

ALGEBRA PRELIM: PAPER 1

Q.1 A) Solve Multiple choice questions.

(4)

- 1) Which of the following is a linear equation in two variables.
 - a. $2x^2 - 3x - 6 = 0$
 - b. $2\sqrt{x} + 4\sqrt{y} = 8$
 - c. $\frac{3}{x^2} + \frac{2}{y^2} = 4$
 - d. $0.7x + 0.8y = 2$

- 2) If the roots of $x^2 + kx + k = 0$ are real and equal, what is the value of k?
 - a. 0 b. 4 c. 0 or 4 d. 2

- 3) If the roots of the given quadratic equation are real and equal then find the value of 'k': $x^2 + 2x + k = 0$
 - a. 1 b. -1 c. 2 d. -2

- 4) Rate of GST on brokerage is
 - a. 5% b. 12% c. 18% d. 28%



B) Solve the following questions.

(4)

- 1) Make the classes exclusive 11-20, 21-30.

- 2) In a hockey team there are 6 defenders, 4 offenders and 1 goalee. Out of these, one player is to be selected randomly as a captain. Find the probability of the selection that - The goalee will be selected.

- 3) A trader from Surat, Gujarat sold cotton clothes to a trader in Rajkot, Gujarat. The taxable value of cotton clothes is Rs. 2.5 lacs. What is the amount of GST at 5% paid by the trader in Rajkot ?

- 4) If $a = 1, b = 4, c = -5$ then find the value of $b^2 - 4ac$.

Q.2 A) Complete the following Activities. (Any Two)

(4)

- 1) Shri Shantilal has purchased 150 shares of FV Rs. 100, for MV of Rs. 120. Company has paid dividend at 7%. Find the rate of return on his investment.

Face value of share	= Rs. 100
Dividend on one share	= 7% of Rs. 100
	= $\frac{7}{100} \times 100$
	= Rs. _____
\therefore Dividend on 150 shares	= _____ $\times 7$
	= Rs. 1050
Market value of share	= Rs. 120
\therefore Total investment	= 150×120
	= Rs. _____



$$\therefore \text{Rate of return} = \underline{\hspace{2cm}} \times 100$$

$$= \underline{\hspace{2cm}} \times 100$$



$$\therefore \text{Rate of return} = \underline{\hspace{2cm}}$$

- 2) The maximum bowling speed (km/h) of 33 players at a cricket coaching centre is given in the following table. Find the modal bowling speed of a player.

Bowling speed (km/h)	Number of players frequency (c.f)
85 - 100	9
100 - 115	11
115 - 130	8
130 - 145	5

Here, $L = 100$, $f_m = 11$, $f_1 = 9$, $f_2 = 8$, $h = 15$.

$$\text{Mode} = \underline{\hspace{2cm}}$$

... (Formula)

... (Substituting the values)

$$= 100 + \left[\frac{11 - 9}{2(11) - 9 - 8} \right] \times 15$$

$$= 100 + \underline{\hspace{2cm}} \times 15$$

$$= 100 + \underline{\hspace{2cm}}$$

$$= 100 + 6 = \underline{\hspace{2cm}}$$



The modal bowling speed of a player is $\underline{\hspace{2cm}}$ km/h.

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

$$\begin{aligned} x^2 + 8x - 20 &= 0 \\ x^2 + \underline{\hspace{2cm}} - 2x - 20 &= 0 \\ x(x + 10) - \underline{\hspace{2cm}}(x + 10) &= 0 \\ (x + 10) \underline{\hspace{2cm}} &= 0 \\ x = \underline{\hspace{2cm}} \text{ or } x = 2 \end{aligned}$$

B) Solve the following questions. (Any four)

(8)

- 1) The taxable value of a wrist watch belt is Rs. 586. Rate of GST is 18%. Then what is price of the belt for the customer?
- 2) In an A.P., $a = 10$ and $d = -3$ then find its first four terms.
- 3) Given below is the frequency distribution of marks scored by the students:

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Number of students	3	10	20	5	2

Calculate mean marks scored by a student by using 'Direct Method'.

- 4) Find the value of p for which $3x + y = 10$ and $9x + py = 23$ have unique solution.

