

# 1- Linear Equations in Two Variables

Weightage

12 Marks

**Jul. '24**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

For simultaneous equations in variables  $x$  and  $y$ ,  $D_x = 49$ ,  $D_y = -63$ ,  $D = 7$ , then what is the value of  $x$ ?

- (A) 7                      (B)  $-7$                       (C)  $\frac{1}{7}$                       (D)  $-\frac{1}{7}$

- \*2. Find the value of the following determinant : [1]

$$\begin{vmatrix} 5 & -2 \\ -3 & 1 \end{vmatrix}$$

- \*3. Complete the following table for drawing the graph of the equation : [2]

$$x + 2y = 4$$

x	-2	0	<input type="text"/>
y	<input type="text"/>	2	1
(x, y)	<input type="text"/>	(0, 2)	<input type="text"/>

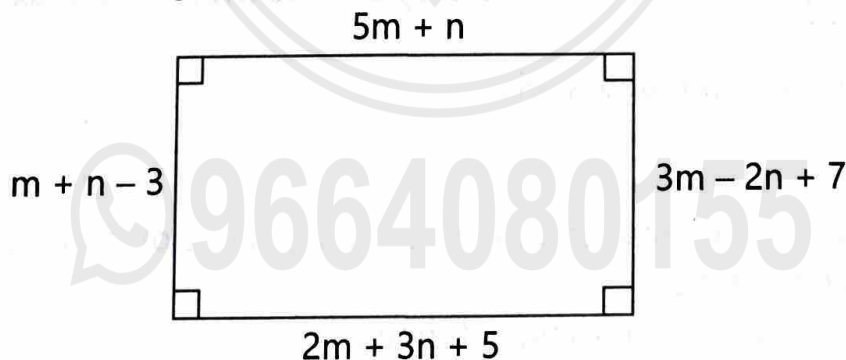
- \*4. Solve the following simultaneous equations : [2]

$$x + y = 5; x - y = 3$$

- \*5. Solve the following simultaneous equation by Cramer's method : [3]

$$4m - 2n = -4; 4m + 3n = 16.$$

6. Using information given in the following figure, find the length and breadth of this rectangle in cm. [3]



**Mar. '24**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

To draw the graph of  $x + 2y = 4$ , find  $x$  when  $y = 1$  :

- (A) 1                      (B) 2                      (C)  $-2$                       (D) 6

- \*2. If  $17x + 15y = 11$  and  $15x + 17y = 21$ , then find the value of  $x - y$ . [1]  
 3. If  $(0, 2)$  is the solution of  $2x + 3y = k$ , then to find the value of  $k$ , [2]  
 complete the following activity.

Activity :

$(0, 2)$  is the solution of the equation  $2x + 3y = k$ .

Put  $x = \square$  and  $y = \square$  in the given equation;

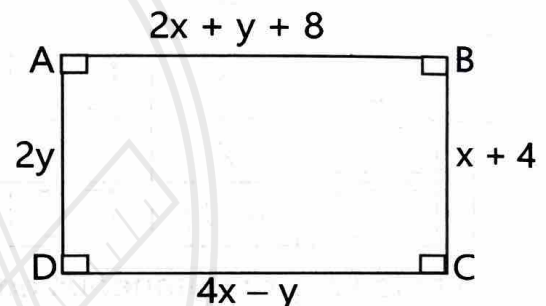
$$\therefore 2 \times \square + 3 \times 2 = k$$

$$\therefore 0 + 6 = k$$

$$\therefore k = \square$$

- \*4. Solve :

$\square$  ABCD is a rectangle. Write two simultaneous equations using information given below in the diagram, in the form of  $ax + by = c$  :



- \*5. Solve the following simultaneous equations using Cramer's rule : [3]  
 $3x - 4y = 10, 4x + 3y = 5$   
 6. Draw the graph of the equation  $x + y = 4$  and answer the following [3]  
 questions :  
 (a) Which type of triangle is formed by the line with X and Y-axes based on its sides.  
 (b) Find the area of that triangle.

Jul. '23

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Find the value of the following determinant :

$$\begin{vmatrix} 3 & 2 \\ 4 & 5 \end{vmatrix}$$

(A) 2

(B) 7

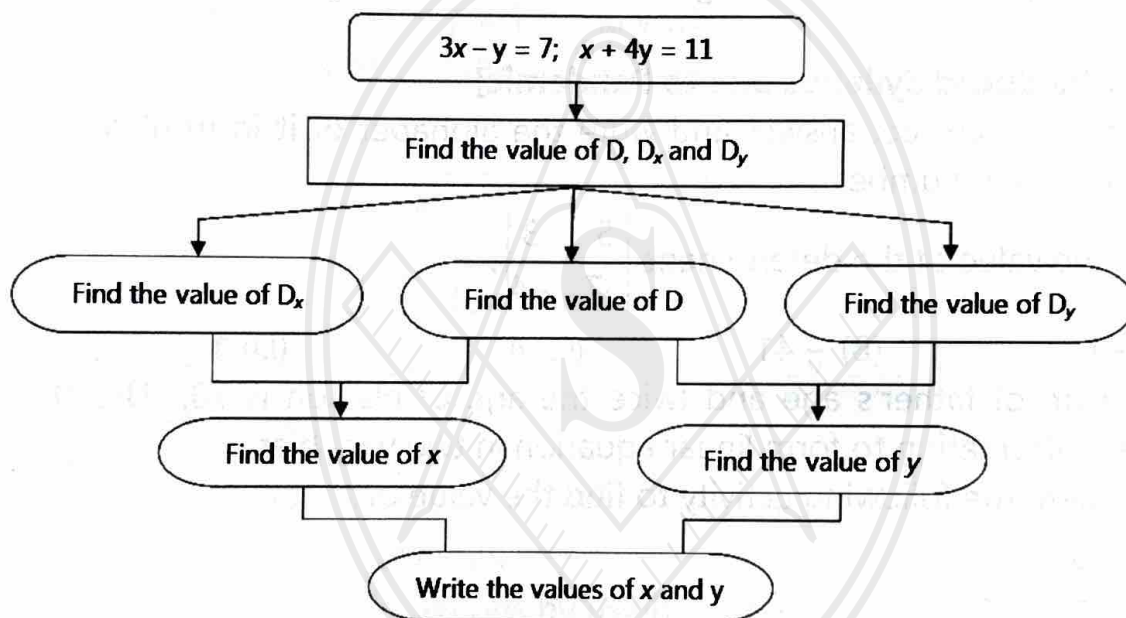
(C) -7

(D) 23

- \*2. If  $15x + 17y = 21$  and  $17x + 15y = 11$ , then find the value of  $x + y$ . [1]
- \*3. Complete the following table to draw the graph of  $x + y = 3$ . [2]

x	3	<input type="text"/>	<input type="text"/>
y	<input type="text"/>	5	3
(x, y)	(3, 0)	<input type="text"/>	(0, 3)

4. Solve the following simultaneous equations :  $x + y = 6$ ,  $x - y = 4$  [2]
- \*5. Two numbers differ by 3. The sum of the twice the smaller number and thrice the greater number is 19. Find the numbers. [3]
6. Observe the following flow chart and solve it : [3]



**Mar. '23**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
 To draw the graph of  $4x + 5y = 19$ , find  $y$  when  $x = 1$ ?  
 (A) 4 (B) 3 (C) 2 (D) -3
- \*2. Find the value of the following determinant : [1]

$$\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$$

- \*3. Complete the following activity to find the value of  $x$  :

$$5x + 3y = 9 \quad \dots(i)$$

$$2x - 3y = 12 \quad \dots(ii)$$

Add equations (i) and (ii)

$$\begin{array}{r} 5x + 3y = 9 \\ + \quad 2x - 3y = 12 \\ \hline 7x = \square \end{array} \quad \therefore x = \frac{\square}{\square}$$

$$\therefore x = \square$$

- \*4. Solve the following simultaneous equations :  $x + y = 4$ ,  $2x - y = 2$ . [2]  
 \*5. Solve the following simultaneous equations using Cramer's rule : [3]  
 $4m + 6n = 54$ ;  $3m + 2n = 28$   
 6. Draw the graph of the equation  $x + 2y = 4$ . Find the area of the triangle [3]  
 formed by the line intersecting to X-axis and Y-axis.

### Jul. '22 : [Reduced Syllabus due to Pandemic]

- \*1. Choose the correct answer and write the alphabet of it in front of the [1]  
 sub-question number.

Find the value of the determinant  $\begin{vmatrix} 5 & 3 \\ -7 & -4 \end{vmatrix}$ .

