Q.1A   Solve Any FOUR of the following: **[4]**

1)   Mr. Mayank (age 27 years) and Mr. Anil (age 66 years) both have taxable income Rs. 8,00,000. Who will have to pay less income tax?

2)   Multiply and write the answer in the simplest form
$5\sqrt{8} \times 2\sqrt{8}$

3)   The marks (out of 100) obtained by 7 students in Mathematics examination are given below. Find the mode for these marks.
99, 100, 95, 100, 100, 60, 90

4)   Determine whether $(x - 1)$ is a factor of $x^4 + 3x^2 - 5x + 1$.

5)   Find the reduced form of ratio of first number to second number: 72, 60

6)   Let all the students of a class form a Universal set. Let set A be the students who secure 50% or more marks in Maths. Then write the complement of set A.

Q.1B   Solve Any TWO of the following: **[4]**

1)   Decide whether set A and B are equal sets. Give reason for your answer.
A = Even prime numbers
B = {x | 7x – 1 = 13}

2)   If the polynomial $y^3 - 5y^2 + 7y + m$ is divided by $y + 2$, the remainder is 50. Find the value of m.

3)   A sports club has organized a table tennis tournaments. The following table gives the distribution of player's ages. Find the cumulative frequencies equal to or more than the lower class limit and complete the table.

Age	Tally marks	Frequency (No. of students)	Equal to lower limit or more than lower limit.
10 – 12	꧄ IIII	09	50
12 – 14	꧄ ꧄ ꧄ ꧄ III	☐	☐ – 9 = 41
14 – 16	꧄ ꧄ III	☐	41 – 23 = ☐
16 – 18	꧄	05	☐ – 13 = ☐
		Total N = 50	

Q.2A   Choose the correct alternative: **[4]**

1)   Identify the linear equation in two variables from the following.
A) $\sqrt{3x} + \sqrt{5y} = 10$ B) $5x - 0y - 14 = 0$
C) $\frac{4}{x} + \frac{5}{y} = 4$ D) $3x^2 - 7y = 13$

2)   A die is thrown. The probability of getting a prime number is
A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) $\frac{2}{3}$ D) $\frac{5}{6}$

3)   If for any A.P. d = 5, then $t_{18} - t_{13} =$
A) 5   B) 20   C) 25   D) 30

4)   The roots of the quadratic equation $9x^2 - 6x + 1 = 0$ are
A) real and equal   B) not real   C) real and unequal   D) none of these

Q.2B   Solve Any TWO of the following   **[4]**

1)   The members of M.Y. mandal collected the following amounts in rupees to help the earthquake affected people:
158, 238, 453, 134, 240, 343, 495, 230, 178, 275, 245, 175, 334, 248, 305,120, 225, 210, 437, 160, 235, 290, 200, 320, 190, 240, 420, 245, 320, 150, 201, 105, 298, 240, 330, 101, 155, 410, 451, 221
Prepare a grouped frequency distribution table taking classes 100 – 200, 200 – 300………

Hence prepare a table showing the cumulative frequency less than the upper class.

2) The arrow is rotated and it stops randomly on the disc. Write the number of sample points n(S) and find out on which colour it may stop.
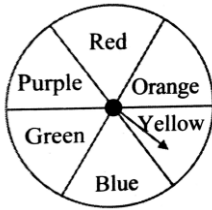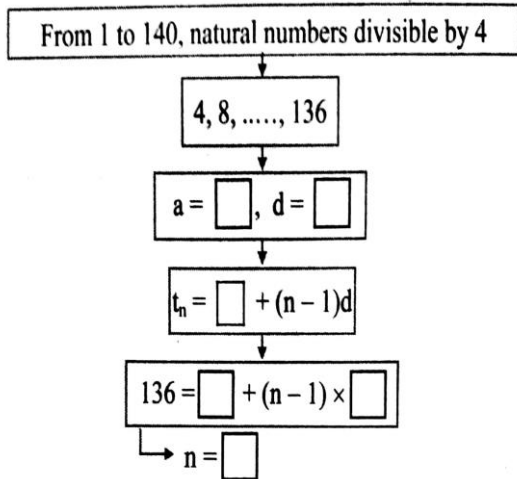

3) Determine the A.P. whose 3rd term is 5 and the 7th term is 9.

Q.3A Solve Any TWO of the following [4]

1) Complete the following activity to find how many natural numbers between 1 and 140 are divisible by 4.

