Answers Paper-2

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

1. A) 3 2. D) 2 3. B) 36 4. C) 16, 19

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

1) **Solution :** $x + 2y = 5$

$+ \quad 2x + y = 7$

$3x + 3y = 12$

$x + y = 4$ ..... [Dividing both sides by 3]

2) **Solution :** $t_n = 2n+1$ ..... [Given]

$t_1 = 2(1) + 1$

$= 2 + 1$

$t_1 = 3$

$\therefore$ The first term of the sequence is 3

3) **Solution :** Market price of one share = ₹ 1,000

Brokerage rate = 0.1%

Brokerage per share = 1,000 × 0.1%

= ₹1

Amount received on sale of 1 share = Selling Price – Brokerage

= 1,000 – 1

= ₹ 999

$\therefore$ Seller will get ₹ 999 on sale of one share.

4) **Solution :** L = 10, $h = 2, f_0 = 58, f_1 = 70, f_2 = 42$ .....(Given)

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

$$\text{Mode} = 10 + \left[\frac{70 - 58}{2(70) - 58 - 42}\right] \times 2$$

$$\text{Mode} = 10 + \frac{12}{40} \times 2 = 10 + \frac{12}{20}$$

$$\text{Mode} = 10 + 0.6 = 10.6$$

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

1) **Solution :** 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 = {**2, 3, 5**} $n(A) = 3$

$$P(A) = \frac{\boldsymbol{n(A)}}{n(S)} \quad \ldots\ldots\ldots\ldots \text{(Formula)}$$

$$= \frac{\mathbf{3}}{6} \qquad \therefore P(A) = \frac{1}{\mathbf{2}}$$

2) **Solution :** Here $t_1 = 1$, $t_n = 149$, $S_n = ?$

$$S_n = \frac{n}{2}(\mathbf{t_1 + t_n})$$

$$= \frac{n}{2} \times (1 + 149)$$

$$= \frac{n}{2} \times \mathbf{150}$$

$$= \mathbf{75}n$$

3) **Solution :** $x^2 + 8x - 20 = 0$

$x^2 + \mathbf{10}x - 2x - 20 = 0$

$x(x + 10) - \mathbf{2}(x + 10) = 0$

$(x + 10)(\boldsymbol{x - 2}) = 0$

$x + 10 = 0$ or $x - 2 = 0$

$x = \mathbf{-10}$ or $x = 2$

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

1) **Ans :** LHS = 5m - 3n

= 5(3) - 3(-2)

= 15 + 6

= 21

≠ RHS

∴ The point (3, -2) does not lie on the graph of 5m - 3n = -21

2) **Ans :** The given A.P. is 1, 7, 13, 19, ...

Here, a = 1 d = 7 - 1= 6

$t_n = a + (n - 1)d$,

$t_{18} = 1 + (18 - 1) \times 6$

$= 1 + 17 \times 6$

$= 1 + 102$

$= 103$

∴ 18^{th} term of the given A.P. is 103

3) **Ans :** -3 is one of the roots of the equation $x^2 - kx - 15 = 0$.

Putting x = -3 in the given equation, we get

$\therefore\ (3)^2 - k(-3) - 15 = 0$

$\therefore\ 9 + 3k - 15 = 0$

$\therefore\ 3k - 6 = 0$

$\therefore\ 3k = 6$

$\therefore\ k = \frac{6}{3}$

$\therefore\ k = 2$

4) **Ans :** Smt. Malhotra purchased a solar equipment for ₹85,000 GST applicable is at 5%

Tax paid by Smt. Malhotra = ₹85,000 x 5% = 4250

Input Tax credit = ₹4,250

Sales price of the equipment = ₹ 90,000

Output Tax = ₹ 90,000 x 5% = ₹ 4,500

Tax payable = Output tax - Input tax credit

= ₹ 4500 - ₹4250

= ₹ 250

5) **Ans :**

Class (Time hours)	**Class mark x_i**	**Frequency (No. of students) f_i**	**Class mark x Frequency $x_i f_i$**
0 - 2	1	8	8
2 - 4	3	14	42
4 - 6	5	18	90
6 - 8	7	10	70
8 - 10	9	10	90
		$\sum f_i =$	$\sum x_i f_i = 300$

$$\text{Mean} = \overline{X} = \frac{\sum x_i f_i}{\sum f_i} = \frac{300}{60} = 5$$

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

1) **Solution :** MV = 50

Let us find the investment required for one share.