(A) -1                      (B) -41                      (C) 41                      (D) 1

- \*2. The sum of father's age and twice the age of his son is 70. Use the [1]  
 given information to form linear equation in two variables.  
 3. Complete the following activity to find the value of  $x$  : [2]

Activity :

$$\begin{array}{r} 3x - y = 2 \\ + \quad 2x + y = 9 \\ \hline \square x = \square \end{array}$$

$$\therefore x = \frac{\square}{5}$$

$$\therefore x = \square$$

- \*4. For solving the following simultaneous equations, find the values of [2]  
 $(x + y)$  and  $(x - y)$ .

$$15x + 17y = 21, \quad 17x + 15y = 11$$

- \*5. Find  $D_x$  and  $D_y$  for the following simultaneous equations : [2]

$$x + 2y = -1, \quad 2x - 3y = 12$$

6. Solve the following equations:  $3x - 2y = \frac{5}{2}$ ,  $\frac{1}{3}x + 3y = \frac{-4}{3}$ . [3]

- \*7. A two digit number and the number with digits interchanged add up to 143. In the given number the digit in unit's place is 3 more than the digit in the ten's place. Find the original number. [3]
8. Solve the following simultaneous equations by using graphical method: [4]  
 $x + y = 4$ ,  $3x - 2y = 7$

**Mar. '22 :**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
 Find simultaneous equations in variables  $x$  and  $y$ ,  $D_x = 49$ ,  $D_y = -63$ ,  $D = 7$  then what is the value of  $y$ ?  
 (A) 9 (B) 7 (C) -7 (D) -9
- \*2. To draw the graph of  $4x + 5y = 19$ , find  $y$  when  $x = 1$ ? [1]
3. Complete the activity to find the value of the determinant. [2]

Activity :

$$\begin{vmatrix} 2\sqrt{3} & 9 \\ 2 & 3\sqrt{3} \end{vmatrix} = 2\sqrt{3} \times \boxed{\phantom{00}} - 9 \times \boxed{\phantom{00}}$$

$$= \boxed{\phantom{00}} - 18 = \boxed{\phantom{00}}$$

4. To solve the following simultaneous equations by Cramer's rule, find the values of  $D_x$  and  $D_y$ . [2]  
 $3x + 5y = 26$ ,  $x + 5y = 22$
- \*5. Find the value of  $(x + y)$  and  $(x - y)$  of the following equations : [2]  
 $49x - 57y = 172$ ,  $57x - 49y = 252$
6. Solve the simultaneous equations by using graphical method : [3]  
 $x + 3y = 7$ ,  $2x + y = -1$
- \*7. Sum of the present ages of Manish and Savita is 31 years. Manish's age 3 years ago was 4 times the age of Savita at that time. Find their present ages. [3]
8. The perimeter of an isosceles triangle is 24 cm. The length of its congruent sides is 13 cm less than twice the length of its base. Find the lengths of all sides of the triangle. [4]

**Jul. '21 :**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Find the value of  $= \begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix}$

- (A) -22 (B) 2 (C) 22 (D) -2

2. If  $x + 2y = 5$  and  $2x + y = 4$ , then find the value of  $x + y$ .
- \*3. To draw the graph of  $4x + 5y = 19$ , complete the following activity to find  $y$ , when  $x = 1$ . [1]  
[2]

Activity :

$$4x + 5y = 19$$

$$\therefore 4 \times \square + 5y = 19$$

$$\therefore 5y = 19 - \square$$

$$\therefore y = \frac{\square}{5}$$

$$\therefore y = \square$$

4. Solve the following simultaneous equations :  $5x + 4y = 17$ ,  $4x + 5y = 10$  [2]
- \*5. For simultaneous equations in variables  $x$  and  $y$ , if  $D_x = 49$ ,  $D_y = -63$  and  $D = 7$ , then find the value of  $x$  and  $y$ . [2]
6. Solve the following simultaneous equations using Cramer's rule : [3]  
 $4m + 6n = 54$ ,  $3m + 2n = 28$
7. Solve the following simultaneous equations graphically : [3]  
 $x + y = 7$ ,  $x - y = -1$
8. When one is added to the numerator as well as the denominator of a certain fraction, it becomes  $\frac{1}{2}$  and if one is subtracted from the numerator and denominator both, the fraction becomes  $\frac{1}{3}$ . Find the original fraction. [4]

**Mar. '21 : No Exam**

**Jul. '20**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
To draw graph of  $4x + 5y = 19$ , what will be the value of  $y$  when  $x = 1$ .  
(A) 4 (B) 3 (C) 2 (D) -3
2. For simultaneous equations in variable  $x$  and  $y$ , if  $D_x = 25$ ,  $D_y = 40$ ,  $D = 5$ , then what is the value of  $x$ ? [1]
- \*3. Complete the following activity and rewrite it. [2]

Activity :

$$\begin{vmatrix} 3 & 2 \\ 4 & 5 \end{vmatrix} = 3 \times \square - \square \times 4$$

$$= \square - 8 = \square$$

4. Sum of two numbers is 7 and their difference is 5. Find the numbers. [2]
5. Solve the following simultaneous equations graphically : [3]  
 $x + y = 5$ ;  $x - y = 1$
6. Construct any one linear equation in two variables. Obtain another equation by interchanging only coefficients of variables. Find the value of the variables. [3]

**Mar. '20**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

For simultaneous equations in variable  $x$  and  $y$ , if  $D_x = 49$ ,  $D_y = -63$ ,  $D = 7$ , then what is the value of  $x$ ?

- (A) 7 (B) -7 (C)  $\frac{1}{7}$  (D)  $-\frac{1}{7}$

- \*2. If  $15x + 17y = 21$  and  $17x + 15y = 11$ , then find the value of  $x + y$ . [1]
- \*3. The denominator of a fraction is 4 more than twice its numerator. Denominator becomes 12 times the numerator, if both the numerator and the denominator are reduced by 6, find the fraction. [3]
- \*4. Complete the following table to draw the graph of  $2x - 6y = 3$ . [2]

$x$	-5	<input type="text"/>
$y$	<input type="text"/>	0
$(x, y)$	<input type="text"/>	<input type="text"/>

- \*5. Find the value of the determinant : [2]
- $$\begin{vmatrix} 7 & 5 \\ 5 & 3 \\ 3 & 1 \\ 2 & 2 \end{vmatrix}$$

6. Convert the following equations into simultaneous equations and solve: [3]  
 $\sqrt{\frac{x}{y}} = 4$ ,  $\frac{1}{x} + \frac{1}{y} = \frac{1}{xy}$

**Jul. '19**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Find the value of the determinant :  $\begin{vmatrix} 5 & 3 \\ -7 & -4 \end{vmatrix}$

- (A) -1 (B) -41 (C) 41 (D) 1

2. Solve the following simultaneous equations :  $4x + 3y = 11$ ,  $3x + 4y = 10$  [2]
3. Solve the following simultaneous equations graphically :  
 $x + y = 2$ ,  $x - y = 4$  [3]
4. Out of 555 km, Vishal travelled certain distance by bus and remaining distance by car. A bus travels with an average speed of 60 km/hr and the average speed of a car is 75 km/hr. He takes total 8 hours to complete the journey. Find the distance that Vishal travelled by bus. [2]

**Mar. '19**

1. If  $\begin{vmatrix} 4 & 5 \\ m & 3 \end{vmatrix} = 22$ , then find the value of m. [2]
2. Two numbers differ by 3. The sum of the greater number and twice the smaller number is 15. Find the smaller number. [2]
- \*3. Solve the following simultaneous equations graphically :  
 $x + y = 0$ ,  $2x - y = 9$  [3]
4. The co-ordinates of the point of intersection of lines  $ax + by = 9$  and  $bx + ay = 5$  is  $(3, -1)$ . Find the values of a and b. [3]

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## 2- Quadratic Equations

Weightage
12 Marks

**Jul. '24**

- \*1. Which equation from the following is quadratic equation? [1]

(A)  $\frac{5}{x} - 3 = x^2$

(B)  $x(x + 5) = 2$

(C)  $n - 1 = 2n$

(D)  $\frac{1}{x^2}(x+2) = x$

- \*2. Determine the nature of roots of the following quadratic equation. [2]

Activity :

$m^2 + 2m + 9 = 0$

$a = \boxed{\phantom{00}}, b = 2, c = 9$

$b^2 - 4ac = 2^2 - 4 \times 1 \times \boxed{\phantom{00}}$

$= \boxed{\phantom{00}} - 36$

$\therefore b^2 - 4ac = \boxed{\phantom{00}}$

$\therefore b^2 - 4ac < 0$

 $\therefore$  Roots of quadratic equation are not real.

- \*3. Find 'k' if  $x = 3$  is a root of quadratic equation  $kx^2 - 10x + 3 = 0$ . [2]

- \*4. Solve the following quadratic equation by formula method : [3]

$y^2 + \frac{1}{3}y = 2$

- \*5. Manisha wants to distribute 540 bananas among some students. If 30 students were more, each would get 3 bananas less. Find the number of students. [4]

**Mar. '24**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

If 3 is one of the root of the quadratic equation  $kx^2 - 7x + 12 = 0$ ,then  $k = \underline{\hspace{2cm}}$ 

(A) 1

(B) -1

(C) 3

(D) -3

2. If 2 and 5 are the roots of the quadratic equation, then complete the following activity to form quadratic equation : [2]

Activity :

Let  $\alpha = 2$  and  $\beta = 5$  are the roots of the quadratic equation. Then quadratic equation is :

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$$\therefore x^2 - (2 + \square)x + \square \times 5 = 0$$

$$\therefore x^2 - \square x + \square = 0$$

- \*3. Solve the following quadratic equation using factorization method : [2]  
 $x^2 + x - 20 = 0$
- \*4. Solve the following quadratic equation by formula method : [3]  
 $3m^2 - m - 10 = 0$
5. A tank can be filled up by two taps in 6 hours. The smaller tap alone takes 5 hours more than the bigger tap alone. Find the time required by each tap to fill the tank separately. [4]

### Jul. '23

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
 Which of the following quadratic equations has roots 3 and 5?  
 (A)  $x^2 - 15x + 8 = 0$  (B)  $x^2 - 8x + 15 = 0$   
 (C)  $x^2 + 3x + 5 = 0$  (D)  $x^2 + 8x - 15 = 0$
- \*2. Complete the following activity to find the value of discriminant of the equation  $x^2 + 10x - 7 = 0$ . [2]  
 Solution :  
 Comparing  $x^2 + 10x - 7$  with  $ax^2 + bx + c = 0$   
 $a = 1, b = 10, c = \square$   
 $\therefore b^2 - 4ac = \square - 4 \times 1 \times (-7)$   
 $= 100 + \square$   
 $= \square$
- \*3. Solve the following quadratic equation by factorisation method : [2]  
 $x^2 + 15x + 54 = 0$
- \*4. Solve the given quadratic equation by using formula method : [3]  
 $5x^2 + 13x + 8 = 0$
- \*5. The sum of two roots of a quadratic equation is 5 and the sum of their cubes is 35, find the equation. [4]

**Mar. '23**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Out of the following equations which one is not a quadratic equation?

