BOARD QUESTION PAPER: MARCH 2025

Mathematics Part - I

Time: 2 Hours **Max. Marks: 40**

Note:

i. *All* questions are compulsory.
ii. Use of a calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.

Q.1. (A) Choose the correct alternative from given: **[4]**

i. $\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$. Write the degree of the given determinant.

(A) 1 (B) 2
(C) 3 (D) 4

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

iii. Find the common difference of the following A.P.:
4, 4, 4, …

(A) 1 (B) 8
(C) 4 (D) 0

iv. Which number cannot represent a probability?

(A) $\frac{2}{3}$ (B) $\frac{15}{10}$
(C) 15% (D) 0.7

(B) Solve the following subquestions: **[4]**

i. If $2x + y = 7$ and $x + 2y = 11$, then find the value of $x + y$.

ii. Find the first term of the given sequence: $t_n = 3n - 4$.

iii. How many alpha numerals are there in the format of GSTIN?

iv. Two coins are tossed simultaneously. Write the sample space S.

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

i. Complete the following table to draw the graph of $x + 2y = 4$.

Activity:

x	-2	☐
y	☐	1
(x, y)	☐	☐

ii. Complete the following activity to form a quadratic equation.

Activity:

I am a quadratic equation.

↓

My standard form is ☐ .

↓

My roots are 5 and 12.

↓

Sum of my roots ☐ .

↓

Product of my roots ☐ .

↓

My quadratic equation is ☐ .

iii. Pushpmala has invested ₹ 24,000 and purchased share of FV ₹ 20 at a premium of ₹ 4. Complete the following activity to find the number of shares she purchased.

Activity:

FV = ₹ 20

Premium = ₹ 4

MV = FV + ☐

= 20 + ☐

= ₹ 24

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

$$= \frac{24,000}{\square}$$

= ☐ shares.

(B) Solve any *four* subquestions from the following: **[8]**

i. Solve the following simultaneous equations:
$x + y = 3;\ 3x - 2y = 4$

ii. Solve the following quadratic equation by factorisation method:
$m^2 + 14m + 13 = 0$

iii. Find the 19th term of the following A.P.:
7, 13, 19, 25, …

iv. A share is sold for the market value of ₹ 2,000. Brokerage is paid at the rate of 0.5%. What is the amount received after the sale?

v. The following table shows the number of students and the time they utilized daily for their studies. Find the mean time spent by the students for their studies.

Class Time (In hours)	Class Marks (x_i)	No. of Students (f_i)	f_ix_i
0 – 2	1	8	08
2 – 4	3	14	42
4 – 6	5	18	90
6 – 8	7	10	70
8 – 10	9	10	90

Q.3. (A) Complete and write any *one* activity from the following: **[3]**

i. Shri Maniklal has purchased 300 shares of F.V. ₹ 100, for M.V. ₹ 120. Company has paid dividend at 7%. Complete the following activity to find the rate of return on his investment.

Activity:

F.V. = ₹ 100

Number of shares = 300

Market value = ₹ 120

a. Sum invested = M.V. × No. of shares

∴ = [ ] × [ ]

= ₹ 36,000

b. Dividend per share = F.V. × rate of dividend

= [ ] × $\frac{[\ ]}{100}$

= ₹ 7

∴ Total dividend received = 300 × 7

= ₹ [ ]

c. Rate of return = $\frac{\text{Dividend income}}{\text{Sum invested}} \times 100$

= $\frac{2{,}100}{36{,}000} \times 100$

= [ ] %.

ii. 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.

Activity:

Let S be the sample space.

∴ S = {23, 25, 32, [ ], 52, 53}

∴ n(S) = [ ]

Event A: The number so formed is an odd number.

∴ A = {23, 25, [ ], 53}

∴ n(A) = 4

∴ P(A) = $\frac{[\ ]}{n(S)}$ …[Formula]

∴ P(A) = $\frac{[\ ]}{6}$

∴ P(A) = $\frac{[\ ]}{3}$

(B) Solve any *two* subquestions from the following: **[6]**

i. Solve the following simultaneous equations by Cramer's rule:

$4x + 3y = 18$; $3x - 2y = 5$

ii. Solve the following quadratic equation by using formula method:

$x^2 - 2x - 3 = 0$

iii. A committee of two members is to be formed from three boys and two girls. Find the probability of the following events:

Event A: At least one girl must be a member of the committee.

Event B: Committee must be of one boy and one girl.

iv. In a general store the prices of different articles and its demand is shown in the following frequency distribution table. Find the Median of the prices.

Price in Rupees	No. of Articles
Less than 20	140
20 – 40	100
40 – 60	80
60 – 80	60
80 – 100	20

Q.4. Solve any *two* subquestions from the following: **[8]**

i. Find the value of 'm' if the quadratic equation
$(m - 12)\,x^2 + 2(m - 12)\,x + 2 = 0$
has real and equal roots.

ii. A farmer borrows ₹ 1,000 and agrees to repay with a total interest of ₹ 140, in 12 instalments. Each instalment being less than the preceding instalment by ₹ 10. What should be the amount of his first and last instalment?

iii. The following table shows the marks of 180 students in Mathematics.

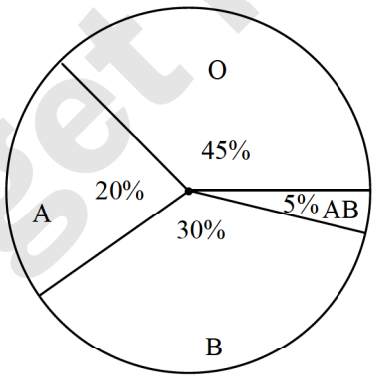
Marks	No. of Students
0 – 10	25
10 – 20	x
20 – 30	30
30 – 40	$2x$
40 – 50	65

Find the value of 'x' and draw histogram.

Q.5. Solve any *one* of the following subquestions: **[3]**

i. Draw the graphs representing the equation $2x = y + 2$ and $4x + 3y = 24$ on the same graph paper. Find the area of the triangle formed by these lines and the X-axis.

ii. The following pie-diagram shows percentage of persons according to blood group in a blood group checking camp. Answer the following questions:



a. Find the measure of central angle for each blood group.
b. Find the total number of persons, if there are 600 persons of blood group B.

BOARD QUESTION PAPER: MARCH 2024

Mathematics Part - I

Time: 2 Hours **Max. Marks: 40**

Note:

i. *All* questions are compulsory.
ii. Use of a calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.

