

केंद्रीय विद्यालय गुणपुर (Kendriya Vidyalaya Gunupur)

शरदकालीन अवकाश गृहकार्य (Autumn Break Homework)

कक्षा 9 – हिंदी (पाठ्यपुस्तक गंगा) | सत्र: 2026-27

मुख्य विषय (Theme): साहित्यिक संवेदना, संस्मरण और सामाजिक चिंतन

सामान्य निर्देश (General Instructions):

- सभी कार्य साफ़, सुंदर और स्पष्ट लिखावट में करें।
- गतिविधियाँ (Activities) चित्र, क्राफ्ट या रंगीन स्केच पेन की सहायता से आकर्षक बनाएँ।
- A4 साइज़ शीट / स्क्रेप बुक का उपयोग करें।
- यह कार्य आपकी रचनात्मकता (Creativity), विषय-समझ और प्रयोगात्मक अधिगम पर आधारित है।

गतिविधि 1: 'गांधा साहित्यिक वॉल-हैंगिंग' (Literary Wall Hanging)

पाठ्यपुस्तक 'गंगा' के प्रसिद्ध कवियों/लेखकों (जैसे कबीर, तुलसी, मुंशी प्रेमचंद आदि) में से किसी एक पर एक सुंदर वॉल-हैंगिंग बनाएँ। इसमें लेखक का चित्र, जीवन परिचय, उनकी प्रमुख कृतियाँ और उनके द्वारा लिखी गई दो प्रसिद्ध सूक्तियाँ/दोहे अंकित करें।

गतिविधि 2: 'यात्रा-वृत्त/यात्रा संस्मरण लेखन' (Travelogue Writing)

गंगा के पाठों की शैली का अनुसरण करते हुए, इस अवकाश के दौरान आपने किसी स्थान की यात्रा की हो या अपने गाँव/शहर के किसी प्राकृतिक स्थान का भ्रमण किया हो, उसका 250 शब्दों में एक सुंदर 'यात्रा-वृत्त' (Travelogue) चित्र या फ़ोटो चिपकाकर लिखें।

गतिविधि 3: 'सामाजिक मुद्दे पर स्वरचित लघुकथा एवं पोस्टर'

गंगा के गद्य खंड की संवेदनाओं को ध्यान में रखते हुए किसी ज्वलंत सामाजिक विषय (जैसे-वृद्धजनों का सम्मान, बालिका शिक्षा, या स्वच्छता) पर एक लघुकथा लिखें और उसका एक प्रतीकात्मक चित्र बनाएँ।

केंद्रीय विद्यालय गुणपुर- आपकी शरदकालीन छुट्टियाँ अनंदमय और ज्ञानवर्धक हों!

KENDRIYA VIDYALAYA GUNUPUR
Autumn Break Holiday Homework – English

CLASS-IX

Session 2026–27

Theme: Explore • Research • Create • Write • Communicate

Dear Students,

The autumn break is an opportunity to learn English beyond textbooks. This holiday homework is designed to develop your reading, writing, vocabulary, grammar, research and creative thinking skills through enjoyable, real-life activities.

- Daily time: 15–20 minutes
- Duration: 10 days of guided activities, followed by project completion and revision as needed.
- Materials: English notebook or scrapbook, pencil, colours and age-appropriate books or trusted online resources with adult guidance.
- Important: Write in your own words. Do not copy entire paragraphs from the internet. Interview family members, observe your surroundings and use your imagination.

Common daily activity: Learn your verbs!

- Every day you must practice 5 daily-use verbs each day for 10 days. Learn their meanings, three forms and one original sentence for each verb.

Example: go – went – gone – I go to school every day.

Reflective Writing

Write a 180–200-word reflective piece on “What Does Success Mean to Me?” Support your ideas with examples.

Vocabulary for Expression

Collect 15 academic and expressive words from editorials or quality reading material. Note meanings, word forms, collocations and original sentences.

Interview and Profile

Interview a teacher, professional or community member about a challenge they overcame. Prepare 8–10 questions and write a 180-word profile.

Literary Appreciation

Select a poem from your prescribed syllabus. Explain its central idea, tone, imagery and at least three poetic devices, using brief textual examples.

Article Writing

Write a 200-word article on “Responsible Use of Artificial Intelligence by Students”. Discuss benefits, limitations and ethical use.

Letter to the Editor

Write a formal letter to the editor about a local environmental or civic issue. Explain the problem and suggest practical remedies.

KENDRIYA VIDYALAYA GUNUPUR
Autumn Holiday
CLASS - IX SUBJECT - SOCIAL SCIENCE

Real life experience in autumn break

1. Visit a historical monument, museum, or culturally significant place.

Record its name, location.

*Identify any inscriptions, old objects, buildings or oral traditions associated with it.