- (A)  $x^2 + 4x = 11 + x^2$  (B)  $x^2 = 4x$   
 (C)  $5x^2 = 90$  (D)  $2x - x^2 = x^2 + 5$

- \*2. Complete the following activity to determine the nature of roots of the quadratic equation  $x^2 + 2x - 9 = 0$ . [2]

Solution :

Compare  $x^2 + 2x - 9$  with  $ax^2 + bx + c = 0$

$$a = 1, b = 2, c = \square$$

$$\therefore b^2 - 4ac = (2)^2 - 4 \times \square \times \square$$

$$\Delta = 4 + \square = 40$$

$$\therefore b^2 - 4ac > 0$$

The roots of the equation are real and unequal.

- \*3. Write the following equation in the form of  $ax^2 + bx + c = 0$ , then write the values of a, b, c :  $2y = 10 - y^2$ . [2]

- \*4. Solve the following quadratic equation by formula method : [3]

$$x^2 + 10x + 2 = 0$$

5. The sum of the squares of five consecutive natural numbers is 1455. [4]  
 Find the numbers.

**Jul. '22 :**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Which of the following quadratic equation has roots 3 and 5?

- (A)  $x^2 - 15x + 8 = 0$  (B)  $x^2 + 8x - 15 = 0$   
 (C)  $x^2 + 3x + 5 = 0$  (D)  $x^2 - 8x + 15 = 0$

2. Find the roots of the quadratic equation  $(x + 5)(x - 4) = 0$ . [1]

- \*3. Find the value of the discriminant of the quadratic equation. [2]

$$2y^2 - y + 2 = 0$$

- \*4. Complete the following activity to find the roots of quadratic equation. [3]

$$25x^2 + 30x + 9 = 0 \text{ by formula method.}$$

Activity :

$$25x^2 + 30x + 9 = 0$$

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

$$a = 25, b = \square, c = 9$$

$$\therefore b^2 - 4ac = (30)^2 - 4 \times 25 \times 9$$

$$\begin{aligned}
 &= 900 - 900 \\
 &= \boxed{\phantom{00}} \\
 \therefore x &= \frac{\boxed{\phantom{00}} \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-\boxed{\phantom{00}} \pm \sqrt{0}}{2 \times 25} \\
 \therefore x &= \frac{-30 + 0}{50} \quad \text{or} \quad \therefore x = \frac{\boxed{\phantom{00}} - 0}{50} \\
 \therefore x &= \frac{-30}{50} \quad \text{or} \quad \therefore x = \frac{-30}{50} \\
 \therefore x &= \frac{-\boxed{\phantom{00}}}{5} \quad \text{or} \quad \therefore x = \frac{-3}{5}
 \end{aligned}$$

- \*5. Solve the given equation by factorisation :  $5m^2 = 22m + 15$  [3]  
 6. A train travels 240 km with uniform speed. If the speed of the train is increased by 12 km/hr, it takes one hour less to cover the same distance. Find the initial speed of the train. [4]  
 7. Product of two numbers is 352 and their mean is 19. Find the numbers. [3]

**Mar. '22 :**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Which one is the quadratic equation?

(A)  $\frac{5}{x} - 3 = x^2$

(B)  $x(x + 5) = 2$

(C)  $n - 1 = 2n$

(D)  $\frac{1}{x^2}(x + 2) = x$

- \*2. Determine whether 2 is a root of quadratic equation  $2m^2 - 5m = 0$ . [1]  
 \*3. Solve the following quadratic equation :  $x^2 + x - 20 = 0$  [2]  
 \*4. One of the roots of equation  $kx^2 - 10x + 3 = 0$  is 3. Complete the following activity to find the value of k. [3]

Activity :

One of the roots of equation  $kx^2 - 10x + 3$  is 3.

Putting  $x = \boxed{\phantom{00}}$  in the above equation

$$\therefore k(\boxed{\phantom{00}})^2 - 10 \times \boxed{\phantom{00}} + 3 = 0$$

$$\therefore \boxed{\phantom{00}} - 30 + 3 = 0$$

$$\therefore 9k = \boxed{\phantom{00}}$$

$$\therefore k = \boxed{\phantom{00}}$$

- \*5. Solve the following quadratic equation using formula :  $x^2 + 10x + 2 = 0$  [3]  
 6. If 460 is divided by a natural number, then quotient is 2 more than nine times the divisor and remainder is 5. Find the quotient and divisor. [4]

**Jul. '21 :**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Which of the following quadratic equation has roots 3 and 5?

(A)  $x^2 - 15x + 8 = 0$

(B)  $x^2 - 8x + 15 = 0$

(C)  $x^2 + 3x + 5 = 0$

(D)  $x^2 + 8x - 15 = 0$

- \*2. Decide whether the equation  $m^3 - 5m^2 + 4 = 0$  is a quadratic equation or not? Justify. [1]  
 \*3. Determine the nature of the quadratic equation  $2x^2 - 5x + 7 = 0$  by using the discriminant. [2]  
 \*4. If  $x = 5$  is a root of quadratic equation  $kx^2 - 14x - 5 = 0$ , then find the value of  $k$  by completing the following activity. [3]

Activity :

One of the roots of quadratic equation  $kx^2 - 14x - 5 = 0$  is 5.

∴ Substituting  $x = \square$  in the above equation.

∴  $k\square^2 - 14 \times 5 - 5 = 0$

∴  $\square k - 70 - 5 = 0$

∴  $25k = \square$

∴  $k = \frac{75}{\square}$

∴  $k = \square$

5. Out of the total students of class 10<sup>th</sup>,  $\frac{7}{2}$  times the square root of total number of students are playing on the ground and remaining 2 students are studying in the classroom. Find the total number of students in class 10<sup>th</sup>. [4]  
 6. For a quadratic equation in variable 'm', the coefficients a, b and c are such that  $a = 2$ ,  $b = 4a$ ,  $c = 3a$ . Form the quadratic equation and solve it by factorization method. [3]

**Mar. '21 : No Exam**

**Jul. '20**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

From the following equations, which one is the quadratic equation?

(A)  $\frac{5}{x} - 3 = x^2$  (B)  $x(x + 5) = 2$  (C)  $n - 1 = 2n$  (D)  $\frac{1}{x^2}(x + 2) = x$

- \*2. One of the roots of quadratic equation  $5m^2 + 2m + k = 0$  is  $-\frac{7}{5}$  [2]

Complete the following activity to find the value of k.

Activity :

$-\frac{7}{5}$  is a root of quadratic equation  $5m^2 + 2m + k = 0$

Put  $m = \square$  in the equation

$$\therefore 5 \times \left(-\frac{7}{5}\right)^2 + 2 \times \square + k = 0$$

$$\therefore \square + \left(-\frac{14}{5}\right) + k = 0$$

$$\therefore k = \square$$

- \*3. Solve the quadratic equation by factorization method :  $x^2 + x - 20 = 0$  [2]

- \*4. Solve the quadratic equation using formula method. [3]

$$5m^2 + 13m + 8 = 0$$

5. If one of the roots of the quadratic equation  $ax^2 + bx + c = 0$  is half of [4]

the other root, show that,  $b^2 = \frac{9ac}{2}$ .

**Mar. '20**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

From the following equations, which one is the quadratic equation?

(A)  $\frac{5}{x} - 3 = x^2$  (B)  $x(x + 5) = 2$  (C)  $n - 1 = 2n$  (D)  $\frac{1}{x^2}(x + 2) = x$

2. Find the values of a and b from the quadratic equation  $2x^2 - 5x + 7 = 0$ . [1]

- \*3. Solve the quadratic equation by factorization method:  $x^2 - 15x + 54 = 0$ . [2]

4. The sum of the areas of two squares is 400 sq. m. If the difference between their perimeters is 16 m, find the sides of two squares. [4]

5. A dealer sells a toy for ₹ 24 and gains as much percent as the cost price of the toy. Find the cost price of the toy. [3]

**Jul. '19**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Out of the following equations which one is not a quadratic equation?

(A)  $x^2 + 4x = 11 + x^2$

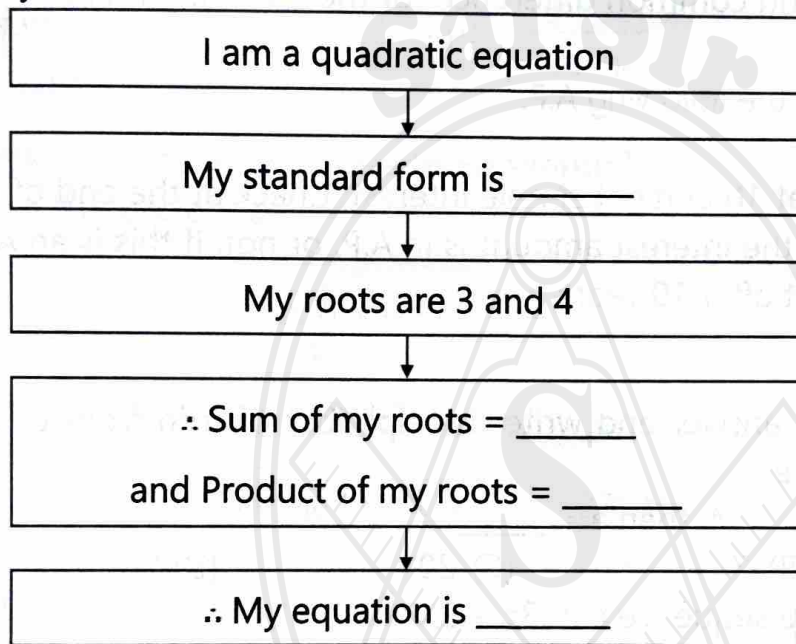
(B)  $x^2 = 4x$

(C)  $5x^2 = 90 + 5$

(D)  $2x - x^2 = x^2$

- \*2. Find k if  $x = 3$  is a root of equation  $kx^2 - 10x + 3 = 0$ . [2]
3. Complete the following activity to form a quadratic equation. [2]

Activity :



4. Construct a word problem on quadratic equation, such that one of its answers is 20 (years, rupees, centimeter, etc.). Also solve it. [3]

**Mar. '19**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

For the quadratic equation  $x^2 + 10x - 7 = 0$ , the values of a, b, c are :

(A)  $a = -1, b = 10, c = 7$

(B)  $a = 1, b = -10, c = -7$

(C)  $a = 1, b = 10, c = -7$

(D)  $a = 1, b = 10, c = 7$

2. Solve the following quadratic equation:  $x^2 + 8x + 15 = 0$ . [2]
- \*3. Obtain a quadratic equation whose roots are  $-3$  and  $-7$ . [2]

4. Two taps together fill a tank completely in  $3\frac{1}{13}$  minutes. The smaller [4]

tap takes 3 minutes more than the bigger tap to fill the tank. How much time does each tap take to fill the tank completely?