Q.1. (A) Choose the correct alternative from given: **[4]**

i. If 3 is one of the root of the quadratic equation $kx^2 - 7x + 12 = 0$, then k = _____
(A) 1 (B) –1 (C) 3 (D) –3

ii. To draw the graph of $x + 2y = 4$, find x when $y = 1$:
(A) 1 (B) 2 (C) –2 (D) 6

iii. For an A.P., $t_7 = 4$, d = –4, then a = _____
(A) 6 (B) 7 (C) 20 (D) 28

iv. In the format of GSTIN, there are _____ alpha-numerals.
(A) 9 (B) 10 (C) 15 (D) 16

(B) Solve the following subquestions: **[4]**

i. If $17x + 15y = 11$ and $15x + 17y = 21$, then find the value of $x - y$.

ii. Find first term of the sequence $t_n = 3n - 2$.

iii. 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.

iv. Two digit numbers are formed using digits 2, 3 and 5 without repeating a digit. Write the sample space.

Q.2. (A) Complete the following activities and rewrite it (any *two*): **[4]**

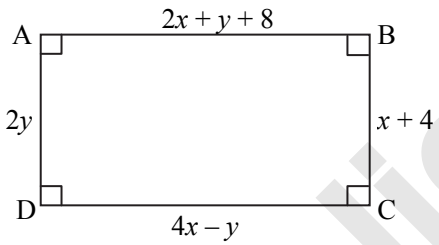
i. If (0, 2) is the solution of $2x + 3y = k$, then to find the value of k, complete the following activity:
Activity:
(0, 2) is the solution of the equation $2x + 3y = k$.
Put $x =$ ☐ and $y =$ ☐ in the given equation;
$\therefore$ $2 \times$ ☐ $+ 3 \times 2 = k$
$\therefore$ $0 + 6 = k$
$\therefore$ k = ☐

ii. If 2 and 5 are the roots of the quadratic equation, then complete the following activity to form quadratic equation:
Activity:
Let $\alpha = 2$ and $\beta = 5$ are the roots of the quadratic equation.
Then quadratic equation is:
$x^2 - (\alpha + \beta)x + \alpha\beta = 0$
$\therefore$ $x^2 - (2 +$ ☐ $)\, x +$ ☐ $\times 5 = 0$
$\therefore$ $x^2 -$ ☐ $x +$ ☐ $= 0$

iii. Two coins are tossed simultaneously. Complete the following activity to write the sample space and the given events A and B in the set form:
Event A: To get at least one head.
Event B: To get no head.
Activity:
Two coins are tossed simultaneously.
∴ Sample space is
S = {[ ], HT, TH, [ ]}
Event A: To get at least one head.
∴ A = {[ ], HT, TH}
Event B: To get no head.
∴ B = {[ ]}

(B) Solve the following subquestions (any *four*): [8]

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



ii. Solve the following quadratic equation using factorisation method:
$x^2 + x - 20 = 0$

iii. Find the 19^{th} term of the following A.P.:
7, 13, 19, 25, …….

iv. A card is drawn from well shuffled pack of 52 playing cards. Find the probability that the card drawn is a face card.

v. 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:

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

Q.3. (A) Complete the following activity and rewrite it (any *one*): [3]

i. 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:

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 = $\square$

$\therefore$ Mode = $\square + \left[\dfrac{f_1 - f_0}{2f_1 - f_0 - \square}\right] \times h$

$\therefore$ Mode = $3.5 + \left[\dfrac{40 - 33}{2(40) - 33 - 27}\right] \times \square$

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

$\therefore$ Mode = $\square$

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

ii. 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:

Activity:

Total value for toy car with GST = ₹ 2360

Rate of GST = 18%

Let taxable value for toy car be ₹ x

$\therefore$ GST = $\dfrac{18}{100} \times x$

$\therefore$ Total value for toy car = $\begin{pmatrix}\text{taxable value}\\ \text{for toy car}\end{pmatrix} + \square$ ….. Formula

$\therefore$ $2360 = \square + \dfrac{\square}{100} \times x$

$\therefore$ $2360 = \dfrac{\square}{100} \times x$

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

$\therefore$ $x = \dfrac{2360 \times 100}{\square}$

$\therefore$ Taxable value for toy car is ₹ $\square$

(B) Solve the following subquestions (any *two*): **[6]**

i. Solve the following quadratic equation by formula method:

$3m^2 - m - 10 = 0$

ii. Solve the following simultaneous equations using Cramer's rule:

$3x - 4y = 10$, $4x + 3y = 5$

iii. 50 shares of face value ₹ 10 were purchased for market value of ₹ 25. Company declared 30% dividend on the shares, then find:

a. Sum invested

b. Dividend received

c. Rate of return.

iv. One coin and a die are thrown simultaneously. Find the probability of the following events:

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

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

Q.4. Solve the following subquestions (any *two*): **[8]**

i. 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.

ii. 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:

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

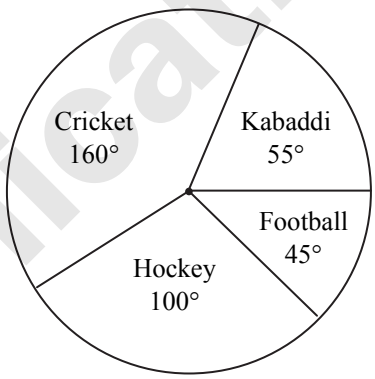
iii. In a 'Mahila Bachat Gat' Kavita invested from the first day of month ₹ 20 on first day, ₹ 40 on second day and ₹ 60 on third day. If she saves like this, then what would be her total saving in the month of February 2020?

Q.5. Solve the following subquestions (any *one*): **[3]**

i. 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:

a. What is the total amount spent on sports?

b. What is the amount spent on cricket?



ii. Draw the graph of the equation $x + y = 4$ and answer the following 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.

BOARD QUESTION PAPER: JULY 2024

Mathematics Part - I

Time: 2 Hours **Max. Marks: 40**

Note:

i. *All* questions are compulsory.
ii. Use of a calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
v. For every MCQ, four alternative (A), (B), (C), (D) of answers are given. Alternative of correct answer is to be written in front of the subquestion number.

Q.1. (A) Choose the correct answer and write the alphabet of it in front of the subquestion number: **[4]**

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

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

ii. Which equation from the following is quadratic equation?

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

iii. The sequence $-10, -6, -2, 2, \ldots\ldots\ldots$.

(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.

iv. Which number from the following cannot represent probability?

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

(B) Solve the following subquestions: **[4]**

i. Find the value of the following determinant:

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

ii. Find the first term and common difference for the following A.P.:
$5, 1, -3, -7, \ldots\ldots\ldots$

iii. Face value of a share is Rs. 100 and premium is Rs. 65, then what is market value of that share?

iv. Write sample space if one die is thrown.

Q.2. (A) Complete any two activities and rewrite is: **[4]**

i. Complete the following table for drawing the graph of the equation:
$x + 2y = 4$

x	-2	0	☐
y	☐	2	1
(x, y)	☐	(0, 2)	☐

ii. Determine the nature of roots of the following quadratic equation.

Activity:

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

$a = \square$, $b = 2$, $c = 9$

$b^2 - 4ac = 2^2 - 4 \times 1 \times \square$

$= \square - 36$

$\therefore \quad b^2 - 4ac = \square$

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

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

iii. 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.

