For office use only

For office use only

Paper-3
MATHEMATICS

Maximum time: 3 Hrs.

Maximum mark: 50.

(To be filled by candidate)

Name of examination ……

Medium of examination ……

Roll number | | | | | | | |

Invigilator's signature

Important Instructions to Candidates

- Candidates must read the following instructions carefully.
- Violation of any instruction may result in penalties including deduction of marks, cancellation of the answer booklet, or disqualification from the examination.
- Write your **Roll Number** and other required details **only in the space provided** on the cover page of the booklet.
- **Do NOT write your name, school name, class, mobile number, or any identification mark** anywhere inside the answer booklet.
- The answers must be written **only in English**, as authorised for this examination.
- Answers written in any other language will **not be evaluated**.
- Candidates must **write only within the printed margins** of each page.
- Any writing outside the margins **will not be evaluated**.
- Do NOT write:
    - Irrelevant matter
    - Religious verses
    - Personal requests
    - Threatening language
- Such content may lead to disciplinary action.

Rough work should be done **only in the space provided** at the end of the booklet or provided paper.
Do not detach or tear any pages.
Any unused or blank pages must be **neatly crossed out.**
This question paper contains two sections: Section A and Section B, containing **eight questions**. **Question 1** in Section A and **Question 5** in Section B are **compulsory**. Candidates are required to attempt **any three** of the remaining questions, ensuring that **at least one question is selected from each section**. Each question consists of **four sub-parts**, namely **(a), (b), (c), and (d)**, carrying **2, 2, 3, and 3 marks** respectively. Candidates are advised to read the questions carefully and respond to **all sub-parts** within the questions attempted, adhering strictly to the prescribed marks and maintaining clarity and precision in their answers in accordance with the expected SSE standards.
Clearly mention:

- Section (A or B)
- Question Number

Answers without proper numbering may not be considered.
No extra sheets will be provided. Candidates must finish the answers within the booklet.

This page intentionally left blank

SECTION A

Q1.

a) *A secret number transformation rule says: "Multiply the number by 3, subtract the sum of its digits, and the result is 102." Find all possible original numbers and explain your reasoning.*

b) *Three fountains spray water every 48 s, 72 s and 108 s.*
(i) Find the minimum interval after which they will spray together.
(ii) If the show starts at 8:20:00 a.m., determine the next time when all three fountains spray together.

c) *Village A starts with 68,000 people and decreases by 1,200 people per year. Village B starts with 42,000 people and increases by 800 people per year.*
(i) Write expressions for the populations of the two villages after x years.
(ii) Find after how many years their populations will become equal.
(iii) Based on your expressions, comment which village may face long-term strain on resources and why.

d) *Use algebra or suitable numerical examples to justify that the square of an odd number is always odd.*

Q2.

a) *A triangular number pattern begins as follows:*
Row 1: 1
Row 2: 3, 5
Row 3: 7, 9, 11
The sum of the numbers in the nth row follows the rule n^3. Predict the sum of the numbers in Row 4 without listing them all, and explain your reasoning.

b) *A father says to his son: "In 12 years, I will be three times as old as you were 2 years ago." Using the fact that the age difference remains constant, form and solve an equation to find their present ages.*

c) *Painter A can complete a job in 8 hours, while Painter B can complete the same job in 10 hours.*
(i) Find the work rate (fraction of the job per hour) of each painter.
(ii) If they work together at their individual constant rates, find the time required to finish the job and explain briefly why the rates can be added.

d) *You have ₹500. Notebooks cost ₹30 each and you must buy at least 10 notebooks. Pens cost ₹10 each.*
(i) Form an inequality representing the maximum number of pens that can be bought.
(ii) Briefly comment which purchase (notebooks or pens) gives better long-term value for learning, with one reason.