## 3- Arithmetic Progression

<b>Weightage</b> <b>8 Marks</b>
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### Jul. '24

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
 The sequence – 10, –6, –2, 2, .....  
 (A) is an A.P., Reason  $d = -16$  (B) is an A.P., Reason  $d = 4$   
 (C) is an A.P., Reason  $d = -4$  (D) is not an A.P.
- \*2. Find the first term and common difference for the following A.P. : [1]  
 5, 1, –3, –7, .....
- \*3. Find the 19<sup>th</sup> term of the following A.P. : [2]  
 7, 13, 19, 25, .....
4. ₹ 2,000 is invested at 10 percent simple interest. Check at the end of the every year whether the interest amount is in A.P. or not. If this is an A.P., find interest amount after 10 years. [2]

### Mar. '24

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
 For an A.P.,  $t_7 = 4$ ,  $d = -4$ , then  $a =$  \_\_\_\_\_  
 (A) 6 (B) 7 (C) 20 (D) 28
2. Find first term of the sequence  $t_n = 3n - 2$ . [1]
- \*3. Find the 19<sup>th</sup> term of the following A.P.: 7, 13, 19, 25, ... [2]
4. In a 'Mahila Bachat Gat' Kavita invested from the first day of month ₹20 on first, ₹ 40 on second day and ₹ 60 on third day. If she saves like this, then what would be her total saving in the month of February 2020 ? [4]

### Jul. '23

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
 Sum of first five multiples of 3 is \_\_\_\_\_.  
 (A) 45 (B) 55 (C) 15 (D) 75
- \*2. Given sequence is an A.P. Find the next two terms of this A.P. : [1]  
 5, 12, 19, 26, .....
3. The first term  $a = 8$  and common difference  $d = 5$  are given. Write an A.P. [2]
- \*4. If  $p$  times the  $p^{\text{th}}$  term of an A.P. is equal to  $q$  times  $q^{\text{th}}$  term, then show that  $(p + q)^{\text{th}}$  term of that A.P. is zero ( $p \neq q$ ). [4]

**Mar. '23**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

For a given A.P.,  $a = 3.5$ ,  $d = 0$ , then  $t_n =$  \_\_\_\_\_ .

- (A) 0 (B) 3.5 (C) 103.5 (D) 104.5

- \*2. Find the common difference of the following A.P. 2, 4, 6, 8, ..... [1]

- \*3. Write an A.P. whose first term is  $a = 10$  and common difference  $d = 5$ . [2]

- \*4. If first term of an A.P. is  $p$ , second term is  $q$  and last term is  $r$ , then show [4]

that sum of all terms is  $(q + r - 2p) \times \frac{(p+r)}{2(q-p)}$ .

**Jul. '22 :**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

For a given A.P.,  $a = 3.5$ ,  $d = 0$ , then  $t_n =$  \_\_\_\_\_ .

- (A) 0 (B) 3.5 (C) 103.5 (D) 104.5

- \*2. Find the first term and common difference for an A.P. : [1]

127, 135, 143, 151, .....

- \*3. Complete the following activity to find the 27<sup>th</sup> term of the following A.P.: [2]

9, 4, -1, -6, -11, .....

Activity :

Here,  $a = 9$ ,  $d =$  ,  $n = 27$

$\therefore t_n =$    $+ (n - 1)d$  .... (Formula)

$\therefore t_{27} = 9 + ($    $- 1) (-5)$

$\therefore t_{27} =$

4. Find the sum of the first 21 even natural numbers. [2]

- \*5. If the sum of the first  $p$  terms of an A.P. is equal to the sum of the first  $q$  terms, then show that the sum of its first  $(p + q)$  terms is zero ( $p \neq q$ ). [4]

6. Measures of angles of a quadrilateral are in A.P. The measure of largest angle is twice the smallest. Find the measures of all angles of the quadrilateral. [3]

(Assume the measures of angles as  $a$ ,  $a + d$ ,  $a + 2d$ ,  $a + 3d$

where  $a < a + d < a + 2d < a + 3d$ )

**Mar. '22 :**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

First four terms of an A.P., are \_\_\_\_\_ whose first term is  $-2$  and common difference is  $-2$ .

(A)  $-2, 0, 2, 4$

(B)  $-2, 4, -8, 16$

(C)  $-2, -4, -6, -8$

(D)  $-2, -4, -8, -16$

- \*2. Write second and third term of an A.P. whose first term is  $6$  and common difference is  $-3$ . [1]

- \*3. Complete the following activity to find the  $19^{\text{th}}$  term of an A.P. [2]

Activity :

Given A.P. :  $7, 13, 19, 25, \dots$

Here first term  $a = 7$ ;  $t_{19} = ?$

$$t_n = a + (\boxed{\phantom{00}}) d \quad \dots(\text{Formula})$$

$$\therefore t_{19} = 7 + (19 - 1) \boxed{\phantom{00}}$$

$$\therefore t_{19} = 7 + \boxed{\phantom{00}}$$

$$\therefore t_{19} = \boxed{\phantom{00}}$$

- \*4. Find the sum of first 'n' even natural numbers. [2]

- \*5. There is an auditorium with 27 rows of seats. There are 20 seats in the first row, 22 seats in the second row, 24 seats in the third row and so on. Find how many total seats are there in the auditorium? [3]

- \*6. If the  $9^{\text{th}}$  term of an A.P. is zero, then prove that the  $29^{\text{th}}$  term is double the  $19^{\text{th}}$  term. [4]

7. Measures of angles of a triangle are in A.P. The measure of smallest angle is five times of common difference. Find the measures of all angles of a triangle. [3]

(Assume the measures of angles as  $a, a + d, a + 2d$ )

**Jul. '21 :**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Find the value of common difference for an A.P.  $-10, -6, -2, 2, \dots$

(A)  $-16$

(B)  $-4$

(C)  $4$

(D)  $16$

- \*2. For a given A.P.,  $a = 3.5$  and  $d = 0$ , then find  $t_n$ . [1]

- \*3. Complete the following activity and rewrite it. [2]

First term and common difference of an A.P. are  $6$  and  $3$  respectively.

Find  $S_{27}$ .

Activity :

$$a = 6, d = 3, S_{27} = ?$$

$$S_n = \frac{n}{2} [ \boxed{\phantom{00}} + (n - 1) d ] \quad \dots(\text{Formula})$$

$$S_{27} = \frac{27}{2} [ 12 + (27 - 1) \boxed{\phantom{00}} ]$$

$$= \frac{27}{2} \times \boxed{\phantom{00}}$$

$$= 27 \times 45$$

$$\therefore S_{27} = \boxed{\phantom{00}}$$

- \*4. Find the 24<sup>th</sup> term of the following A.P. 12, 16, 20, 24, ..... [2]
- \*5. In an A.P. sum of three consecutive terms is 27 and their product is 504. [3]  
Find the terms.  
(Assume that three consecutive terms in A.P. are  $a - d$ ,  $a$ ,  $a + d$ )
6. In an A.P., 16, 14, 12, ..... the sum of how many terms is 60? [4]  
Write these terms with all possibilities.
7. Write any one arithmetic progression with common difference 5. Find [3]  
its  $n^{\text{th}}$  term and sum of first 'n' terms.

**Mar. '21 : No Exam**

**Jul. '20**

1. Choose the correct answer and write the alphabet of it in front of the [1]  
sub-question number.  
What is the sum of the first 10 natural numbers?  
(A) 55 (B) 20 (C) 65 (D) 11
- \*2. Find the first term and common difference for the following A.P. : [1]  
127, 135, 143, 151, .....
- \*3. Find the 19<sup>th</sup> term of the following A.P. 7, 13, 19, 25, ..... [2]
4. In an A.P. the first term is  $-5$  and last term is 45. If sum of 'n' terms in [3]  
the A.P. is 120, then complete the activity to find n.

Activity :

$$t_1 = -5, t_n = \boxed{\phantom{00}}, S_n = \boxed{\phantom{00}}$$

$$S_n = \frac{n}{2} [ t_1 + \boxed{\phantom{00}} ]$$

$$\boxed{\phantom{00}} = \frac{n}{2} [-5 + 45]$$

$$240 = n \times \boxed{\phantom{00}}$$

$$\therefore n = \boxed{\phantom{00}}$$

**Mar. '20**

\*1. Find second and third term of an A.P. whose first term is  $-2$  and common difference is  $-2$ . [1]

\*2. Complete the following activity and rewrite it. [2]

First term and common difference of an A.P. are  $6$  and  $3$  respectively. Find  $S_{27}$ .