Activity:

FV = 10 Premium = Rs. 2

$\therefore \quad MV = FV + \square = \square + 2$

$= Rs.\ 12$

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

$= \frac{12,000}{\square}$

$= \square$ shares.

(B) Solve the following subquestions (any *four*): **[8]**

i. Solve the following simultaneous equations:

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

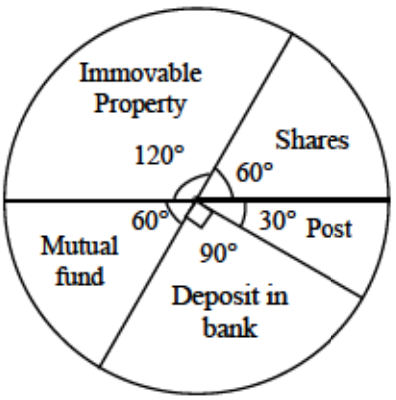
ii. Find 'k' if $x = 3$ is a root of quadratic equation $kx^2 - 10x + 3 = 0$.

iii. Find the 19th term of the following A.P.:

7, 13, 19, 25, ……..

iv. 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?

v. The annual investments of a family are shown in the following pie diagram. Answer the following questions base on it.



a. If the investment in the shares is Rs. 2,000, find the total investment.

b. How much amount is invested in the Post?

Q.3. (A) Complete any *one* activity of the following and rewrite it: **[3]**

i. 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.

Activity:

Brokerage = $\square$ × rate of brokerage

$= 1000 \times \frac{0.1}{\square}$

$= 10 \times 0.1$

$= \square$

Amount received after sale = MV – $\square$

$= \square - 1$

= Rs. $\square$.

ii. 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.

Activity:

S = $\{\square\}$

n(S) = $\square$

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

∴ B = $\{\square\}$

∴ n(B) = $\square$

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

$= \square$

(B) Solve the following subquestions (any *two*): **[6]**

i. Solve the following simultaneous equation by Cramer's method:

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

ii. Solve the following quadratic equation by formula method:

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

iii. 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.

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.

iv. 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.

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

Q.4. Solve the following subquestions (any *two*): **[8]**

i. 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.

ii. ₹ 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., then find interest amount after 10 years.

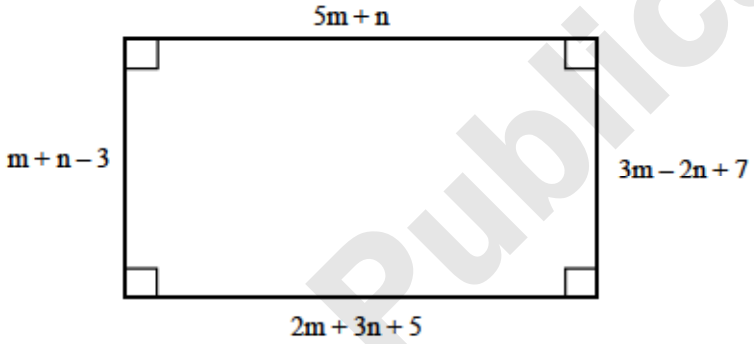
iii. In one group of students; 10% students got 0 to 20 marks; 20% students got 20 to 40 marks; 35% students got 40 to 60 marks; 20% students got 60 to 80 marks and remaining 30 students got 80 to 100 marks, then:
   a. Prepare a grouped frequency distribution table.
   b. Find the mode of the marks scored.

Q.5. Solve any *one* subquestion of the following: **[3]**

i. Draw histogram of the following data:

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

ii. Using information given in the following figure, find the length and breadth of this rectangle is cm.



BOARD QUESTION PAPER: MARCH 2023

Mathematics Part - I

Time: 2 Hours **Max. Marks: 40**

Note:

i. *All* questions are compulsory.
ii. Use of a calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
v. For every MCQ, four alternatives (A), (B), (C), (D) of answers are given. Alternative of correct answer is to be written in front of the subquestion number.

Q.1. (A) Choose the correct answer and write the alphabet of it in front of the subquestion number: **[4]**

i. To draw the graph of $4x + 5y = 19$, find y when $x = 1$:
(A) 4 (B) 3 (C) 2 (D) –3

ii. 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) $2x - x^2 = x^2 + 5$

iii. For the given A.P. a = 3.5, d = 0, then t_n = _____
(A) 0 (B) 3.5 (C) 103.5 (D) 104.5

iv. If n(A) = 2, P(A) = $\frac{1}{5}$, then n(S) = ?
(A) 10 (B) $\frac{5}{2}$ (C) $\frac{2}{5}$ (D) $\frac{1}{3}$

(B) Solve the following subquestions: **[4]**

i. Find the value of the following determinant:

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

ii. Find the common difference of the following A.P.:
2, 4, 6, 8, …

iii. On certain article if rate of CGST is 9%, then what is the rate of SGST?

iv. If one coin is tossed, write the sample space 'S'.

Q.2. (A) Complete any *two* given activities and rewrite it: **[4]**

i. Complete the following activity; find the value of x:
$5x + 3y = 9$ …(I)
$2x - 3y = 12$ …(II)
Add equations (I) and (II)
$5x + 3y = 9$
$+ 2x - 3y = 12$
$7x =$ ☐
$x =$ ☐/☐
$x =$ ☐

ii. Complete the following activity to determine the nature of the roots of the quadratic equation $x^2 + 2x - 9 = 0$:

Solution:

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

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

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

$\Delta = 4 + \square = 40$

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

$\therefore$ The roots of the equation are real and unequal.

iii. Complete the following table using given information:

Sr. No.	FV	Share is at	MV
1.	₹ 100	Par	☐
2.	☐	Premium ₹ 500	₹ 575
3.	₹ 10	☐	₹ 5
4.	₹ 200	Discount ₹ 50	☐

(B) Solve the following subquestions (any *four*): **[8]**

i. Solve the following simultaneous equations:
$x + y = 4; 2x - y = 2$

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

iii. Write an A.P. whose first term is a = 10 and common difference d = 5.

iv. 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.

v. Observe the following table and find Mean:
Assumed mean A = 300

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

Q.3. (A) Complete any *one* activity and rewrite it: **[3]**

i. 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:

a. Committee of 2 boys = $\{\square\}$

b. Committee of 2 girls = $\{\square\}$

c. Committee of one boy and one girl = $\{\boxed{B_1G_1}, \boxed{B_1G_2}, \square, \square\}$

d. $\therefore$ Sample space (S) = $\{(B_1B_2), (B_1G_1), \square, \square, (B_2G_2), (G_1G_2)\}$

ii. Fill in the boxes with the help of given information:

