CALSS –X

GUESS PAPER

MATHS

General Instructions:

1. **All questions are compulsory.**
2. **The question paper consists of 34 questions divided into four sections A, B, C and D. Section A comprises of 10 questions of 1 mark each. Section B comprises of 8 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each and Section D comprises of 6 questions of 4 marks each.**
3. **Question numbers 1 to 10 in Section A are multiple choice questions where you are to select one correct option out of the given four.**
4. **There is no overall choice. However internal choice has been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one of the alternatives in all such questions.**
5. **Use of calculators is not permitted.**
6. **An additional 15 minutes time has been allotted to read this question paper only.**

DUTA

Section – A

Q.1 Fundamental theorem of Arithmetic is

(a) Every composite number can be factorized as a product of numbers and this factorization is unique, apart from the order in which the factors occur.

(b) Every composite number can be factorized as a product of primes and this factorization is unique, apart from the order in which the prime factors occur.

(c) Every number can be factorized as a product of numbers and this factorization is unique, apart from the order in which the factors occur.

(d) Every number can be factorized as a product of primes and this factorization is unique, apart from the order in which the prime factors occur.

Q.2 Euclid's Division Lemma states that if a and b are any two positive integers, then there exist unique integers q and r such that

(a) $a = bq + r, 0 < r \leq b$ (b) $a = bq + r, 0 \leq q < b$
(c) $a = bq + r, 0 \leq r < b$ (d) $a = bq + r, 0 < q \leq b$

Q.3 Maximum numbers of real zeroes can $x^3 - 27$ have is

(a) 1 (b) 3 (c) 2 (d) 4

Q.4 Which of the following pairs of equations is inconsistent

(a) $3x - 2y = 8$, $2x + 3y = 1$ (b) $3x - y = 8$, $x - y/3 = 3$ (c) $lx - y = m$, $x + my = l$ (d) $5x - y = 10$, $10x - 2y = 20$

Q.5 The perimeters of two triangles PQR and LMN are 38 cm and 24 cm, if LM = 10 cm, then PQ is

(a) 15 cm (b) 16 cm (c) 12 cm (d) 18 cm

Q.6 If $x = a\cos\theta$ and $y = b\sin\theta$, then $b^2x^2 + a^2y^2$ is

(a) 1 (b) ab (c) a^2b^2 (d) $b^2 + a^2$

Q.7 $\dfrac{2\tan 30^o}{1+\tan^2 30^o} =$

(a) $\sin 60^o$ (b) $\cos 60^o$ (c) $\tan 60^o$ (d) $\sin 30^o$

Q.8 If $\sin\theta + \operatorname{cosec}\theta = 2$, then $\sin^8\theta + \operatorname{cosec}^8\theta =$

(a) 1 (b) 2 (c) 8 (d) 16

Q.9 If $\sqrt{2}\sin(60^o - \alpha) = 1$, then α is

(a) 45^o (b) 15^o (c) 60^o (d) 30^o

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Q.10 Which of the following is based on all observation of the data?

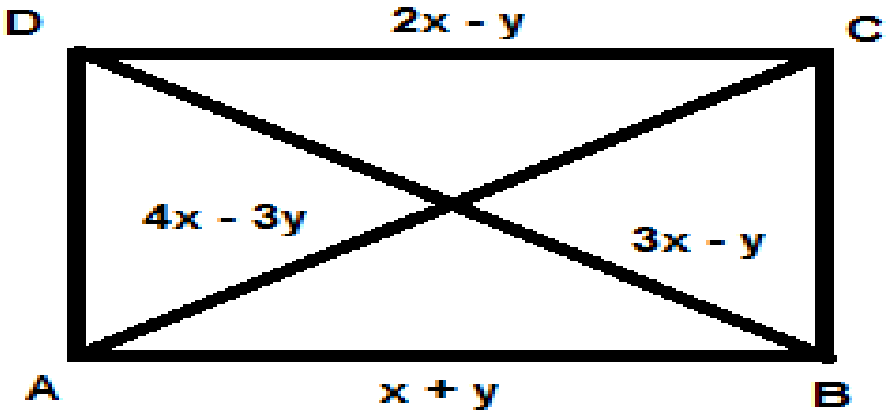
(a) Mean (b) Median (c) Mode (d) Mode and Median

SECTION – B

Q.11 What is the smallest number which when divided by 35, 56 and 91, leaves the remainder 7 in each case?

Q.12 What must be subtracted from $8x^4 + 14x^3 - 2x^2 + 7x - 8$ so that the resulting polynomial is exactly divisible by $4x^2 + 3x - 2$?