Activity :

$$a = 6, d = 3, S_{27} = ?$$

$$S_n = \frac{n}{2} [\boxed{\phantom{00}} + (n - 1) d] \quad \dots(\text{Formula})$$

$$S_{27} = \frac{27}{2} [12 + (27 - 1) \boxed{\phantom{00}}]$$

$$= \frac{27}{2} \times \boxed{\phantom{00}}$$

$$= 27 \times 45$$

$$\therefore S_{27} = \boxed{\phantom{00}}$$

\*3. Decide whether the following sequence is an A.P. If so, find the 20<sup>th</sup> term of the progression :  $-12, -5, 2, 9, 16, 23, 30, \dots$  [2]

\*4. In an A.P. sum of three consecutive terms is  $27$  and their product is  $504$ , find the terms. [3]

(Assume that three consecutive terms in A.P. are  $a - d, a, a + d$ )

5. One person borrows ₹  $4,000$  and agrees to repay with a total interest of ₹  $500$  in  $10$  instalments. Each instalment being less than the preceding instalment by ₹  $10$ . What would be the first and the last instalments? [4]

**Jul. '19**

\*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

For a given A.P.,  $a = 3.5, d = 0$ , then  $t_n = \underline{\hspace{2cm}}$ .

(A) 0

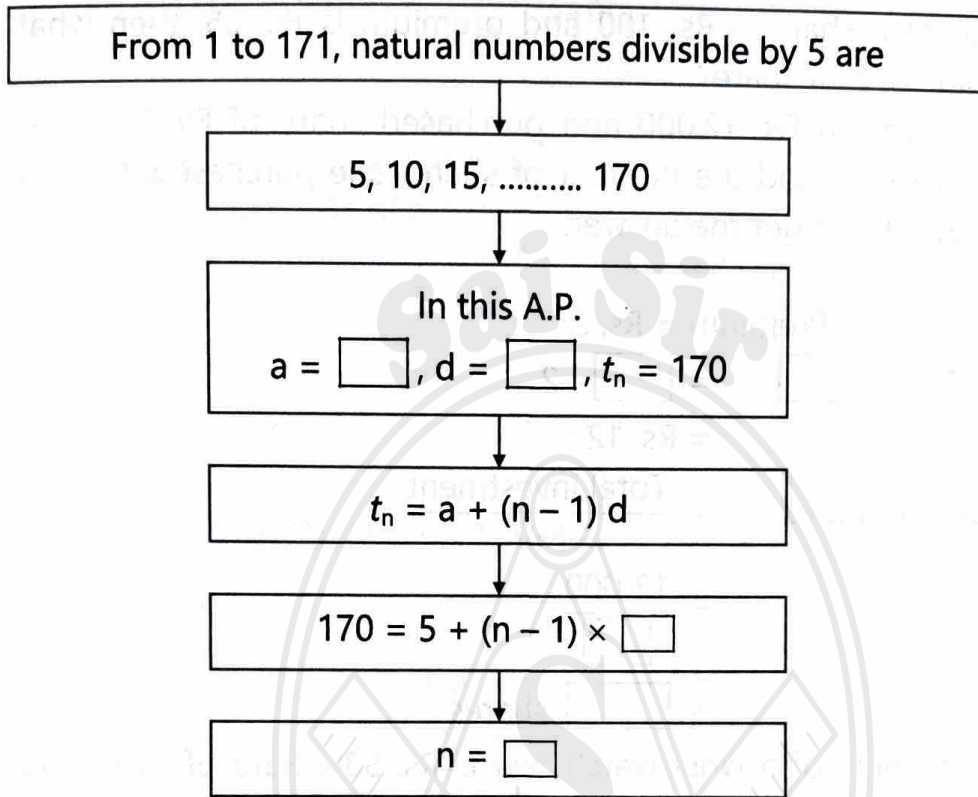
(B) 3.5

(C) 103.5

(D) 104.5

2. Complete the following activity to find the number of natural numbers between 1 and 171, which are divisible by 5. [2]

Activity :



3. Find the 23<sup>rd</sup> term of the A.P. 9, 4, -1, -6, -11. [2]
4. Sachin invested some amounts in a National Saving Certificates in a specific way. In the first year, he invested ₹ 4,000, in the second year ₹ 6,000, in the third year ₹ 8,000 and so on for 12 years. Find the total amount he invested in 12 years. [3]

**Mar. '19**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
In the A.P. 2, -2, -6, -10, ..... common difference (d) is :  
(A) -4                      (B) 2                      (C) -2                      (D) 4
- \*2. First term and common difference of an A.P. are 12 and 4 respectively. If  $t_n = 96$ , find n. [2]
3. Find the 19<sup>th</sup> term of the following A.P. 7, 13, 19, 25, ..... [2]
4. Amit saves certain amount every month in a specific way. In the first month he saves ₹ 200, in the second month ₹ 250, in the third month ₹ 300 and so on. How much will be his total savings in 17 months? [3]

## 4- Financial Planning

Weightage 8 Marks
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**Jul. '24**

- \*1. Face value of a share is Rs. 100 and premium is Rs. 65, then what is market value of that share? [1]
- \*2. Smita has invested Rs. 12,000 and purchased share of FV Rs. 10 at a premium of Rs. 2. Find the number of shares she purchased. Complete the given activity to get the answer. [2]

Activity :

$$FV = 10$$

$$\text{Premium} = \text{Rs. } 2$$

$$\therefore MV = FV + \boxed{\phantom{00}} = \boxed{\phantom{00}} + 2$$

$$= \text{Rs. } 12$$

$$\therefore \text{Number of shares} = \frac{\text{Total investment}}{MV}$$

$$= \frac{12,000}{\boxed{\phantom{00}}}$$

$$= \boxed{\phantom{00}} \text{ shares.}$$

- \*3. The taxable value of a wrist watch belt is Rs. 586. Rate of GST is 18%, then what is the price of the belt for the customer? [2]
- \*4. A share is sold for the market value of Rs. 1,000. Brokerage is paid at the rate of 0.1%. Find the amount received after sale by completing the activity. [3]

Activity :

$$\text{Brokerage} = \boxed{\phantom{00}} \times \text{rate of brokerage}$$

$$= 1000 \times \frac{0.1}{\boxed{\phantom{00}}}$$

$$= 10 \times 0.1$$

$$= \boxed{\phantom{00}}$$

$$\text{Amount received after sale} = MV - \boxed{\phantom{00}}$$

$$= \boxed{\phantom{00}} - 1$$

$$= \text{Rs. } \boxed{\phantom{00}}$$

Mar. '24

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

In the format of GSTIN, there are \_\_\_ alpha-numerals

(A) 9 (B) 10 (C) 15 (D) 16

2. If the face value of a share is ₹ 100 and market value is ₹ 150. If rate of brokerage is 2%, find brokerage paid on one share. [1]

3. The total value (with GST) of remote controlled toy car is ₹ 2360. Rate of GST is 18% on toys. Complete the following activity to find the taxable value for the toy car. [3]

Activity :

Total value for toy car with GST = ₹ 2360

Rate of GST = 18%

Let taxable value for toy car be ₹ x

$$\therefore \text{GST} = \frac{18}{100} \times x$$

$$\therefore \text{Total value for toy car} = \left( \begin{array}{c} \text{taxable value} \\ \text{for toy car} \end{array} \right) + \boxed{\phantom{000}} \dots \text{Formula}$$

$$\therefore 2360 = \boxed{\phantom{000}} + \frac{\boxed{\phantom{000}}}{100} \times x$$

$$\therefore 2360 = \frac{\boxed{\phantom{000}}}{100} \times x$$

$$\therefore 2360 \times 100 = 118x$$

$$\therefore x = \frac{2360 \times 100}{\boxed{\phantom{000}}}$$

$\therefore$  Taxable value for toy car is ₹  $\boxed{\phantom{000}}$

- \*4. 50 shares of face value ₹ 10 were purchased for market value of ₹ 25. [3]  
Company declared 30% dividend on the shares, then find :

- (1) Sum invested  
(2) Dividend received  
(3) Rate of return

**Jul. '23**

\*1. On certain article if rate of CGST is 9%, then what is the rate of SGST and what is the rate of GST? [1]

\*2. Complete the following table using given information : [2]

Sr. No.	FV	Share is at	MV
1.	₹ 10	Premium of ₹ 7	<input type="text"/>
2.	₹ 25	<input type="text"/>	₹ 16
3.	₹ 300	<input type="text"/>	₹ 315
4.	<input type="text"/>	At par	₹ 5

\*3. Mr. Rohit is a retailer. He paid a GST of ₹ 6,500 at the time of purchase. He collected GST of ₹ 8,000 at the time of sale. [2]

(a) Find his input tax and output tax.

(b) What is his input tax credit?

(c) Find his payable GST.

(d) Hence find the payable CGST and SGST.

\*4. Smita has invested ₹ 12,000 and purchased shares of FV ₹ 10 at a premium of ₹ 2. Find the number of shares she purchased. Complete the given activity to get the answer. [3]

Solution :

FV = ₹ 10, Premium = ₹ 2

$$\therefore MV = FV + \boxed{\phantom{00}} = 10 + \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

$$\text{Number of shares} = \frac{\text{Total investment}}{MV}$$

$$= \frac{12,000}{\boxed{\phantom{00}}}$$

$$= \boxed{\phantom{00}} \text{ shares}$$

Ans.: Smita has purchased  shares.