Tax invoice of services provided (Sample)								
Food Junction, Khed-Shivapur, Pune 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 %	
9963	Masala Tea	1	10	10.00		₹ 0.25	2.5 %	
9963	Masala Dosa	2	60		2.5%		2.5%	₹ 3.00
			Total	150.00				₹ 3.75
						Grand Total	= ₹ 157.50	

(B) Solve the following subquestions (any *two*): **[6]**

i. Solve the following simultaneous equations using Cramer's rule:
$4m + 6n = 54$; $3m + 2n = 28$

ii. Solve the following quadratic equation by formula method:
$x^2 + 10x + 2 = 0$

iii. A two digit number if formed with digits 2, 3, 5, 7, 9 without repetition. 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.

iv. The frequency distribution table shows the number of mango trees in a grove and their yield of mangoes. Find the median of data:

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

Q.4. Solve the following subquestions (any *two*): **[8]**

i. If the first term of an A.P. is p, second term is q and last term is r, then show that sum of all terms is $(q + r - 2p) \times \frac{(p + r)}{2(q - p)}$.

ii. Show the following data by a frequency polygon:

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

iii. The sum of the squares of five consecutive natural numbers is 1455. Find the numbers.

Q.5. Solve the following subquestions (any *one*): **[3]**

i. Draw the graph of the equation $x + 2y = 4$. Find the area of the triangle formed by the line intersecting to X-axis and Y-axis.

ii. 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.

BOARD QUESTION PAPER: JULY 2023

Mathematics Part - I

Time: 2 Hours **Max. Marks: 40**

Note: i. *All* questions are compulsory.
ii. Use of a calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
v. For every MCQ, four alternatives (A), (B), (C), (D) of answers are given. Alternative of correct answer is to be written in front of the subquestion number.

Q.1. (A) Choose the correct answer and write the alphabet of it in front of the subquestion number: **[4]**

i. Sum of first five multiples of 3 is _____
(A) 45 (B) 55
(C) 15 (D) 75

ii. Find the value of determinant $\begin{vmatrix} 3 & 2 \\ 4 & 5 \end{vmatrix}$:
(A) 2 (B) 7 (C) −7 (D) 23

iii. 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) $x^2 + 8x - 15 = 0$

iv. Two coins are tossed simultaneously. Write the number of sample points n(S):
(A) 2 (B) 8 (C) 4 (D) 6

(B) Solve the following subquestions: **[4]**

i. If $15x + 17y = 21$ and $17x + 15y = 11$, then find the value of $x + y$.

ii. Given sequence is an A.P. Find the next two terms of this A.P.:
5, 12, 19, 26, ……...

iii. On certain article if rate of CGST is 9%, then what is the rate of SGST and what is the rate of GST?

iv. If n(S) = 2 and n(A) = 1, then find P(A).

Q.2. (A) Complete the following activity and rewrite (any *two*): **[4]**

i. Complete the following table to draw the graph of the equation $x + y = 3$:

x	3	☐	☐
y	☐	5	3
(x, y)	(3, 0)	☐	(0, 3)

ii. Complete the following activity to find the value of discriminant of the equation $x^2 + 10x - 7 = 0$.

Solution:

Comparing $x^2 + 10x - 7 = 0$ with $ax^2 + bx + c = 0$

$a = 1, b = 10, c =$ ☐

$\therefore \quad b^2 - 4ac =$ ☐ $- 4 \times 1 \times (-7)$

$= 100 +$ ☐

$\therefore \quad =$ ☐

iii. Complete the following table using given information:

Sr. No.	FV	Share is at	MV
1.	₹ 10	Premium of ₹ 7	☐
2.	₹ 25	☐	₹ 16
3.	₹ 300	☐	₹ 315
4.	☐	at par	₹ 5

(B) Solve the following subquestions (any *four*): **[8]**

i. Solve the following simultaneous equations:
$x + y = 6; x - y = 4$

ii. Solve the following quadratic equation by factorisation method:
$x^2 + 15x + 54 = 0$

iii. The first term a = 8 and common difference d = 5 are given. Write an A.P.

iv. Mr. Rohit is a retailer. He paid GST of ₹ 6,500 at the time of purchase. He collected GST of ₹8,000 at the time of sale.
(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 payable SGST.

v. Find the mean from the given values:
$\sum x_i f_i = 1265; N = 50$

Q.3. (A) Complete the following activity and rewrite (any *one*): **[3]**

i. 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.

Solution:

FV = ₹ 10, Premium = ₹ 2

$\therefore$ MV = FV + ☐ = 10 + ☐ = ☐

$\therefore$ Number of shares = $\frac{\text{Total investment}}{\text{MV}} = \frac{12,000}{\square}$

= ☐ shares

Ans. Smita has purchased ☐ shares.

ii. 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

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

(a) Event A : Prime number on the upper face

A = {2, 3, 5} $\therefore$ n(A) = ☐

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

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

(b) Event B : Even number on the upper face

$B = \{2, 4, 6\}$ $\therefore n(B) =$ ☐

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

$\therefore P(B) =$ ☐ $= \frac{1}{2}$

(B) Solve the following subquestions (any *two*): **[6]**

i. Two numbers differ by 3. The sum of the twice the smaller number and thrice the greater number is 19. Find the numbers.

ii. Solve the given quadratic equation by using formula method: $5x^2 + 13x + 8 = 0$

iii. 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:

(a) a red balloon

(b) a blue balloon

(c) a green balloon.

iv. 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:

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

Q.4. Solve the following subquestions (any *two*): **[8]**

i. The sum of two roots of a quadratic equation is 5 and sum of their cubes is 35, find the equation.

ii. If p times the p^{th} term of an A.P. is equal to q times q^{th} term, then show that $(p + q)^{th}$ term of that A.P. is zero $(p \neq q)$.

iii. Draw a pie diagram to represent the world population given in the following table :

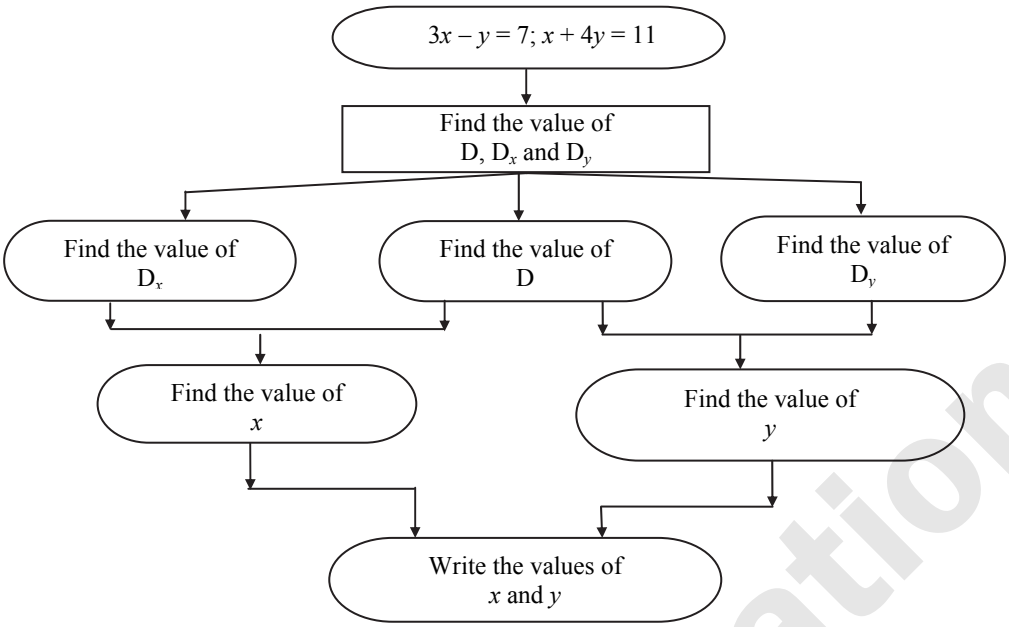
Country	Japan	England	India	China
Percentage of World Population	20	10	40	30

