Contact : 7559462655/ 88

GENIUS INSTITUTE
Near Gogate Jogalekar College, Ratnagiri.

Std. X (SSC) Mathematics -I

Time : 2 Hours Preliminary Paper - 2 (2022-23) Total Marks : 40

Note : 1. All questions are compulsory.
2. Use of calculator is not allowed
3. The numbers to the right of the questions indicate full marks.
4. Draw neat/graphs wherever necessary
5. Answer should be written in blue or black ink.

Q.1. (A) Choose the correct answer and write the letter of the alphabet of it : **4**

1) To draw the graph of $4x + 5y = 19$, if $x = 1$ is taken then what will be the value of y?
A) 3 B) 2 C) −3 D) 4

2) Degree of quadratic equation is always ..... .
A) 4 B) 1 C) 3 D) 2

3) When two dice are thrown the number of sample points in the sample space are .....
A) 8 B) 36 C) 52 D) 4

4) 1, 4, 7, 10, 13... Next two terms of this A.P. are .....
A) 19, 22 B) 10, 7 C) 16, 19 D) 16, 18

B) Solve the following sub-questions : **4**

1) If $x + 2y = 5$ and $2x + y = 7$ then find the value of $x + y$
2) Find first term of the sequence $t_n = 2n + 1$
3) A share is sold for the market value of ₹1,000. Brokerage is paid at the rate of 0.1%. What is the amount received after the sale?
4) Find the mode from the following information.
L = 10, $h = 2, f_0 = 58, f_1 = 70, f_2 = 42$

Q. 2 (A) Complete and write *any* <u>TWO</u> activities from the following : **4**

1) If one die is rolled then find the probability of the following event by completing the activity.
Event A : Number on the upper face is prime.
Solution : Let 'S' is the sample space.
S = {1, 2, 3, 4, 5, 6} $n(S) = 6$
Event A : Prime number on the upper face.
A = { ……..} $\therefore n(A) = 3$

$P(A) = \frac{\square}{n(S)}$ …… (Formula)

$= \frac{\square}{6}$ $\therefore P(A) = \frac{1}{\square}$

2) For an A.P., If $t_1 = 1$ and $t_n = 149$ then find Sn.

Activity : Here $t_1 = 1$, $t_n = 149$, $S_n = ?$

$S_n = \frac{n}{2}$ (☐ + ☐)

$= \frac{n}{2} \times$ ☐

$=$ ☐ n

3) Complete the following activity to solve the given quadratic equation by factorization method.

Activity : $x^2 + 8x - 20 = 0$

$x^2 + (.....) - 2x - 20 = 0$

$x(x + 10) - (.....)(x + 10) = 0$

$(x + 10)(.....) = 0$

$x = \ldots\ldots$ or $x = 2$

B) Solve *any* <u>FOUR</u> sub-questions from the following : **8**

1) State with reason whether the point (3 -2) will lie on the graph of the equation $5m - 3n = -21$.
2) 1,7,13,19.....find 18^{th} term of this A.P.
3) If one of the roots of quadratic equation $x^2 - kx - 15 = 0$ is -3 then find the value of 'k'.
4) Smt. Malhotra purchased solar panels for the taxable value of ₹ 85,000. She sold for them ₹ 90,000. The rate of GST is 5%. Find the ITC of Smt. Malhotra. What is the amount of GST payable by her ?
5) The following table shows the number of students and the time they utilized daily for their studies. Find the mean time spent by students for their studies by direct method.

Time (hours)	0 - 2	2 - 4	4 - 6	6 - 8	8 - 10
No. of students	8	14	18	10	10

Q. 3 (A) Complete and write *any* <u>ONE</u> activity from the following : **3**

1) Shri. Aditya Sanghavi invested ₹50,118 in shares of FV ₹100, when the market value is ₹50. Rate of brokerage is 0.2% and Rate of GST on brokerage is 18%, then How many shares were purchased for ₹50,118?

Activity : MV = 50

Let us find the investment required for one share.

Brokerage at 0.2% on ₹50 = $50 \times \frac{0.2}{100}$ = ₹☐

GST on brokerage at 18% = $0.1 \times \frac{18}{100}$ = ₹☐

Investment for one share = ₹☐ + ₹0.10 + ₹☐

= ₹☐

The number of shares purchased by Aditya $= \frac{\text{Investment}}{\text{Investment for one share}}$

$= \frac{50118}{50.118}$

$=$ ☐

2) Complete the following activity :

Solution :

Milk Fats	Collected milk (litre)
2-3	30
3-4	70 → ☐
4-5	80 → ☐
5-6	60 → ☐
6-7	20

$$\text{Mode} = L + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right] \times h$$

$$= 4 + \left[\frac{80 - 70}{2(80) - 70 - 60}\right] \times \square$$

$$= 4 + \square$$

$$= \square$$

B) Solve *any* TWO sub-questions from the following : **6**

1) Solve the following simultaneous equations graphically.
   $2x + 3y = 12$; $x - y = 1$
2) Find how many three digit natural numbers are divisible by 5.
3) Joseph purchased following shares, Find his total investment.
   Company A : 200 shares, FV = ₹ 2 Premium = ₹ 18.
   Company B : 45 shares, MV = ₹ 500
   Company C : 1 share, MV = ₹10,540.
4) A balloon vendor has 2 red, 3 blue and 4 green balloons. He wants to choose one of them at random to give it to Pranali. What is the probability of the event that Pranali gets,
   1) a red balloon 2) a blue balloon 3) a green balloon.

Q. 4 Attempt *any* TWO sub-questions from the following : **8**

1) The semi perimeter of a rectangular shape garden is 36 m. The length of the garden is 4 m more than its breadth. Find the length and the breadth of the garden.
2) If the roots of the given quadratic equation are real and equal then find the value of 'm'.
   $(m-12)\,x^2 + 2\,(m-12)\,x + 2 = 0$

3) Draw a frequency polygon for the following grouped frequency distribution table.
Age of the donor

Years	20-24	25-29	30-34	35-39	40-44	45-49
No. of blood doners	38	46	35	24	15	12

Q. 5 Attempt *any* <u>ONE</u> sub-question from the following : **3**

1) Construct word problem on quadratic equation, such that one of its answers is 20 (years, rupees, centimetre, etc.) Also solve it.
2) The faces of a die bear numbers 0, 1, 2, 3, 4, 5. If the die is rolled twice, then find the probability that the product of digits on the upper face is zero.