**Mar. '23**

1. On certain article if rate of CGST is 9%, then what is the rate of SGST? [1]  
 2. Complete the following table using given information : [2]

Sr. No.	FV	Share is at	MV
1.	₹ 100	Par	<input type="text"/>
2.	<input type="text"/>	Premium ₹ 500	₹ 575
3.	₹ 10	<input type="text"/>	₹ 5
4.	₹ 200	Discount ₹ 50	<input type="text"/>

3. Courier service agent charged total ₹ 590 to courier a parcel from Nashik to Nagpur. In the tax invoice, taxable value is ₹ 500 on which CGST is ₹ 45 and SGST is ₹ 45. Find the rate of GST charged for this service. [2]  
 4. Complete and write activity from the following. [3]  
 Fill in the boxes with the help of given information :

Tax invoice of services provided (Sample)								
<b>Food Junction, Khed-Shivapur, Pune</b>						Invoice No. 58		
Mob No. 7588580000, email – ahar.khed@yahoo.com								
GSTIN: 27AAAAA5555B1ZA						Invoice Date : 25 Feb., 2020		
SAC	Food items	Qty.	Rate (in ₹)	Taxable amount	CGST		SGST	
9963	Coffee	1	20	20.00	2.5%	₹ 0.50	2.5%	<input type="text"/>
9963	Masala Tea	1	10	10.00	<input type="text"/>	₹ 0.25	2.5%	<input type="text"/>
9963	Masala Dosa	2	60	<input type="text"/>	2.5%	<input type="text"/>	2.5%	₹ 3.00
			Total	150.00	<input type="text"/>	<input type="text"/>		₹ 3.75
Grand Total							= ₹ 157.50	

**Jul. '22 : Excluded (Reduced Syllabus due to Pandemic)****Mar. '22 : Excluded (Reduced Syllabus due to Pandemic)****Jul. '21 : Excluded (Reduced Syllabus due to Pandemic)**

**Mar. '21 : No Exam****Jul. '20**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
In the format of GSTIN there are \_\_\_\_\_ alpha numerals.  
(A) 15 (B) 10 (C) 16 (D) 9
- \*2. A retailer sold two tins of lustre paint and taxable value of each tin is ₹ 2,800. If the rate of GST is 28%, then find the amount of CGST and SGST charged in the tax invoice. [3]
3. Bhujangrao invested ₹ 2,50,590 in shares of F.V. ₹ 10 when M.V is ₹ 250. Rate of brokerage is 0.2% and GST is 18%, then find : [4]  
(a) The number of shares purchased.  
(b) The amount of brokerage paid.  
(c) GST paid for the trading.

**Mar. '20**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
In the format of GSTIN there are \_\_\_\_\_ alpha numerals.  
(A) 15 (B) 10 (C) 16 (D) 9
- \*2. 'Pawan Medical' supplies medicines. On some medicines the rate of GST is 12%, then what is the rate of CGST and SGST? [1]
- \*3. Shri Shantilal has purchased 150 shares of FV ₹ 100, for MV of ₹ 120. Company has paid dividend at 7% then to find the rate of return on his investment, complete the following activity : [3]  
FV = ₹ 100; Number of shares = 150, Market value = ₹ 120
1. Sum invested = MV × No. of shares =  ×   
∴ Sum invested = ₹ 18,000
2. Dividend per share = FV × Rate of dividend =  ×  $\frac{\text{input}}{100}$   
= ₹ 7  
∴ Total dividend received = 150 × 7 =
3. Rate of return =  $\frac{\text{Dividend income}}{\text{Sum invested}} \times 100 = \frac{1050}{18000} \times 100$   
=

**Jul. '19**

1. Market value of a share is ₹ 200. If the brokerage rate is 0.3% then find the purchase value of the share. [2]
2. A ready-made garment shopkeeper gives 5% discount on the dress of ₹ 2,000 and charges 5% GST on the remaining amount. What is the purchase price of the dress for the customer? [3]

**Mar. '19**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

The tax levied by Central Government for trading within a state is \_\_\_\_\_.

(A) IGST                      (B) CGST                      (C) SGST                      (D) UTGST

2. Smita has invested ₹ 12,000 and purchased shares of FV ₹ 10 at a premium of ₹ 2. Find the number of shares she purchased. Complete the given activity to get the answer. [2]

Activity :

FV = ₹ 10, Premium = ₹ 2

$$\therefore MV = FV + \boxed{\phantom{00}} = \boxed{\phantom{00}} + 2 = 12$$

$$\text{No. of shares} = \frac{\text{Total investment}}{\text{MV}}$$

$$= \frac{\boxed{\phantom{00}}}{12} = \boxed{\phantom{00}} \text{ shares}$$

3. Smt. Malhotra purchased solar panels for the taxable value of ₹ 85,000. She sold them for ₹ 90,000. The rate of GST is 5%. Find the ITC of Smt. Malhotra. What is the amount of GST payable by her? [3]

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## 5- Probability

Weightage
8 Marks

**Jul. '24**

- \*1. Which number from the following cannot represent probability ? [1]
- (A)  $\frac{2}{3}$                       (B) 1.5                      (C) 15%                      (D) 0.7
- \*2. Write sample space if one die is thrown.
3. The numbers 2, 4, 6, 8, 10, 12 are on the surface of one die. If this die is rolled once, then complete the activity to find probability of getting a number on upper face is a perfect square. [1]  
[3]

Activity :

$$S = \{ \square \}$$

$$n(S) = \square$$

Condition for event B : Getting a perfect square on the upper surface of that die.

$$B = \{ \square \} \quad \therefore n(B) = \square$$

$$P(B) = \frac{n(B)}{n(S)} = \frac{\square}{6}$$

$$= \square$$

- \*4. Two dice are rolled. Write the sample space 'S' and number of sample points n(S). Also write the events in the set form and number of sample points in the event according to the given condition. [3]
- (a) Condition for event A : Sum of the digits on upper face is a multiple of 5.
- (b) Condition for event B : Sum of the digits on upper face is 25.

**Mar. '24**

- \*1. Two digit numbers are formed using digits 2, 3 and 5 without repeating a digit. Write the sample space. [1]
- \*2. Two coins are tossed simultaneously. Complete the following activity to write the sample and the given events A and B in the set form : [2]
- Event A : To get at least one head.
- Event B : To get no head.

Activity :

Two coins are tossed simultaneously.

∴ Sample space is

$$S = \{\square, HT, TH, \square\}$$

Event A : To get at least one head.

$$\therefore A = \{\square, HT, TH\}$$

Event B : To get no head.

$$\therefore B = \{\square\}$$

3. A card is drawn from well shuffled pack of 52 playing cards. Find the probability that the card drawn is a face card. [2]

4. One coin and a die are thrown simultaneously. Find the probability of the following events : [3]

Event A : To get a head and a prime number.

Event B : To get a tail and an odd number.

**Jul. '23**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Two coins are tossed simultaneously. Write the number of sample points  $n(S)$ .

(A) 2 (B) 8 (C) 4 (D) 6

2. If  $n(S) = 2$  and  $n(A) = 1$ , then find  $P(A)$ . [2]

3. Complete and write activity from the following. [3]

If one die is rolled once, then find the probability of each of the following events :

(a) Number on the upper face is prime.

(b) Number on the upper face is even.

Solution :

'S' is the sample space.

$$\therefore S = \{1, 2, 3, 4, 5, 6\} \quad \therefore n(S) = \square$$

Event A :

Prime number on the upper face.

$$\therefore A = \{2, 3, 5\} \quad \therefore n(A) = \square$$

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

$$\therefore P(A) = \frac{3}{\square} = \square$$

Event B :

Even number on the upper face.

$$\therefore B = \{2, 4, 6\} \quad \therefore n(B) = \boxed{\phantom{00}}$$

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

$$\therefore P(B) = \boxed{\phantom{00}} = \frac{1}{2}$$

- \*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 Pranali. What is the probability of the event that Pranali gets : [3]
- (1) a red balloon      (2) a blue balloon      (3) a green balloon

**Mar. '23**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

If  $n(A) = 2$ ,  $P(A) = \frac{1}{5}$  then find  $n(S) = ?$

- (A) 10      (B)  $\frac{5}{2}$       (C)  $\frac{2}{5}$       (D)  $\frac{1}{3}$

2. If coin is tossed, write the sample space 'S'. [1]
- \*3. Form a 'Road safety committee' of two, from 2 boys ( $B_1, B_2$ ) and 2 girls ( $G_1, G_2$ ). Complete the following activity to write the sample space. [3]

(a) Committee of 2 boys = {  $\boxed{\phantom{00}}$  }

(b) Committee of 2 girls = {  $\boxed{\phantom{00}}$  }

(c) Committee of one boy and one girl = {  $\boxed{B_1, G_1}$ ,  $\boxed{B_1, G_2}$ ,  $\boxed{\phantom{00}}$ ,  $\boxed{\phantom{00}}$  }

(d)  $\therefore$  Sample space = {  $(B_1 B_2)$ ,  $(B_1 G_1)$ ,  $\boxed{\phantom{00}}$ ,  $\boxed{\phantom{00}}$ ,  $(B_2 G_2)$ ,  $(G_1 G_2)$  }

- \*4. A two digit number is formed with digits 2, 3, 5, 7 9 without repetition. [3]  
What is the probability of the following events?  
Event A : The number formed is an odd number.  
Event B : The number formed is a multiple of 5.

Jul. '22 :

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

There are 40 cards in a bag. Each card bears a number from 1 to 40. One card is drawn at random. What is the probability that the card bears a number which is a multiple of 5?

- (A)  $\frac{1}{5}$                       (B)  $\frac{3}{5}$                       (C)  $\frac{4}{5}$                       (D)  $\frac{1}{3}$

2. A die is thrown. Write sample space. [1]

3. Two coins are tossed simultaneously. Find the probability of the event of getting 'no head'. [2]

4. One die is rolled. Complete the following activity, to find the probability that the number on the upper face is prime. [2]

Activity :

'S' is the sample space

$$\therefore S = \{ \square \}$$

$$\therefore n(S) = 6$$

Event A :

Getting prime number on the upper face.

$$A = \{ \square \}$$

$$\therefore n(A) = 3$$

$$\therefore P(A) = \frac{n(A)}{\square} \quad (\text{Formula})$$

$$\therefore P(A) = \square$$

5. From three men and two women environment committee of two persons is to be formed. To find the probabilities of the given events, complete the following activity. [3]

Event A : There must be at least one woman member.

Event B : Committee of one man and one woman to be formed.

Activity :

Let  $M_1, M_2, M_3$  be the three men and  $W_1, W_2$  be the two women.