Q.5. Solve the following subquestions (any *one*): **[3]**

i. Represent the following data using histogram:

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

ii. Observe the following flow chart and solve it:



BOARD QUESTION PAPER: MARCH 2022

Mathematics - I

Time: 2 Hours **Max. Marks: 40**

Notes:

i. *All* questions are compulsory.
ii. Use of calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQ's [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
v. For every MCQ, the correct alternative (A), (B), (C) or (D) with subquestion number is to be written as an answer.

Q.1. (A) Four alternative answers are given for every subquestion. Choose the *correct* alternative and write its alphabet with subquestion number. **[4]**

i. Which one is the quadratic equation?

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

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

ii. 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

iii. For 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

iv. Which number cannot represent a probability?

(A) 1.5 (B) $\frac{2}{3}$

(C) 15% (D) 0.7

(B) Solve the following subquestions: **[4]**

i. To draw a graph of $4x + 5y = 19$, find y when $x = 1$.

ii. Determine whether 2 is a root of quadratic equation $2m^2 - 5m = 0$.

iii. Write second and third term of an A.P. whose first term is 6 and common difference is –3.

iv. Two coins are tossed simultaneously. Write the sample space 'S'.

Q.2. (A) Complete the following activities and rewrite it (any *two*): **[4]**

i. Complete the activity to find the value of the determinant.

Activity:

$$\begin{vmatrix} 2\sqrt{3} & 9 \\ 2 & 3\sqrt{3} \end{vmatrix} = 2\sqrt{3} \times \square - 9 \times \square$$

$$= \square - 18$$

$$= \square$$

ii. Complete the following activity to find the 19th term of an A.P., 7, 13, 19, 25, ……. :

Activity:

Given A.P. : 7, 13, 19, 25, ……

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

$t_n = a + (\square)\, d$ ……. (formula)

$\therefore \quad t_{19} = 7 + (19 - 1)\ \square$

$\therefore \quad t_{19} = 7 + \square$

$\therefore \quad t_{19} = \square$

iii. If one die is rolled, then to find the probability of an event to get prime number on upper face, complete the following activity.

Activity:

One die is rolled.

'S' is sample space.

$S = \{\square\}$

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

Event A: Prime number on the upper face.

$A = \{\square\}$

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

$\therefore \quad P(A) = \frac{\square}{n(S)}$ …….. (formula)

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

(B) Solve the following subquestions (any *four*): **[8]**

i. To solve the following simultaneous equations by Cramer's rule, find the value of D_x and D_y.

$3x + 5y = 26$

$x + 5y = 22$

ii. 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?

iii. Find the sum of first 'n' even natural numbers.

iv. Solve the following quadratic equations by factorisation method:

$x^2 + x - 20 = 0$

v. Find the values of $(x + y)$ and $(x - y)$ of the following simultaneous equations:

$49x - 57y = 172$

$57x - 49y = 252$

Q.3. (A) Complete the following activity and rewrite it (any *one*): **[3]**

i. One of the roots of equation $kx^2 - 10x + 3 = 0$ is 3. Complete the following activity to find the value of k.

Activity:

One of the roots of equation

$kx^2 - 10x + 3 = 0$ is 3

Putting $x = \square$ in the above equation

$\therefore \quad k(\square)^2 - 10 \times \square + 3 = 0$

$\therefore \quad \square - 30 + 3 = 0$

$\therefore \quad 9k = \square$

$\therefore \quad k = \square$

ii. 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 –
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) = $\square$
$\therefore$ P(A) = $\square$ ……..(formula)
$\therefore$ $P(A) = \frac{\square}{52}$
$\therefore$ $P(A) = \frac{\square}{13}$

Event B: The card drawn is a spade.
$\therefore$ n(B) = $\square$
$P(B) = \frac{n(B)}{n(S)}$
$\therefore$ $P(B) = \frac{\square}{4}$

(B) Solve the following subquestions (any *two*): **[6]**

i. Solve the simultaneous equations by using graphical method:
$x + 3y = 7$
$2x + y = -1$

ii. 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?

iii. 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.

iv. Solve the following quadratic equation using formula:
$x^2 + 10x + 2 = 0$

Q.4. Solve the following subquestions (any *two*): **[8]**

i. 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.

ii. If the 9^{th} term of an A.P. is zero, then prove that the 29^{th} term is double the 19^{th} term.

iii. 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.

Q.5. Solve the following subquestions (any *one*): **[3]**

i. 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.

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

BOARD QUESTION PAPER: JULY 2022

Mathematics Part - I

Time: 2 Hours **Max. Marks: 40**

Note: i. *All* questions are compulsory.
ii. Use of a calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
v. For ever MCQ, the correct alternative (A), (B), (C) or (D) with subquestion number is to be written as an answer.

Q.1. (A) For every subquestion four alternative answers are given. Choose the correct answer and write the alphabet of it: **[4]**

i. For an A.P., a = 3.5, d = 0, then t_n = _____.
(A) 0 (B) 3.5 (C) 103.5 (D) 104.5

ii. Find the value of the determinant $\begin{vmatrix} 5 & 3 \\ -7 & -4 \end{vmatrix}$.
(A) –1 (B) –41 (C) 41 (D) 1

iii. 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) $x^2 - 8x + 15 = 0$

iv. 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) $\frac{1}{3}$

(B) Solve the following subquestions: **[4]**

i. The sum of father's age and twice the age of his son is 70. Use the given information to form a linear equation in two variables.

ii. A die is thrown. Write sample space.

iii. Find the roots of the quadratic equation $(x + 5)(x - 4) = 0$.

iv. Find the first term and common difference for an A.P., 127, 135, 143, 151, … .