- 5) Determine the nature of roots of the following quadratic equations from their discriminant.
 $m^2 + 2m + 9 = 0$

Q.3 A) Complete the following Activity (Any one)

(3)

- 1) Complete the following activity to find the sum of all even numbers from 1 to 100.
 Even numbers from 1 to 100 are

_____, 4, 6, 8, ... _____

$\therefore t_n = 100, a = 2, d = \underline{\hspace{2cm}}$

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

$\therefore 100 = 2 + (n - 1) 2$

$\therefore n = \underline{\hspace{2cm}}$

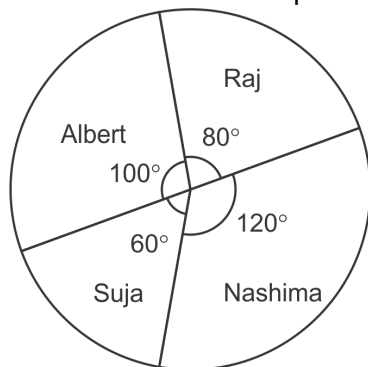
$S_n = \frac{n}{2} (t_1 + t_n)$

$\therefore S_n = \underline{\hspace{2cm}}$



- 2) The following pie diagram represents the number of valid votes obtained by four students who contested for school captain.

The total of valid votes polled was 720. Answer the following question:



- a) Who has won the election?
 b) What is the minimum number of votes? who got it?
 c) By how many votes did the winner defeat the nearest contestant?

Let 'a' be the no. of votes received by Albert
 Total no. of votes 720 corresponds of central angle 360°

Central angle for Albert = _____ × 360°

$\therefore 100 = \frac{a}{720} \times 360$

$\therefore 100 \times 2 = a$

\therefore Votes received by Albert = _____

Let 'b' be the no. of votes received by Raj
 Total no. of votes 720 corresponds of central angle 360°

\therefore Central angle for Raj = _____ $\times 360^\circ$

$\therefore 80 = \frac{b}{720} \times 360$

$\therefore b = 80 \times 2$

\therefore Votes received by Raj = _____

Let 'c' be the no. of votes received by Suja

Total no. of votes 720 corresponds of central angle 360°

Central angle for Raj = _____ $\times 360^\circ$

$\therefore 60 = \frac{c}{720} \times 360$

$\therefore c = 60 \times 2$

\therefore Votes received by Suja = _____

Let 'd' be the no. of votes received by Namisha

Total no. of votes 720 corresponds of central angle 360°

Central angle for Namisha = _____ $\times 360^\circ$

$\therefore 120 = \frac{d}{720} \times 360$

$\therefore d = 120 \times 2$

\therefore Votes received by Namisha = _____



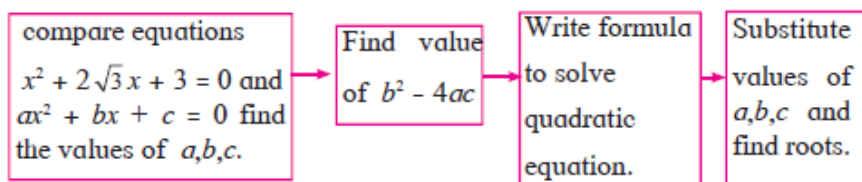
B) Solve the following questions. (Any two)

(6)

1) In factory the ratio of salary of skilled and unskilled workers is 5 : 3. Total salary of one day of both of them is Rs. 720. Find daily wages of skilled and unskilled workers.

2)

Solve $x^2 + 2\sqrt{3}x + 3 = 0$ by using formula and complete the following flow chart.



3) There are three boys and three girls. An environment committee of two is to be formed. Write the sample space S, the number of sample points n(S). Express the following events and find the total number of elements in the following events: A is the event that the committee should

contain at least two girls. B is the event that the committee should contain both the boys. C is the event that there is only one girl in the committee. D is the event that there is at the most one boy in the committee.

- 4) Find how many three digit natural numbers are divisible by 5.



Q.4 Solve the following questions. (Any two)

(8)

1)

Two years ago, my age was $4\frac{1}{2}$ times the age of my son. Six years ago, my age was twice the square of the age of my son. What is the present age of my son?

- 2) A card is drawn at random from well-shuffled pack of 52 playing cards. Find the probability that the card drawn is

- a. i. King ii. A face card iii. A red card.
 b. i. Jack of hearts ii. A diamond iii. Not a diamond.

- 3) In a tree plantation programme, the number of trees planted by students of different classes is given in the following table. Draw a pie diagram showing the information.

Standard	5 th	6 th	7 th	8 th	9 th	10 th
No. of trees	40	50	75	50	70	75

Q.5 Solve the following questions. (Any one)

(3)

- 1) A man spent Rs. 2800 on buying a number of plants priced at Rs. x each. Because of the number involved, the supplier reduced the price of each plant by Rupee 1. The man finally paid Rs. 2730 and received 10 more plants. Find x.
- 2) Difference between two numbers is 3. The sum of three times the bigger number and two times the smaller number is 19. Then find the numbers.