Out of these men and women, environment committee of 2 persons is to be formed.

$$S = \{M_1M_2, M_1M_3, M_2M_3, M_1W_1, M_1W_2, M_2W_1, M_2W_2, M_3W_1, M_3W_2, \square\}$$

$$\therefore n(S) = 10$$

Event A :

There must be at least one woman member.

$$\therefore A = \{M_1W_1, M_1W_2, \square, M_2W_2, M_3W_1, M_3W_2, W_1W_2\}$$

$$\therefore n(A) = \square$$

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

$$\therefore P(A) = \frac{\square}{10}$$

Event B :

Committee of one man and one woman to be formed.

$$\therefore B = \{M_1W_1, M_1W_2, M_2W_1, \square, M_3W_1, M_3W_2\}$$

$$\therefore n(B) = 6$$

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

$$\therefore P(B) = \frac{6}{10}$$

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

- \*6. Length and breadth of a rectangular garden are 77 metres and 50 metres. There is a circular lake in the garden having diameter 14 m. Due to wind, a towel from a terrace on a nearby building fell into the garden. Then find the probability of the event that it fell in the lake. [3]

**Mar. '22 :**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Which number cannot represent a probability?

- (A) 1.5      (B)  $\frac{2}{3}$       (C) 15%      (D) 0.7

2. Two coins are tossed simultaneously. Write the sample space 'S'. [1]  
 \*3. If one die is rolled, then to find the probability of an event to get prime number on upper face, complete the following activity : [2]

Activity :

One die is rolled.

'S' is the sample space

$$S = \{ \square \}$$

$$\therefore n(S) = 6$$

Event A :

Prime number on the upper face.

$$A = \{ \square \}$$

$$\therefore n(A) = 3$$

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

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

4. A box contains 5 red, 8 blue and 3 green pens. Rutuja wants to pick a pen at random. What is the probability that the pen is blue? [2]

5. A card is drawn at random from a pack of well shuffled 52 playing cards. Complete the following activity to find the probability that the card drawn is – [3]

Event A : The card drawn is an ace.

Event B : The card drawn is a spade.

Activity :

'S' is the sample space

$$\therefore n(S) = 52$$

Event A :

The card drawn is an ace.

$$\therefore n(A) = \square$$

$$P(A) = \frac{\square}{\square}$$

(Formula)

$$\therefore P(A) = \frac{\square}{52}$$

$$\therefore P(A) = \frac{\square}{13}$$

Event B :

The card drawn is a spade

$$\therefore n(B) = \square$$

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

$$\therefore P(B) = \frac{\square}{4}$$

6. A bag contains 8 red and some blue balls. One ball is drawn at random from the bag. If ratio of probability of getting red ball and blue ball is 2 : 5, then find the number of blue balls. [3]

**Jul. '21 :**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

Which number cannot represent a probability?

- (A)  $\frac{2}{3}$  (B) 1.5 (C) 15% (D) 0.7

2. If two coins are tossed simultaneously then write the sample space. [1]  
 \*3. A die is rolled. Complete the following activity to find the probability of getting a prime number on the upper face of die. [2]

Activity :

'S' is the sample space for the die rolled.

$$\therefore S = \{ \square \} \quad \therefore n(S) = 6$$

Event A : To get the prime number on the upper face.

$$\therefore A = \{ \square \} \quad \therefore n(A) = 3$$

$$\therefore P(A) = \frac{\square}{n(S)} \quad \text{(Formula)}$$

$$P(A) = \frac{3}{6}$$

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

- \*4. A box contains 5 strawberry chocolates, 6 coffee chocolates and 2 peppermint chocolates. Find the probability that chocolate picked at random from the box is a coffee chocolate. [2]

5. A two digit number is to be formed from the digits 2, 3, 5 without repetition of the digits. Complete the following activity to find the probability that the number so formed is an odd number. [3]

Activity :

Let 'S' be the sample space.

$$\therefore S = \{23, 25, 32, \square, 52, 53\}$$

$$\therefore n(S) = \square$$

Now condition for event 'A' is that the number so formed is an odd number.

$$\therefore A = \{23, 25, \square, 53\} \quad \therefore n(A) = 4$$

$$\therefore P(A) = \frac{\square}{n(S)} \quad \dots(\text{Formula})$$

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

$$\therefore P(A) = \frac{\square}{3}$$

6. A die rolled and a coin is tossed simultaneously. Write the sample space 'S' and number of sample points  $n(S)$ . Also write the events A and B in set form and their number of sample points according to the given condition. [3]
- (a) Condition for event A : To get a head or tail on the coin and a number divisible by 3 on the upper face of die.
- \* (b) Condition for event B : To get a number on the upper face of die greater than 7 and a head on the coin.

**Mar. '21 : No Exam**

**Jul. '20**

1. A die is rolled then write the sample space 'S' and number of sample point  $n(S)$ . [1]
2. For the following experiments, write sample space 'S' and number of sample points  $n(S)$  : [2]
- Two digit numbers are formed using the digits 2, 3 and 5 without repeating a digit.
3. A card is drawn from a well shuffled pack of 52 playing cards. Complete the activity to find the probability of the event that the card drawn is a red card. [3]

Activity :

'S' is the sample space.  $n(S) = 52$

Event A :

Card drawn is a red card

Total number of red cards =  hearts +  diamonds

$$\therefore n(A) = \square$$

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

$$\therefore P(A) = \frac{\square}{52}$$

$$\therefore P(A) = \square$$

4. Six faces of a die are as shown below : [3]

A  B  C  D  E  O

If the die is rolled once, find the probability of event 'M' that 'English vowel appears on upper face'.

**Mar. '20**

- \*1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

If  $n(A) = 2$ ,  $P(A) = \frac{1}{5}$  then find  $n(S) = ?$

- (A)  $\frac{2}{5}$                       (B)  $\frac{5}{2}$                       (C) 10                      (D)  $\frac{1}{3}$

- \*2. Complete the following activity and rewrite it. [2]

A card is drawn from a well shuffled pack of 52 playing cards. Find the probability of the event, the card drawn is a red card.

Activity :

Suppose 'S' is the sample space.

$$\therefore n(S) = 52$$

Event A : Card drawn is a red card.

Total number of red cards =  hearts + 13 diamonds

$$\therefore n(A) = \text{$$

$$P(A) = \frac{\text{$$

$$\therefore P(A) = \frac{26}{52}$$

$$\therefore P(A) = \text{$$

- \*3. A two digit number is formed with the digits 2, 3, 5, 7, 9 without repetition. [2]

What is the probability that the number formed is an odd number?

- \*4. A balloon vendor has 2 red, 3 blue and 4 green balloons. He wants to [3]

choose one of them at random to give it to Pranali. What is the probability of the event that Pranali gets,

- (a) a red balloon                      (b) a blue balloon

**Jul. '19**

1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]

If  $n(A) = 2$ ,  $P(A) = \frac{1}{5}$  then find  $n(S) = ?$

- (A)  $\frac{2}{5}$                       (B)  $\frac{5}{2}$                       (C) 10                      (D)  $\frac{1}{3}$

2. There are 9 tickets in a box, each bearing one of the numbers from 1 to 9. One ticket is drawn at random from the box. [2]

Event A : Ticket drawn shows an even number.

Complete the following activity from the given information :

Activity :

$$S = \{ \square \}$$

$$n(S) = \square$$

$$A = \{ \square \}$$

$$n(A) = \square$$

3. A bag contains 3 Red, 3 White, 3 Green, and 3 Black Balls. One ball is picked up from the bag at random. What is the probability that the ball drawn is : (a) White (b) not White [3]
4. A student made a cube-shaped die from a card sheet. Instead of writing numbers 1, 2, 3, 4, 5, 6 on its face, he wrote letters a, b, c, d, e, f one on each face randomly. If he rolls the die twice, find the probability that he gets vowel on the upper face both the times. [3]

**Mar. '19**

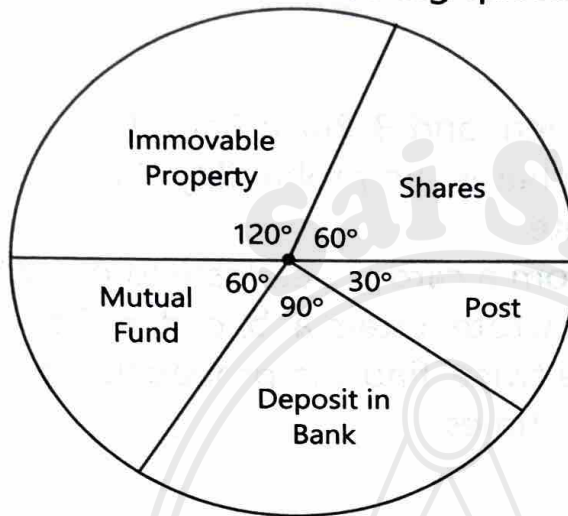
1. Choose the correct answer and write the alphabet of it in front of the sub-question number. [1]  
If a die is rolled, what is the probability that number appearing on upper face is less than 2?  
(A)  $\frac{1}{3}$  (B)  $\frac{1}{2}$  (C) 1 (D)  $\frac{1}{6}$
2. Two coins are tossed simultaneously. Complete the following activity of writing the sample space (S) and expected outcomes of the events : [2]  
(i) Event A : to get at least one head.  
(ii) Event B : to get no head.  
Activity :  
If two coins are tossed simultaneously  
 $\therefore S = \{ \square, HT, TH, \square \}$   
(i) Event A : at least getting one head.  $A = \{ HH, \square, TH \}$   
(ii) Event B : to get no head.  $B = \{ \square \}$
3. A two digit number is to be formed from the digits 0, 1, 2, 3. Repetition of the digits is allowed. Find the probability that a number so formed is a prime number. [3]

## 6- Statistics

Weightage  
12 Marks

**Jul. '24**

- \*1. The annual investments of a family are shown in the following pie-diagram. Answer the following questions based on it. [2]