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

i. Complete the following activity to find the 27th term of the following A.P.,
9, 4, –1, –6, –11, … .
Activity:
Here, a = 9, d = $\square$, n = 27
t_n = $\square$ + (n – 1)d …[Formula]
∴ $t_{27} = 9 + (\square - 1)(-5)$
∴ t_{27} = $\square$

ii. One die is rolled. Complete the following activity, to find the probability that the number on the upper face is prime.
Activity:
S is the sample space.
S = $\{\square\}$
∴ n(S) = 6

Even A: Getting a prime number on the upper face.

A = $\{\square\}$

$\therefore$ n(A) = 3

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

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

iii. Complete the following activity to find the value of x.

Activity;

$3x - y = 2$

$2x + y = 8$

$\square x = \square$

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

$\therefore$ $x = \square$

(B) Solve any *four* subquestions from the following: **[8]**

i. For solving the following simultaneous equations, find the values of $(x + y)$ and $(x - y)$.
$15x + 17y = 21$, $17x + 15y = 11$.

ii. Find the value of the discriminant of the quadratic equation $2y^2 - y + 2 = 0$.

iii. Find the sum of the first 21 even natural numbers.

iv. Two coins are tossed simultaneously. Find the probability of the event of getting no head.

v. Find D_x and D_y for the following simultaneous equations.
$x + 2y = -1$, $2x - 3y = 12$

Q.3. (A) Complete and write any *one* activity from the following: **[3]**

i. 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 activities.
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 three men and W_1, W_2 be two women. Out of these men and women environment committee of the 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.

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

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

$P(A) = \frac{n(A)}{n(S)}$ …[Formula]

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

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

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

$\therefore$ n(B) = 6

$P(B) = \frac{n(B)}{n(S)}$ …[Formula]

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

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

ii. Complete the following activity to find the roots of the quadratic equation $25x^2 + 30x + 9 = 0$ by formula method.

Activity:

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

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

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

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

$= 900 - 900$

$= \square$

$x = \frac{\square \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{-\square \pm \sqrt{0}}{2 \times 25}$

$\therefore$ $x = \frac{-30 + 0}{50}$ or $\therefore$ $x = \frac{\square - 0}{50}$

$\therefore$ $x = -\frac{30}{50}$ or $\therefore$ $x = -\frac{30}{50}$

$\therefore$ $x = -\frac{\square}{5}$ or $\therefore$ $x = -\frac{3}{5}$

(B) Attempt any *two* subquestions from the following: **[6]**

i. Solve the given equation by factorisation: $5m^2 = 22m + 15$.

ii. Solve the following equations:

$3x - 2y = \frac{5}{2}$, $\frac{1}{3}x + 3y = -\frac{4}{3}$.

iii. 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. Find the probability of the event that it fell in the lake.

iv. A two digit number and the number with digits interchanged add up to 143. In the given number the digit in units place is 3 more than the digit in the tens place. Find the original number.

Q.4. Attempt any *two* subquestions from the following: **[8]**

i. Solve the following simultaneous equations graphically:

$x + y = 4$, $3x - 2y = 7$.

ii. A train travels 240 km with uniform speed. If the speed of the train is increased by 12 km/h, it takes one hour less to cover the same distance. Find the initial speed of the train.

iii. If the sum of the first p terms of an A.P. is equal to the sum of first q terms, then show that the sum of its first (p + q) terms is zero ($p \neq q$).

Q.5. Solve the following subquestions: (Any *one*) **[3]**

i. The measures of the 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.
[Assume measures of angles as a°, (a + d)°, (a + 2d)°, (a + 3d)°,
(where a < a + d < a + 2d < a + 3d)]

ii. The product of two numbers is 352 and their mean is 19. Find the numbers.

BOARD QUESTION PAPER: MARCH 2020
Mathematics Part - I

Time: 2 Hours **Max. Marks: 40**

Notes:

i. *All* questions are compulsory.
ii. Use of calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQ's Q. No. 1(A) only the first attempt will be evaluated and will be given credit.
v. For every MCQ, the correct alternative (A), (B), (C) or (D) of answers with subquestion number is to be written as an answer.

Q.1. A. For every subquestion 4 alternative answers are given. Choose the correct answer and write the alphabet of it: **[4]**

i. In the format of GSTIN there are _____ alpha-numerals.
(A) 15 (B) 10
(C) 16 (D) 9

ii. From the following equations, which one is the quadratic equation?
(A) $\frac{5}{x} - 3 = x^2$ (B) $x(x + 5) = 4$
(C) $n - 1 = 2n$ (D) $\frac{1}{x^2}(x + 2) = x$

iii. For simultaneous equations in variables 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) $\frac{-1}{7}$

iv. If $n(A) = 2$, $P(A) = \frac{1}{5}$, then $n(S) = ?$
(A) $\frac{2}{5}$ (B) $\frac{5}{2}$
(C) 10 (D) $\frac{1}{3}$

Q.1. B. Solve the following subquestions: **[4]**

i. Find second and third term of an A.P. whose first term is – 2 and common difference is – 2.

ii. 'Pawan Medicals' supplies medicines. On some medicines the rate of GST is 12%, then what is the rate of CGST and SGST?

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

iv. If $15x + 17y = 21$ and $17x + 15y = 11$, then find the value of $x + y$.

Q.2. A. Complete and write any *two* activities from the following: **[4]**

i. Complete the following table to draw the graph of $2x - 6y = 3$:

x	–5	☐
y	☐	0
(x, y)	☐	☐

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

Solution:

First term = a = 6, common difference = $d = 3$, $S_{27} = ?$

$S_n = \frac{n}{2}[\square + (n-1)d]$ – formula

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

$= \frac{27}{2} \times \square$

$= 27 \times 45$

$\therefore \quad S_{27} = \square$

iii. 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.

Solution:

Suppose 'S' is sample space.

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

Event A: Card drawn is a red card.

$\therefore$ Total red cards = $\square$ hearts + 13 diamonds

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

$\therefore \quad p(A) = \frac{\square}{n(S)}$ – formula

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

$\therefore \quad p(A) = \square$

Q.2. B. Solve any *four* subquestions from the following: **[8]**

i. Find the value of the determinant:

$$\begin{bmatrix} \frac{7}{3} & \frac{5}{3} \\ \frac{3}{2} & \frac{1}{2} \end{bmatrix}$$

ii. Solve the quadratic equation by factorisation method:

$x^2 - 15x + 54 = 0$

iii. Decide whether the following sequence is an A.P. if so, find the 20^{th} term of the progression:

$-12, -5, 2, 9, 16, 23, 30, \ldots\ldots\ldots\ldots$

iv. A two digit number is formed with digits 2, 3, 5, 7, 9 without repetition. What is the probability that the number formed is an odd number?

v. If L = 10, $f_1 = 70$, $f_0 = 58$, $f_2 = 42$, $h = 2$, then find the mode by using formula.

Q.3. A. **Complete and write any *one* activity from the following:** **[3]**

i.