Brokerage at 0.2% on ₹50 = $50 \times \frac{0.2}{100}$ = ₹ **0.10**

GST on brokerage at 18% = $0.1 \times \frac{18}{100}$ = ₹ **0.018**

Investment for one share = ₹ **50** + ₹0.10 + ₹ **0.018**

= ₹ **50.118**

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

$= \frac{50118}{50.118}$

= **1000**

2) **Solution :**

Milk Fats	Collected milk (litre)
2-3	30
3-4	70 → f_0
4-5	80 → f_1
5-6	60 → f_2
6-7	20

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

$$= 4 + \left[\frac{80 - 70}{2(80) - 70 - 60}\right] \times 1$$

$$= 4 + \frac{\mathbf{10}}{\mathbf{30}}$$

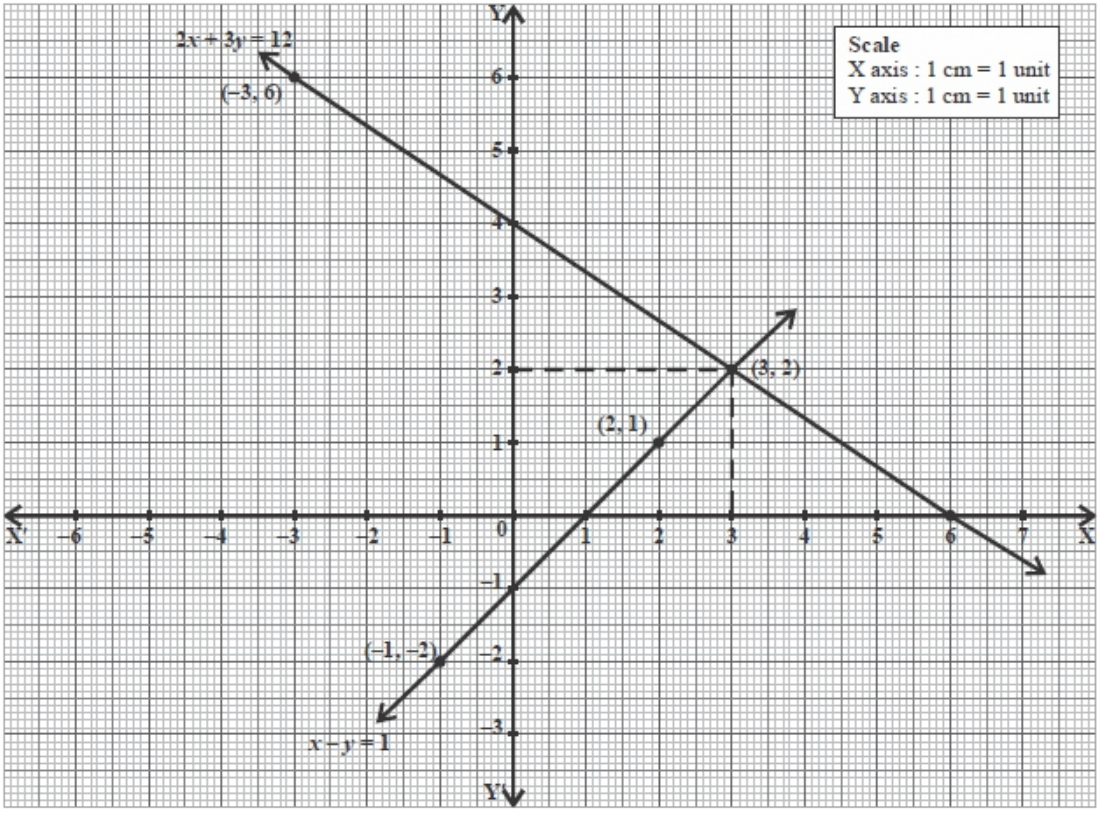
$$= \mathbf{4.333}$$

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

1) **Ans :**

x	–3	3	6
y	6	2	0

x	–1	2	3
y	–2	1	2



The two lines intersect at the point (3, 2).

∴ The solution of the given equations is $x = 3$ and $y = 2$.