- (a) If the investment in the shares is Rs. 2,000, find the total investment.  
 (b) How much amount is invested in the Post?
- \*2. In the following table, the toll (in Rs.) paid from 6 am to 6 pm by drivers and the number of vehicles is shown. Find the mean of the toll by 'assumed mean' method. [3]

Toll (Rs.)	No. of Vehicles
300 – 400	80
400 – 500	110
500 – 600	120
600 – 700	70
700 – 800	40

3. In one group of students; 10% students got 0 to 20 marks; 20% students got 20 to 40 marks; 35% students got 40 to 60 marks; 20% students got 60 to 80 marks and remaining 30 students got 80 to 100 marks, then : [4]  
 (a) Prepare a grouped frequency distribution table.  
 (b) Find the mode of the marks scored.
4. Draw histogram of the following data : [3]

Students I.Q.	Number of Students
60 – 80	4
80 – 100	12
100 – 120	16
120 – 140	8

Mar. '24

1. The following table shows classification of number of workers and number of hours they work in software company. Prepare less than upper limit type cumulative frequency distribution table : [2]

Number of hours daily	Number of workers
8-10	150
10-12	500
12-14	300
14-16	50

2. The following frequency distribution table shows the classification of the number of vehicles and the volume of petrol filled in them. To find the mode of the volume of petrol filled, complete the following activity. [3]

Class (Petrol filled in Liters)	Frequency (Number of Vehicles)
0.5-3.5	33
3.5-6.5	40
6.5-9.5	27
9.5-12.5	18
12.5-15.5	12

Activity :

From the given table,

Modal class = 

$$\therefore \text{Mode} = \boxed{\phantom{00}} + \left[ \frac{f_1 - f_0}{2f_1 - f_0 - \boxed{\phantom{00}}} \right] \times h$$

$$\therefore \text{Mode} = 3.5 + \left[ \frac{40 - 33}{2(40) - 33 - 27} \right] \times \boxed{\phantom{00}}$$

$$\therefore \text{Mode} = 3.5 + \left[ \frac{7}{80 - 60} \right] \times 3$$

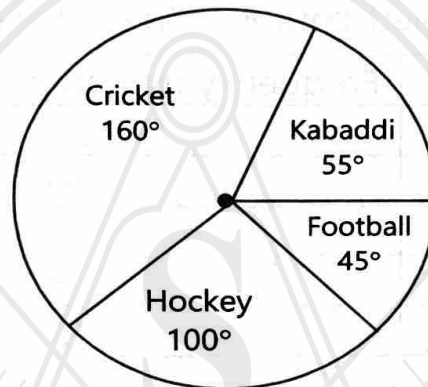
$$\therefore \text{Mode} = \boxed{\phantom{00}}$$

$\therefore$  The mode of the volume of petrol filled is

3. The following table shows the classification of percentage of marks of students and the number of students. Draw frequency polygon from the table without drawing histogram : [4]

Result (Percentage)	Number of students
20–40	25
40–60	65
60–80	80
80–100	15

4. In the given figure, the pie diagram represents the amount spent on different sports by a school administration in a year. If the money spent on football is ₹ 9,000, answer the following questions : [3]



- (a) What is the total amount spent on sports ?  
 (b) What is the amount spent on cricket ?

### Jul. '23

1. Find the Mean from the given values :  $\sum x_i f_i = 1265$ ;  $N = 50$ . [2]  
 \*2. The following table shows the number of students of class X and the time they utilized daily for their studies. Find the mean time spent by 50 students for their studies by direct method : [3]

Time (hrs)	No. of students
0 – 2	7
2 – 4	18
4 – 6	12
6 – 8	10
8 – 10	3

3. Draw a pie diagram to represent the world population given in the following table : [4]

Country	Japan	England	India	China
Percentage of World Population	20	10	40	30

4. Represent the following data using histogram : [3]

Daily income (₹)	No. of workers
130 – 135	4
135 – 140	7
140 – 145	14
145 – 150	16

Mar. '23

1. The frequency distribution table shows the number of mango trees in a grove and their yield of mangoes. Find the median of data. [3]

No. of Mangoes	50–100	100–150	150–200	200–250	250–300
No. of trees	33	30	90	80	17

2. Observe the following table and find Mean : [2]  
Assumed Mean  $A = 300$

Class	Class mark $x_i$	$d_i = x_i - A$	Frequency $f_i$	Frequency $\times$ Deviation $f_i d_i$
200 – 240	220	- 80	5	- 400
240 – 280	260	- 40	10	- 400
280 – 320	300 $\rightarrow A$	0	15	0
320 – 360	340	40	12	480
360 – 400	380	80	8	640
Total			$\Sigma f_i = 50$	$\Sigma f_i d_i = 320$

- Show the following data by a frequency polygon : [4]

Electricity bill (₹)	200 – 400	400 – 600	600 – 800	800 – 1000	1000 – 1200
Families	240	300	450	350	160

4. A survey was conducted for 180 people in a city. 70 ate pizza, 60 ate burgers and 50 ate chips. Draw a pie diagram for the given information. [3]

**Jul. '22 : Excluded (Reduced Syllabus due to Pandemic)**

**Mar. '22 : Excluded (Reduced Syllabus due to Pandemic)**

**Jul. '21 : Excluded (Reduced Syllabus due to Pandemic)**

**Mar. '21 : No Exam due to Pandemic.**

**Jul. '20**

1. If  $\sum f_i d_i = 108$  and  $\sum f_i = 100$ , then find  $\bar{d} = ?$
- \*2. Complete the activity to prepare a table showing the co-ordinates which are necessary to draw a frequency polygon :

Class	18 – 19	19 – 20	20 – 21	<input type="text"/>
Class Mark	18.5	19.5	<input type="text"/>	21.5
Frequency	4	<input type="text"/>	15	19
Co-ordinates of point	<input type="text"/>	(19.5, 13)	(20.5, 15)	(21.5, 19)

- \*3. The following table shows causes of noise pollution. Find the measure of central angles for each, to draw a pie diagram.

Construction	Traffic	Aircraft take offs	Industry
10%	50%	15%	25%

- \*4. Time allotted for the preparation of an examination by some students is shown in the table. Draw a histogram to show this information :

Time (minutes)	No. of students
60 – 80	14
80 – 100	20
100 – 120	24
120 – 140	22

5. The following table shows frequency distribution of number of trees planted by students in the school :

No. of trees planted	No. of students
0 – 10	30
10 – 20	70
20 – 30	100
30 – 40	70
40 – 50	40

Find the mode of trees planted.

Mar. '20

1. If  $L = 10$ ,  $f_1 = 70$ ,  $f_0 = 58$ ,  $f_2 = 42$ ,  $h = 2$ , then find the mode by using formula. [2]
2. Complete the following activity and rewrite it. [3]

Age group (in years)	No. of persons	Measure of Central Angle
20 – 25	80	$\frac{\square}{200} \times 360^\circ = \square$
25 – 30	60	$\frac{60}{200} \times 360^\circ = \square$
30 – 35	35	$\frac{35}{200} \times \square = 63^\circ$
35 – 40	25	$\frac{25}{200} \times 360^\circ = \square$
Total	200	$\square$

3. A milk centre sold milk to 50 customers. The table below gives the number of customers and the milk they purchased. Find the mean of the milk sold by direct method : [3]

Milk sold (litres)	No. of customers
1 – 2	17
2 – 3	13
3 – 4	10
4 – 5	7
5 – 6	3

4. Represent the following data by histogram : [4]

Price of sugar (per kg in ₹)	Number of weeks
18 – 20	4
20 – 22	8
22 – 24	22
24 – 26	12
26 – 28	6
28 – 30	8

**Jul. '19**

- \*1. Find the mode from the following information :

$$L = 10, f_1 = 70, f_0 = 58, f_2 = 42, h = 2$$

2. 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 :

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

3. The time required for some students to complete a science experiment and the number of students is shown in the following grouped frequency distribution table. Draw the frequency polygon with the help of histogram using the given information :

Time required for experiment (minutes)	Number of students
20 – 22	6
22 – 24	14
24 – 26	20
26 – 28	16
28 – 30	12
30 – 32	10

**Mar. '19**

1. The following frequency distribution table shows marks obtained by 180 students in Mathematics examination :

Marks	No. of students
0 – 10	25
10 – 20	x
20 – 30	30
30 – 40	2x
40 – 50	65

Find the value of x.

Also draw a histogram representing the above information.

2. The following table shows the daily supply of electricity to different places in a town. To show the information by a pie diagram, measures of central angles of sectors are to be decided. [2]

Complete the following activity to find the measures :

Places	Supply of electricity (Thousand units)	Measure of Central Angle
Roads	4	$\frac{4}{30} \times 360^\circ = 48^\circ$
Factories	12	$\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}} \times 360^\circ = 144^\circ$
Shops	6	$\frac{6}{30} \times 360^\circ = \boxed{\phantom{00}}$
Houses	8	$\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}} \times 360^\circ = \boxed{\phantom{00}}$
Total	30	

3. The following frequency distribution table shows the distances travelled by some rickshaws in a day. Observe the table and answer the following questions : [3]

Class (Daily distance travelled in km)	Continuous Classes	Frequency (Number of rickshaws)	Cumulative Frequency
60 – 64	59.5 – 64.5	10	10
65 – 69	64.5 – 69.5	34	10 + 34 = 44
70 – 74	69.5 – 74.5	58	44 + 58 = 102
75 – 79	74.5 – 79.5	82	102 + 82 = 184
80 – 84	79.5 – 84.5	10	184 + 10 = 194
85 – 89	84.5 – 89.5	6	194 + 6 = 200

- Which is the modal class? Why?
- Which is the median class? Why?
- Write the cumulative frequency (C.F.) of the class preceding the median class.
- What is the class interval (h) to calculate median?