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

ii. 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:

Solution: FV = ₹ 100; Number of shares = 150

Market value = ₹ 120

1. Sum investment = MV × No. of Shares

$= \square \times \square$

∴ Sum investment = ₹ 18,000

2. Dividend per share = FV × Rate of dividend

$= \square \times \frac{\square}{100}$

= ₹ 7

∴ Total dividend received = 150 × 7

$= \square$

3. $\text{Rate of return} = \frac{\text{Dividend income}}{\text{Sum invested}} \times 100$

$= \frac{1050}{18000} \times 100$

$= \square$

Q.3. B. **Attempt any *two* subquestions from the following:** **[6]**

i. 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.

ii. 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.

iii. 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:

Milk Sold (litre)	No. of Customers
1–2	17
2–3	13
3–4	10
4–5	7
5–6	3

iv. In an A.P. sum of three consecutive terms is 27 and their products is 504. Find the terms. (Assume that three consecutive terms in an A.P. are a – d, a, a + d.)

Q.4. Attempt any *two* subquestions from the following: **[8]**

i. Represent the following data by histogram:

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

ii. 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 should be the first and the last instalments?

iii. 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.

Q.5. Attempt any *one* subquestion from the following: **[3]**

i. Convert the following equations into simultaneous equations and solve:

$$\sqrt{\frac{x}{y}} = 4, \frac{1}{x} + \frac{1}{y} = \frac{1}{xy}$$

ii. 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.

BOARD QUESTION PAPER: JULY 2020

Maths - I

Time: 2 Hours **Max. Marks: 40**

Notes:
i. *All* questions are compulsory.
ii. Use of calculator is not allowed.
iii. The numbers to the right of the questions indicate full marks.
iv. In case of MCQ's (Q. No. 1(A)) only the first attempt will be evaluated and will be given credit.
v. For every MCQ, the correct alternative (A), (B), (C) or (D) with sub-question number is to be written as an answer.

Q.1. (A) Four alternative answers are given for every sub-question. Choose the correct alternative and write its alphabet with sub-question number: **[4]**

i. 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

ii. What is the sum of the first 10 natural numbers?
(A) 55 (B) 20 (C) 65 (D) 11

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

iv. In the format of GSTIN there are _____ alpha-numerals.
(A) 9 (B) 10 (C) 16 (D) 15

Q.1. (B) Solve the following subquestions: **[4]**

i. For simultaneous equations in variable x and y, if $D_x = 25$, $D_y = 40$, $D = 5$, then what is the value of x?

ii. Find the first term and common difference for the following A.P:

127, 135, 143, 151, ……

iii. A die is rolled then write sample space 'S' and number of sample point n(S).

iv. If $\sum fidi = 108$ and $\sum fi = 100$, then find $\bar{d} = ?$

Q.2. (A) Complete the following activities and rewrite it (any two): **[4]**

i. Activity:

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

$$= \square - 8$$

$$= \square$$

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

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 = ☐ in the equation

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

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

$\therefore \quad k =$ ☐

iii. 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	☐
Class Mark	18.5	19.5	☐	21.5
Frequency	4	☐	15	19
Co-ordinates of point	☐	(19.5, 13)	(20.5, 15)	(21.5, 19)

Q.2. (B) Solve the following sub-questions (any four): **[8]**

i. Sum of two numbers is 7 and their difference is 5. Find the numbers.

ii. Solve the quadratic equation by factorisation method:
$x^2 + x - 20 = 0$

iii. Find the 19th term of the following A.P.:
7, 13, 19, 25, …….. .

iv. For the following experiments, write sample space 'S' and number of sample points n(S):
Two digit numbers are formed using digits 2, 3 and 5 without repeating a digit.

v. 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%

Q.3. (A) Complete the following activity and rewrite it (any one): **[3]**

i. In an A.P. the first term is –5 and last term is 45. If sum of 'n' terms in the A.P. is 120, then complete the activity to find n.

Activity:

$t_1 = -5$, $t_n =$ ☐ , $S_n =$ ☐

$S_n = \frac{n}{2}$ [$t_1 +$ ☐]

☐ $= \frac{n}{2}$ [–5 + 45]

$240 = n \times$ ☐

$\therefore \quad n =$ ☐

ii. 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.

Activity:
'S' is the sample space.
n(S) = 52
Event A: Card drawn is a red card.
Total number of red cards = ☐ hearts + ☐ diamonds

$\therefore \quad n(A) =$ ☐

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

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

$$\therefore \quad p(A) = \square$$

Q.3. (B) Solve the following subquestions (any two): **[6]**

i. Solve the following simultaneous equations graphically:
$x + y = 5; x - y = 1.$

ii. Solve quadratic equation using formula method:
$5m^2 + 13m + 8 = 0.$

iii. A retailer sold 2 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.

iv. 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

Q.4. Solve the following subquestions (any two): **[8]**

i. If one root of the quadratic equation $ax^2 + bx + c = 0$ is half of the other root, show that, $b^2 = \frac{9ac}{2}$.

ii. 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:
   a. the number of shares purchased,
   b. the amount of brokerage paid, and
   c. GST paid for the trading.

iii. 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.

Q.5. Solve the following subquestions (any one): **[3]**

i. Six faces of a die are as shown below:

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'.

ii. Construct any one linear equation in two variables. Obtain another equation by interchanging only coefficients of variables. Find the value of the variables.

BOARD QUESTION PAPER: MARCH 2019
MATHS (PART - I)

Time: 2 Hours **Max. Marks: 40**

Note:
i. *All* questions are compulsory.
ii. Use of calculator is not allowed.
iii. Figures to the right of questions indicate full marks.

1. (A) Solve the following questions (Any four): **[4]**

i. Find the median of:
66, 98, 54, 92, 87, 63, 72.

ii. Multiply and write the answer in the simplest form:
$5\sqrt{7} \times 2\sqrt{7}$

iii. If $3x + 5y = 9$ and $5x + 3y = 7$, then find the value of $x + y$.

iv. Write the ratio of second quantity to first quantity in the reduced form:
5 dozen pens, 120 pens.

v. Write the following polynomial in coefficient form:
$2x^3 + x^2 - 3x + 4$.

vi. For computation of income tax which is the assessment year of financial year 01–04–2016 to 31–03–2017?

(B) Solve the following questions (Any two): **[4]**

i. Find the value of the polynomial $2x^3 + 2x$, when $x = -1$.

ii. If A = {11, 21, 31, 41}, B = {12, 22, 31, 32}, then find:
a. A $\cup$ B
b. A $\cap$ B

iii. Sangeeta's monthly income is ₹ 25,000. She spent 90% of her income and donated 3% for socially useful causes. How much money did she save?