Q3.

a) *Fifteen workers can build a wall in 20 days. Only 12 days are now available to build the same wall. How many workers are needed? Explain why this is an example of inverse proportion.*

b) *Alloy A has copper and zinc in the ratio* $3:2$*, and Alloy B has copper and zinc in the ratio* $5:3$*. If equal masses of the two alloys are melted and mixed, find the resulting ratio of copper to zinc in the new alloy.*

c) *Consider the following information about a class:*
Statement I: The sum of the ages of 20 students is 240 years.
Statement II: The teacher is 40 years old.
Decide which of these statements is/are sufficient to determine the average age of the class and explain your answer.

d) *To test whether a number* N *is divisible by 6, a student checks:*
   I. N *is divisible by 2.*
   II. N *is divisible by 3.*
Determine whether each condition alone is sufficient, or whether both are required, to conclude that N *is divisible by 6. Give reasons.*

Q4.

a) *Can a triangle have sides of length 3 cm, 6 cm and 10 cm? Use the Triangle Inequality Property to justify your answer.*

b) *Two same-side interior angles formed by a transversal cutting a pair of parallel lines measure* $5x°$ *and* $(3x + 20)°$*.Identify the relationship between these angles and solve for* x*.*

c) *Name a quadrilateral that has rotational symmetry of order 2 and exactly two lines of symmetry. Draw a rough sketch and mark its lines of symmetry.*

d) *In a group of 40 students, 25 play Football, 15 play Cricket and 5 play neither game.Using Venn-diagram reasoning, find how many students play both Football and Cricket.*

SECTION B

Q5.

(a) A wire of length 20 cm is bent to form:

(i) a square, and

(ii) a rectangle of dimensions $6\ cm \times 4\ cm$.

Find the area enclosed in each case and state which shape encloses the greater area, with a brief explanation.

(b) A cube has side length a. *Each side is increased by 50%.*

(i) Find the new volume of the cube in terms of a.

(ii) Find the percentage increase in volume and explain why the increase in volume is greater than 50%.

(c) A rectangular floor measures $12\ m \times 10\ m$. *A square carpet of side* $6\ m$ *is placed at the centre. Find the area of the floor that remains uncovered.*

(d) A tank of dimensions $2\ m \times 1.5\ m \times 1\ m$ *is completely full of water.*

(i) Find its capacity in litres.

(ii) If water is used at the rate of 4000 L per day, for how many days will the water last?

Q6. **DATA INTERPRETATION**

The table below shows the cumulative number of students scoring at or above each mark (out of 50) in two subjects and in aggregate. The total strength of the class is 100 students.

Subject	*40 and above*	*30 and above*	*20 and above*	*10 and above*
Physics	*9*	*32*	*80*	*92*
Chemistry	*4*	*21*	*66*	*81*
Aggregate	*7*	*27*	*73*	*87*

(a) How many students scored between 30 and 40 marks in Physics?

(b) If the pass mark is 20, how many students failed in Chemistry?

(c) Find the percentage of students who scored 30 marks or more in Aggregate.

(d) Using the 40-and-above data, assess the claim: "Physics was easier than Chemistry." Give one supporting argument or one counter-argument.

Q7.

(a) A trader sells two items for ₹1000 each. On one item he gains 10% and on the other he loses 10%. Determine his overall gain or loss in rupees and explain why equal gain and loss percentages do not cancel out.

(b) A sum of money doubles itself in 8 years at simple interest. Find the rate of interest per annum.

(c) A train moving at 72 km/h passes a pole in 10 seconds. Find the length of the train.

(d) A car travels from A to B at 40 km/h and returns from B to A at 60 km/h. Show that the average speed for the entire journey is not 50 km/h and compute the correct average speed.

Q8.

(a) The perimeter of a rectangle is 40 cm and its length is 4 cm more than its breadth. Form and solve an equation to find the dimensions of the rectangle, and hence find its area.

(b) A bag contains red, blue and green balls. The probability of drawing a red ball is $\frac{1}{3}$ and the probability of drawing a blue ball is $\frac{1}{4}$. Find the probability of drawing a green ball.

(c) A family spends 25% of its monthly income on rent. If this is represented on a pie chart, find the central angle of the sector representing rent.

(d) A plant grows 2 cm, 4 cm and 8 cm in the first three weeks.
(i) State whether this growth pattern is an arithmetic progression or a geometric progression.
(ii) Assuming the pattern continues, predict the growth during the fifth week.

FOR ROUGH WORK

Do not write on this page. Please keep it neat and unsoiled

	Mark (Examiner -1)	**Mark (Examiner-2)**
SECTION – A		
SECTION – B		
Total		