Q.13 The sides of and diagonals of rectangle shown in the figure are in centimeters. Find x and y. The side AB = x + y , CD = 2x – y , diagonal AC = 4x – 3y and diagonal BD = 3x – y



Q.14 The sum of the deviations of a set of values $x_1, x_2, x_3, \ldots\ldots x_n$ measured from 50 is -10 and the sum of deviations of the values from 46 is 70. Find the value of n and the mean.

Q.15 If $7\sin^2\theta + 3\cos^2\theta = 4$, find the value of $\sec\theta + \operatorname{cosec}\theta$ $(0^o < \theta < 90^o)$

OR

If $\dfrac{\sin^2\theta}{\tan^2\theta - \sin^2\theta} = 3$, then find the value of $\dfrac{1+\tan\theta}{1-\tan\theta}$

Q.16 Prove that the diagonals of trapezium divide each other proportionally.

Q.17 In an equilateral triangle, prove that the square of one side is equal to four times the square of one of its altitudes.

Q.18 If the mean of the following distribution is 27, find the value of p.

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	8	p	12	13	10

SECTION – C

Q.19 If $\sin\theta + \sin^2\theta + \sin^3\theta = 1$, prove that $\cos^6\theta - 4\cos^4\theta + 8\cos^2\theta = 4$

Q.20 If $\operatorname{cosec}\theta - \sin\theta = m$, $\sec\theta - \cos\theta = n$ prove that $m^2n^2(m^2 + n^2 + 3) = 1$

OR

If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, prove that $x^2 + y^2 = 1$.

Q.21 A point D is on side BC of an equilateral triangle ABC such that $DC = \frac{1}{4}BC$. Prove that $AD^2 = 13\ CD^2$

Q.22 Sides AB and BC and median AD of a triangle ABC are respectively proportional to the sides PQ and QR and median PM of triangle PQR. Show that triangles are similar.

Q.23 A train over takes two persons who are walking in the same direction in which the train is going at the speed of 2 km/hr and 4 km/hr and passes them completely in 9 and 10 seconds respectively. Find the length and speed of the train.

OR

Solve : $\frac{b^2}{a}x - \frac{a^2}{b}y = ab(a+b), \qquad b^2x - a^2y = 2a^2b^2$

Q.24 If the median is 28.5. Find the values of x and y.

C.I	**0 – 10**	**10 – 20**	**20 – 30**	**30 – 40**	**40 – 50**	**50 – 60**	**Total**
frequency	**5**	**x**	**20**	**15**	**y**	**5**	**60**

Q.25 Prove that $2+3\sqrt{2}$ is irrational.

Q.26 The traffic lights at three different road – crossings change after every 48 seconds, 72 seconds and 108 seconds. If they change simultaneously at 7 a.m. after what time will they change again simultaneously?

OR

Prove that one of every three consecutive positive integers is divisible by 3.

Q.27 If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - x - 4$, find the value of $\frac{1}{\alpha}+\frac{1}{\beta}-\alpha\beta$.

Q.28 Find the mode of the following distribution:

Age (in years)	5 – 15	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65
No. of students	6	11	21	23	14	5

SECTION – D

Q.29 Evaluate

$$\frac{\sec^2 54-\cot^2 36}{\text{cosec}^2 57-\tan^2 33}+\sin^2 23+\sin^2 36+\sin^2 43+\sin^2 47+\sin^2 54+\sin^2 67+\tan 5\sin 10\tan 30\sec 80\tan 85$$

Q.30 If $\sec\theta+\tan\theta=x$, prove that $\sec\theta-\tan\theta=\frac{1}{x}$ and prove that $\sin\theta=\frac{x^2-1}{x^2+1}$

OR

If $a\sin^3 x+b\cos^3 x=\sin x\cos x$ and $a\sin x-b\cos x=0$ prove that $a^2+b^2=1$

Q.31 Prove that ratio of area of two similar triangles is equal to ratio of square of their corresponding sides.

OR

State and prove Pythagoras Theorem.

Q.32 Obtain all zeros of $3x^4+6x^3-2x^2-10x-5$ if two of its zeros are $\sqrt{\frac{5}{3}},-\sqrt{\frac{5}{3}}$

Q.33 Draw the graph of the equations $2x + y - 6 = 0$; $4x - 2y - 4 = 0$.Also shade the triangle formed the lines and $x = 0$. Also find the area of the shaded triangle.

Q.34 Draw more than and less than ogive and hence find the median.

Group	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Frequency	4	4	7	10	12	8	5

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