2) **Ans :** The three digits natural numbers are 100, 101, 102, 103, ... 999.
As per the given condition, the series comprises of three digit natural numbers divisible by 5.
The series is 100, 105, 110, 115,.....995.
Here, $a = 100$, $d = t_2 - t_1 = 105 - 100 = 5$, and $t_n = 995$.
But, $t_n = a + (n - 1)d$
$\therefore$ $995 = 100 + (n - 1)\ 5$
$\therefore$ $995 = 100 + 5n - 5$
$\therefore$ $995 = 95 + 5n$
$\therefore$ $995 - 95 = 5n$
$\therefore$ $900 = 5n$

$\therefore n = \frac{900}{5}$

$\therefore n = 180$

3) **Ans : For Company A**
Face value of shares = ₹ 2
Premium = ₹ 18
Market value of shares = Face value + Premium
= 2 + 18 = ₹ 20
Total investment in Company A = Total number of shares x Market value of shares
= 200 x 20 = ₹ 4,000

For Company B
Market value of shares = ₹ 500
Total number of shares = 45
Total investment in Company B = Total number of shares x Market value of shares
= 500 x 45 = ₹ 22,500

For Company C
Market value of shares = ₹ 10,540
Total number of shares = 1
Total investment in Company C = Total number of shares x Market value of shares
= 1 x 10,540
= ₹ 10,540
Total investment of Joseph = Investment in company A + Investment in company B + Investment in company C
= 4,000 + 22,500 + 10,540
= ₹ 37,040
Total investment of Joseph is ₹ 37,040.

4) Ans : Let S be the sample space. The total available balloons are 2 of red, 3 of blue and 4 of green
$\therefore$ $S = \{R_1, R_2, B_1, B_2, B_3, G_1, G_2, G_3, G_4\}$
$\therefore$ $n(S) = 9$
1) Let A be the event of getting red balloon.
$\therefore$ $A = \{R_1, R_2\}$ $\therefore$ $n(A) = 2$

$\therefore P(A) = \frac{n(A)}{n(S)}$

$\therefore P(A) = \frac{2}{9}$

2) Let B be the event of getting blue balloon.

$\therefore B = \{B_1, B_2, B_3\}$ $\therefore n(B) = 3$

$\therefore P(B) = \frac{n(B)}{n(S)}$

$\therefore P(B) = \frac{3}{9}$

3) Let C be the event of getting green balloon.

$\therefore C = \{G_1, G_2, G_3, G_4\}$ $\therefore n(C) = 4$

$\therefore P(C) = \frac{n(C)}{n(S)}$

$\therefore P(C) = \frac{4}{9}$

Q. 4 Attempt *any* <u>TWO</u> sub-questions from the following : **8**

1) **Ans :** Let the length and breadth of the garden be x m and y m respectively

According to the first condition,

The semi perimeter of a rectangular shape garden is 36 m.

$\therefore x + y = 36$ .....(I)

According to the second condition,

The length of the garden is 4 m more than its breadth.

$\therefore x = y + 4$

$\therefore x - y = 4$ .....(II)

Adding equations (I) and (II), we get

$x + y = 36$

$+ x - y = 4$

$\therefore 2x = 40$

$\therefore x = \frac{40}{2} = 20$

Substituting $x = 20$ in equation (I), we get

$20 + y = 36$

$\therefore y = 36 - 20$

$\therefore y = 16$

The length and breadth of the garden are 20 m and 16 m respectively.

2) **Ans :** $(m\text{-}12)\, x^2 + 2\,(m\text{-}12)\, x + 2 = 0$

Comparing the given equation with $ax^2 + bx + c = 0$, we get

$a = m - 12$, $b = 2(m - 12)$, $c = 2$

$\Delta = b^2 - 4ac$

$= [2(m - 120]^2 - 4 \times (m - 12) \times 2$

$= 4(m - 12)^2 - 8(m - 12)$
$= 4(m^2 - 24m + 144) - 8m + 96$
$= 4m^2 - 96m + 576 - 8m + 96$
$= 4m^2 - 104m + 672$
$= 4(m^2 - 26m + 168)$
$= 4(m2 - 14m - 12m + 168)$
$= 4[m(m - 14) - 12(m - 14)]$
$= 4[(m - 14)(m - 12)]$