*Interview an elderly person or consult a reliable source to learn about its past.

*Explain how historians can use such evidence to understand history.

*Suggest two ways to preserve local heritage.

2. Economics in Everyday Life

*Observe a local market, small shop, farm, or household enterprise.

*Prepare a report explaining:

*What goods or services are produced or sold?

*What resources are needed for the activity?

*How do buyers and sellers determine prices?

*What challenges might the producer or seller face?

*How does this activity support people's livelihoods?

Subject/chapter related question

Early Humans & Civilization

1. Explain how the discovery of fire transformed the lives of Paleolithic early humans.

2. What was the Neolithic Revolution? Mention two major changes it brought to human settlement patterns.

3. List three key features that define an urban civilization (e.g., Indus Valley or Mesopotamian civilization).

4. Trace the transition of early humans from nomadic hunter-gatherers to settled agriculturalists. How did agriculture lead to division of labor and trade?

Atmosphere and Climate

5. Differentiate between weather and climate using suitable examples.

6. Name the atmospheric layer where all weather phenomena (rain, fog, storms) occur. Why is the Stratosphere considered ideal for flying jet aircraft?

7. What is the Greenhouse Effect? Explain how it maintains Earth's temperature suitable for life.

8..Explain the global factors that influence climate (latitude, altitude, distance from the sea, and wind patterns).

Shaping Earth's Surface

9.Distinguish between Endogenic forces and Exogenic forces with one example of each.

10.How does running water create a V-shaped valley and a waterfall?

11.Explain the process of weathering and how it differs from erosion.



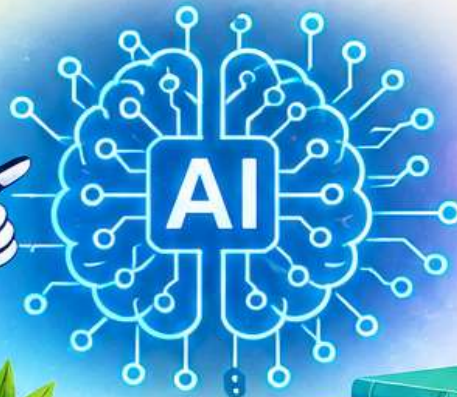
KENDRIYA VIDYALAYA GUNUPUR



Autumn Break Holiday Home Work

Subject :
ARTIFICIAL INTELLIGENCE

Subject Teacher :
Chandra Sekhar Sahu



Machine
Learning



Robotics



Data
Science



Automation



KENDRIYA VIDYALAYA GUNUPUR
CLASS IX (SESSION 2026-2027)
ARTIFICIAL INTELLIGENCE (SUBJECT CODE - 417)

Time Allowed: 90

Min Maximum Marks: 40

General Instructions:

1. Please read the instructions carefully.
2. This Question Paper consists of 15 questions in two sections: Section A & Section B.
3. Section A has Objective type questions whereas Section B contains Subjective type questions.

SECTION A - OBJECTIVE TYPE QUESTIONS (16 MARKS):

- (i) This section has 04 questions.
- (ii) Marks allotted are mentioned against each question/part.
- (iii) There is no negative marking.
- (iv) Do as per the instructions given.

SECTION B – SUBJECTIVE TYPE QUESTIONS (24 MARKS):

- (i) This section has 11 questions.
- (ii) A candidate has to do 10 questions.
- (iii) Do as per the instructions given.
- (iv) Marks allotted are mentioned against each question/part.

SECTION A - OBJECTIVE TYPE QUESTIONS

1 Answer all the question.		
a	Which of the following is an example of verbal communication ? (A) Gestures (B) Facial expressions (C) Written letters (D) Posture	1
b	What does the abbreviation "SMART" commonly stand for in the context of goal-setting? (A) Superior, Motivated, Analytical, Resourceful, Timely (B) Specific, Measurable, Achievable, Realistic, Time-bound (C) Speedy, Manageable, Accurate, Realistic, Tangible (D) Successful, Methodical, Adaptable, Reliable, Thorough	1
c	Which of the following is not a key element of self-management skills? (a) Prioritising your work (b) Not taking feedback (c) Goal setting (d) Staying updated about new practices	1
d	Which of the following types of communication takes place when one individual addresses a large gathering? (a) Written communication (b) Public communication (c) Small group communication (d) Interpersonal communication	1
2 Answer all the question.		
a	Neha is a student of class X who loves to dance but does not take any professional tuition to learn dancing. One day while returning home from school, she saw an open air dance competition being held at the roadside. She participated out of interest and eventually secured her place in the top five among the participants and got rewarded as well. This motivated her greatly and she enrolled herself into a dance class. Now she thinks to take dancing as her career. The above example signifies which type of motivation? a. Internal b. External c. Forcibly d. Both a. and b.	1
b	Which of the following is not a step to build self-motivation? (A) Focusing on your goal. (B) Planning to achieve your goal. (C) Being indisciplined. (D) Finding out your strength	1
c	Which of the following types of communication takes place when the number of people is small enough to communicate with each other effectively? (A) Interpersonal communication (B) Public communication (C) Intrapersonal communication (D) Small group communication	1

