, E, F are the mid-points of side BC, CA & AB respectively of a ΔABC . Determine the ratio of the areas of ΔDEF & ΔABC .

Or

In an equilateral triangle ABC, the side BC is trisected at D. Prove that $9AD^2 = 7AB^2$

31. Prove the following:

$$\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{2\sin^2 A - 1} = \frac{2}{1 - 2\cos^2 A}$$

Or

Without using the trigonometrically tables, Find the value of:

$$\frac{\cos 80^\circ}{\sin 10^\circ} + \cos 59^\circ \operatorname{cosec} 31^\circ$$

32. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$; show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$.
33. Draw the graph of the system of equations $x + y = 5$ & $2x - y = 2 = 0$. Shade the region bounded by these lines & the x-axis. Find the area of the shaded region.
34. The mean of the following frequency distribution 57.6 and the sum of the observations is 50. Find the missing frequencies f_1 and f_2 .

| Class | Frequency |
|-----------|-----------|
| 0 - 20 | 7 |
| 20 - 40 | f_1 |
| 40 - 60 | 12 |
| 60 - 80 | f_2 |
| 80 - 100 | 8 |
| 100 - 120 | 5 |

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