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

i. In the A.P. 2, –2, –6, –10, ... common difference (d) is:
(A) –4 (B) 2 (C) –2 (D) 4

ii. 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

iii. The tax levied by Central Government for trading within a state is:
(A) IGST (B) CGST (C) SGST (D) UTGST

iv. 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) $\frac{1}{6}$

(B) Solve the following questions (Any two): **[4]**

i. First term and common difference of an A.P. are 12 and 4 respectively. If $t_n = 96$, find n.

ii. If $\begin{vmatrix} 4 & 5 \\ m & 3 \end{vmatrix} = 22$, then find the value of m.

iii. Solve the following quadratic equation:
$x^2 + 8x + 15 = 0$.

3. (A) Complete the following activites (Any two): **[4]**

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

Activity: FV = ₹ 10, Premium = ₹ 2

$\therefore$ MV = FV + $\square$ = $\square$ + 2 = 12

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

$= \frac{\square}{12} = \square$ shares

ii. 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. Complete the following activity to find the measures:

Places	Supply of electricity (Thousand units)	Measure of central angle
Roads	4	$\frac{4}{30} \times 360 = 48°$
Factories	12	$\frac{\square}{\square} \times 360 = 144°$
Shops	6	$\frac{6}{30} \times 360 = \square$
Houses	8	$\frac{\square}{\square} \times 360 = \square$
Total	30	

iii. Two coins are tossed simultaneously. Complete the following activity of writing the sample space (S) and expected outocomes of the events:

a. Event A : to get at least one head.

b. Event B : to get no head.

Activity: If two coins are tossed simultaneously

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

a. Event A : at least getting one head.

$\therefore$ A = {HH, $\square$, TH}.

b. Event B : to get no head.

B = {$\square$}.

(B) Solve the following questions (Any two): **[4]**

i. Find the 19^{th} term of the A.P. 7, 13, 19, 25, …… .

ii. Obtain a quadratic equation whose roots are –3 and –7.

iii. Two numbers differ by 3. The sum of the greater number and twice the smaller number is 15. Find the smaller number.

4. Solve the following questions (Any three): **[9]**

i. 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?

ii. A two digit number is to be formed using the digits 0, 1, 2, 3. Repetition of the digits is allowed. Find the probability that a number so formed is a prime number.

iii. 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?

iv. Solve the following simultaneous equations graphically:

$x + y = 0$; $2x - y = 9$.

5. Solve the following questions (Any one): **[4]**

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

Marks	Number 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.

ii. Two taps together can fill a tank completely in $3\frac{1}{13}$ minutes. The smaller 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?

6. Solve the following questions (Any one): **[3]**

i. 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.

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

Class (Daily distance travelled in km)	Continous Classes	Frequency (Number of rickshaws)	Cumulative Frequency less than type
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

a. Which is the modal class? Why?
b. Which is the median class and why?
c. Write the cumulative frequency (C.F.) of the class preceding the median class.
d. What is the class interval (h) to calculate median?

BOARD QUESTION PAPER: July 2019

Maths Part - I

Time: 2 Hours **Max. Marks: 40**

Note:

i. *All* questions are compulsory.

ii. Use of calculator is not allowed.

iii. Figures to the right of questions indicate full marks.

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1. (A) Solve the following questions (Any four): **[4]**

i. If $|7| \times |-4| = a$, then find the value of a.

ii. If $x + y = 5$ and $x - y = 1$, then find the value of x.

iii. Find the median of the scores 7, 10, 5, 8, 9.

iv. Write the degree of Polynomial $5x^2 + 2x + 3x^4 + 4$.

v. If A = {1, 2, 3, 4, 5} and B = {1, 3, 7}, then $A \cap B$ = ?

vi. Find out the ratio of 1 mm to 1 cm.

(B) Solve the following questions (Any two): **[4]**

i. Find the factors of the Polynomial $3x^2 - 2x - 1$.

ii. □ABCD is a parallelogram. The ratio of measures of $\angle$ A and $\angle$ B is 5 : 4. Find the measure of $\angle$ B.

iii. Alka spends 90% of the money that she gets every month and saves ₹120. How much money does she get monthly?

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

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

(A) –1 (B) –41 (C) 41 (D) 1

ii. 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) $2x - x^2 = x^2 + 5$

iii. If n(A) = 2, $p(A) = \frac{1}{5}$, then n(S) = ?

(A) 10 (B) 2 (C) 5 (D) 20

iv. For a given A.P., a = 3.5, d = 0, then t_n = _____

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

(B) Solve the following questions (Any two): **[4]**

i. Find the value of k, if $x = 3$ is a root of the equation $kx^2 - 10x + 3 = 0$

ii. Market value of a share is ₹ 200. If the brokerage rate is 0.3%, then find the purchase value of the share.

iii. 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 (hrs.)	No. of Students
0 – 2	8
2 – 4	14
4 – 6	18
6 – 8	10
8 – 10	10

3. (A) Complete the following activities (Any two): **[4]**

i. 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.
Event A: Ticket shows an even number.
Complete the following activity from the given information:
Activity:

S = { }

n(S) = ☐

A = { }

n(A) = ☐

ii. Complete the following activity to form a quadratic equation.
Activity:

I am a quadratic equation

↓

My standard form in ☐

↓

My roots are 3 and 4.

↓

∴ Sum of my roots = ☐

and product of my roots = ☐

↓

∴ My equation is ☐

iii. Complete the following activity to find the number of natural numbers between 1 and 171, which are divisible by 5:
Activity

From 1 to 171, natural numbers divisible by 5 are

↓

5, 10, 15, _____, 170

↓

In this A.P.

a = ☐ , d = ☐ , t_n = 170

↓

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

↓

$170 = 5 + (n - 1) \times$ ☐

↓

n = ☐

(B) Solve the following questions (Any two): **[4]**

i. Solve the following simultaneous equations:
$4x + 3y = 11$; $3x + 4y = 10$

ii. Find the 23rd term of the following A.P.:
9, 4, –1, –6, –11, …

iii. Find the mode from the following information:
L = 10, h = 2, $f_0 = 58$, $f_1 = 70$, $f_2 = 42$.

4. Solve the following questions (Any three): **[9]**

i. Solve the following simultaneous equations graphically:
$x + y = 2$; $x - y = 4$.

ii. Sachin invested some amounts in 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.

iii. A readymade garment shopkeeper gives 5% discount on a dress of ₹ 2,000 and charges 5% GST on the remaining amount. What is the purchase price of the dress for the customer?

iv. 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.

5. Solve the following questions (Any one): **[4]**

i. Out of 555 km, Vishal travelled certain distance by bus and remaining distance by car. Bus travels with an average speed of 60 km/hr and the average speed of car is 75 km/hr. He takes total 8 hours to complete the journey. Find the distance that Vishal travelled by bus.

ii. 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 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

6. Solve the following questions (Any one): **[3]**

i. Construct a word problem on quadratic equation, such that one of its answers is 20 (years, rupees, centimetre etc.). Also solve it.

ii. A student made a cube shaped die from a card sheet. Instead of writing numbers 1, 2, 3, 4, 5, 6 on its faces, 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 a vowel on the upper face both times.