d	Which of the following is the correct expansion of CSV? (A) Comma and Space Value (B) Comma Separated Values (C) Control Separated Values (D) Character Separated Values	1
3	Answer all the question.	
a	Which condition of evaluation does the following diagram indicate? Prediction : No Reality : Yes (A) False Positive (B) False Negative (C) True Positive (D) True Negative	1
b	Statement 1 : In “When” block of 4Ws canvas we find the stakeholders. Statement 2 : Stakeholders are the people who face a particular problem and would be benefitted with the solution. (A) Both Statement 1 and Statement 2 are correct. (B) Both Statement 1 and Statement 2 are incorrect. (C) Statement 1 is correct but Statement 2 is incorrect. (D) Statement 2 is correct but Statement 1 is incorrect.	1
c	What is the primary need for evaluating an AI model's performance in the AI Model Development process? (a) To increase the complexity of the model. (b) To visualize the data. (c) To assess how well the chosen model will work in future. (d) To reduce the amount of data used for training.	1
d	Which form of unsupervised learning does the following diagram indicate? (a) Clustering (b) Regression (c) Reinforcement learning (d) Classification	1
4	Answer all the question.	
a	State True/False : Machine learning and Deep learning are part of Artificial Intelligence, but not everything that is Machine learning will be Deep learning.	1
b	_____ is defined as the percentage of correct predictions out of all the observations. (A) Precision (B) Accuracy (C) Recall (D) F1	1
c	For Data Science, usually the data is collected in the form of tables. These tabular datasets can be stored in different formats. Which of the following formats is not used for storing data in a tabular format? (a) CSV (b) Website (c) SQL (d) Spreadsheet	1
d	is one of the parameter for evaluating a model's performance and is defined as the fraction of positive cases that are correctly identified. (a) Precision (b) Accuracy (c) Recall (d) F1	1

SECTION B – SUBJECTIVE TYPE QUESTIONS
(SHORT TYPE QUESTION)

Answer all the question.		
5	If you are a team leader of a team of 20 people in an organization, mention any two methods that you will use for effective communication with your team members.	2
6	Define the following with respect to AI project cycle : (i) Data Exploration (ii) Data Features	2
7	Explain the difference between sector-based and value-based ethical frameworks with one example of each.	2
8	Give two differences between Supervised and Unsupervised learning.	2
9	Draw the confusion matrix for the following data :	2

	(a) The number of true positive = 200 (c) The number of false positive = 35	(b) The number of true negative = 50 (d) The number of false negative = 55	
10	Explain the effectiveness of physical exercise and fresh air in stress management.		2
11	Write the 7 C's of communication.		2

(LONG TYPE QUESTION)

12	Differentiate between Deep Learning, Artificial Intelligence and Machine Learning. Also draw a labelled Venn diagram depicting the relationship between AI, ML and DL.	4
13	Ms. Sooji is a beginner in the field of Artificial Intelligence. She got confused among the core terms like Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL). Many a times, these terms are used interchangeably but are they the same? Justify your answer. Help her in understanding these terms by drawing a well labelled diagram to depict the interconnection of these three fields.	4
14	Consider the following scenarios and identify which AI domain would be most appropriate for each, with justification : (A) An AI based education platform needs to translate to English language and analyze thousands of student essays to provide instant feedback on grammar, content quality and writing style. (B) An AI based application installed on a busy crossing in a metropolitan city scans all vehicles driving through that crossing during peak traffic hours and categorizes them into four wheelers and two wheelers.	4

Q1	Answer any <u>Four</u> out of <u>Five</u> question.	4 M
I	What is the first step in goal setting? (A) Take feedback (C) Set a SMART goal (B) Find strengths (D) Discuss with your friend	1
II	Which statement shows all five main elements of the communication cycle? (A) A person is thinking before speaking. (B) A person is writing a letter but not sending. (C) A customer is asking a question and the cashier responding. (D) A teacher is preparing lesson notes.	1
III	Which of the following is primarily a Mobile Operating System? (A) Microsoft Windows (C) Mac OS (B) Ubuntu (D) Google Android	1
IV	Seema bakes cakes. Her customer comes to her bakery and starts shouting at her for late delivery. She does not get angry and listens to her customer. She is (A) hard worker (C) fearful (B) confident (D) patient	1
V	What should a strong password consist of? (A) Only letters (C) Name of a person (B) Numbers and special characters (D) Letters, numbers and special characters	1
Q2	Answer any <u>Four</u> out of <u>Five</u> question.	4 M
I	A misconception about an entrepreneur is: Entrepreneurs are _____ not _____	1
II	Mani has her final exam coming up. She creates a study schedule and sticks to it, balancing her study time with short breaks. Which self-management skill is she demonstrating ? (A) Emotional Intelligence (C) Stress management (B) Managing Emotions (D) Time management	1