But the roots are real and equal,

$4[(m - 14)(m - 12)] = 0$ .....($\triangle = 0$)

$(m - 14)(m - 12) = 0$

By using the property, if the product of two numbers is zero, then at least one of them is zero , we get

$m - 14 = 0$ or $m - 12 = 0$

$\therefore m = 14$ or $m = 12$

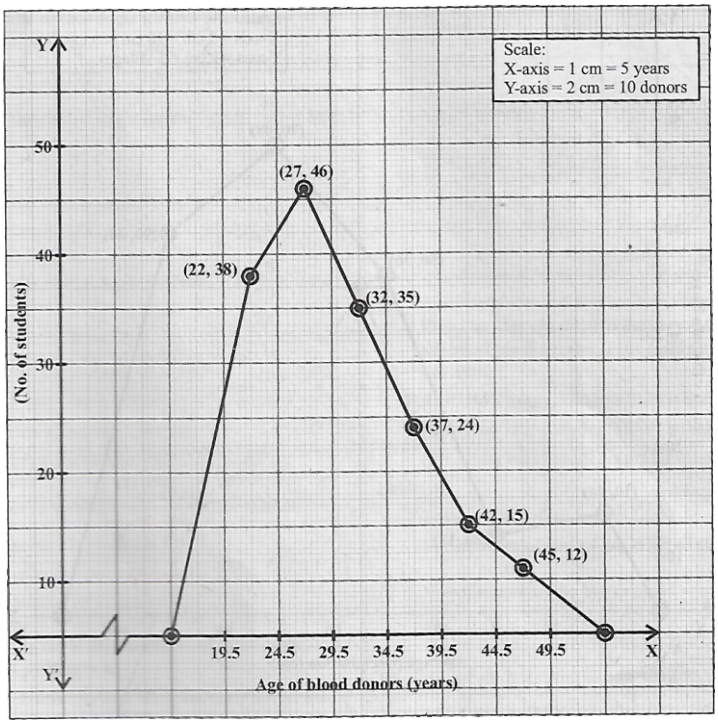
But, if $m = 12$, then quadratic coefficient becomes zero.

$\therefore m \neq 12$

$\therefore m = 14$

3) **Ans :**

Years Class	**Extended Class**	**Class Mark**	**No. of blood doners frequency**	**Indicators**
20-24	19.5-24.5	22	38	(22, 38)
25-29	24.5-29.5	27	46	(27, 46)
30-34	29.5-34.5	32	35	(32, 35)
35-39	34.5-39.5	37	24	(37, 24)
40-44	39.5-44.5	42	15	(42, 15)
45-49	44.5-49.5	45	12	(45, 12)



Q. 5 Attempt *any* ONE sub-question from the following : **3**

1) **Ans :** Find the roots if a equation $x^2 - 10x = 200$

$x^2 - 10x = 200$

$\therefore\ x^2 - 10x - 200 = 0$

$\therefore\ x^2 - 20x + 10x - 200 = 0$

$\therefore\ x(x - 20) + 10(x - 20) = 0$

$\therefore\ (x + 10)\ (x - 20) = 0$

$\therefore\ x = -10$ or $x = 20$

Hence one of its answer is 20

2) **Ans :** Sample space,

S = {(0, 0), (0, 1), (0, 2), (0, 3) (0, 4), (0, 5)
(1, 0), (1, 1), (1, 2), (1, 3) (1, 4), (1, 5)
(2, 0), (2, 1), (2, 2), (2, 3) (2, 4), (2, 5)
(3, 0), (3, 1), (3, 2), (3, 3) (3, 4), (3, 5)
(4, 0), (4, 1), (4, 2), (4, 3) (4, 4), (4, 5)
(5, 0), (5, 1), (5, 2), (5, 3) (5, 4), (5, 5)}

n(S) = 36

Let A be the event that the product of digits on the upper face is zero.

A = {(0, 0), (0, 1), (0, 2), (0, 3) (0, 4), (0, 5), (1, 0), (2, 0), (3, 0), (4, 0), (5, 0)}

n(A) = 11

$\therefore\ P(A) = \frac{n(A)}{n(S)}$

$\therefore\ P(A) = \frac{11}{36}$