From 1 to 140, natural numbers divisible by 4

$$4, 8, ..., 136$$

$$a = \boxed{}, \ d = \boxed{}$$

$$t_n = \boxed{} + (n-1)d$$

$$136 = \boxed{} + (n-1) \times \boxed{}$$

$$n = \boxed{}$$

2) Smita has invested Rs. 12,000 and purchased shares 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.

FV = Rs. 10, Premium = Rs. 2

$$\therefore \quad MV = \boxed{} + \boxed{}$$

$$= \boxed{} + \boxed{} = \boxed{}$$

$$\therefore \quad \text{No. of shares} = \frac{\text{Total investment}}{MV} = \frac{12000}{\boxed{}}$$

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

$$\therefore \quad \text{Smita has purchased} \boxed{} \text{ shares.}$$

3) $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ to solve this quadratic equation by factorization, complete the following activity.

$$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$$

$$\therefore \sqrt{2}x^2 + \boxed{} + \boxed{} + 5\sqrt{2} = 0$$

$$\therefore x\boxed{} + \sqrt{2}\boxed{} = 0$$

$$\therefore \boxed{}(x + \sqrt{2}) = 0$$

$$\therefore \boxed{} = 0 \text{ or } (x + \sqrt{2}) = 0$$

$$\therefore x = \boxed{} \text{ or } x = -\sqrt{2}$$

$$\therefore \boxed{} \text{ and } -\sqrt{2} \text{ are roots of the equation.}$$

Q.3B Solve Any TWO of the following [4]

1) Find the roots of the equation $2x^2 - 5x + 3 = 0$ by factorization.

2) A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a house hold.

Family size	$1 - 3$	$3 - 5$	$5 - 7$	$7 - 9$	$9 - 11$

| Number of families	7	8	2	2	1

Find the mode of this data.

3) Write sample space 'S' and number of sample points n(S) for the following experiment. Also, write events. A in the set form and write n(A).

One coin and one die are thrown simultaneously.

Condition for event A: To get a head or tail and an even number.

Q.4 Solve Any THREE of the following [9]

1) If one of the root of quadratic equation $x^2 - 10x + 2k = 0$ is $(h + 2\sqrt{6})$, find the values of 'h' and 'k'.

2) Length and breadth of a rectangular garden are 77 m and 50 m. 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.

77 m
50 m
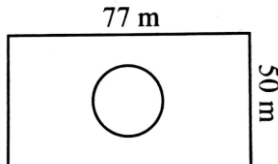
3) A survey of students was made to know which game they like. The data obtained in the survey is presented in the adjacent pie diagram. If the total number of students are 1000,
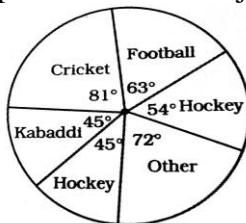
a) How many students like cricket?
b) How many students like football?
c) How many students prefer other games?

4) A man borrows Rs. 8000 and agrees to repay with a total interest of Rs. 1360 in 12 monthly instalments. Each instalment being less than the preceding one by Rs. 40. Find the amount of the first instalment.

Q.5 Solve Any ONE of the following: [4]

1) The following determinants are obtained from the simultaneous equations in variables x and y.

$D_X = \begin{vmatrix} -11 & a \\ 9 & -4 \end{vmatrix}$, $D_y = \begin{vmatrix} 3 & -11 \\ b & 9 \end{vmatrix}$, $D = \begin{vmatrix} 3 & 2 \\ 7 & -4 \end{vmatrix}$

The solution of the equations are $x = -1$ and $y = -4$. Find the values of a and b. Also find the original simultaneous equations having this solution.

2) Pankajrao invested Rs. 1, 25, 295 in shares of FV Rs. 10 when MV is Rs. 125. Rate of brokerage is 0.2% and GST is 18%. Then find (1) How many shares were purchased (2) the amount of brokerage paid and (3) GST paid for trading.

Q.6 Solve Any ONE of the following [3]

1) A company provided Z-security services for the taxable value of Rs. 64,500. Rate of GST is 18%. Company had paid GST of Rs. 1550 for laundry services and uniforms etc. What is the amount of ITC? Find the amount of CGST and SGST payable by the company.

2) AB is a segment. The point 'P' is on the perpendicular bisector of segment AB such that length of AP exceeds length of AB by 7 cm. If the perimeter of ΔABP is 38 cm. Find the sides of ΔABP.