III	Which file extension is commonly used for image files ? (A) .txt (B) .exe (C) .jpg (D) .mp3	1
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IV	Which of the following is an example of verbal communication ? (A) Gestures (B) Facial expressions (C) Written letters (D) Posture	1
V	Raghav can turn on and off any appliance remotely using an internet enabled device. This is an example of _____. (A) Artificial Intelligence (AI) (B) Internet of Things (IoT) (C) Computer Vision (CV) (D) Deep Learning (DL)	1
Q3	Answer any Four out of Five question.	4 M
I	Assertion (A): Bioethics is an example of a Value-based Framework for AI. Reason (R) : Bioethics deals with ethical issues related to health, medicine, and biological sciences. (A) Both (A) and (R) are true and (R) is the correct explanation of (A). (B) Both (A) and (R) are true, but (R) is not the correct explanation of (A). (C) (A) is true, but (R) is false. (D) (A) is false but (R) is true	1
II	It is a domain-specific language that is designed for managing data held in different kinds of DBMS (Database Management System). It is particularly useful in handling structured data. Which computer language is this? (A) SQL (B) CSV (C) Spreadsheet (D) TXT	1
III	Which form of learning-based approach does the following diagram indicate? (A) Clustering (B) Classification (C) Regression (D) Dimensionally Reduction	1
IV	_____ is defined as the percentage of correct predictions out of all the observations. (A) Precision (B) Accuracy (C) Recall (D) F1	1
V	The most important software in any computer is the This is the software that starts working as soon as we switch on a computer. (A) Web Browsers (B) Operating System (C) Office Software (D) Designing Software	1
Q4	Answer any Four out of Five question.	4 M
I	A spam e-mail detection system correctly identifies an e-mail as "Not Spam" when it actually is not spam. This represents: (A) True Positive (TP) (B) True Negative (TN) (C) False Positive (FP) (D) False Negative (FN)	1
II	Artificial Neural Networks are inspired by: (A) Computer circuits (B) Mathematical equations (C) Human brain and nervous system (D) Internet networks	1
III	Ethical frameworks are primarily designed to: (A) Increase the efficiency of AI algorithms. (B) Ensure that choices made do not cause unintended harm. (C) Reduce the cost of AI development. (D) Speed up the AI project cycle.	1
	Statement 1 Overfitting occurs when a model memorizes the training data rather than	

IV	learning patterns. Statement 2: Using the same data for training and evaluation helps the model give accurate results.	1
	(A) Both statements are correct.1 (B) Both statements are incorrect. (C) Statement 1 is correct but statement 2 is incorrect. (D) Statement 1 is incorrect but statement 2 is correct.	
V	Which learning approach would be most suitable for training an AI model to park the car correctly? (A) Supervised Learning (B) Unsupervised Learning (C) Transfer Learning (D) Reinforcement Learning	1
	Answer any Six out of Seven question.	12 M
Q5	State the qualities to become a successful entrepreneur.	2
Q6	How ICT skills help us in our day-to-day activities ?	2
Q7	Explain the difference between sector-based and value-based ethical frameworks with one example of each.	2
Q8	Explain Train-test split technique with respect to machine learning algorithm.	2
Q9	List the four steps for effective time management.	2
Q10	Provide one real-world application each of Supervised Learning and Unsupervised Learning.	2
Q11	What do you mean by Evaluation of an AI model? Also explain the concept of overfitting with respect to AI model Evaluation.	2

AI PORTFOLIO TOPICS

- **Impact of Artificial Intelligence on Education**
- **Artificial Intelligence in Everyday Life**
- **AI and the Future of Employment**
- **Artificial Intelligence and Human Creativity**
- **The Role of AI in Building a Smart Society**
- **AI and Social Media**

KENDRIYA VIDYALAYA GUNUPUR

SCIENCE SUBJECT PORTFOLIO (2026–2027)

Forces and Motion

*A Student Investigative Journal on Dynamics, Newton's Laws, and
Momentum*

Student's Name: _____

Class & Section: IX

Roll No: _____

Subject: Science (Physics)

Teacher: Mrs. Priyanka Dash

Topic: How Forces Affect Motion

1. Balanced vs. Unbalanced Forces in Daily Life

Balanced Forces: When two equal and opposite forces act on a body simultaneously, the net force is zero. They do not change the state of rest or uniform motion (e.g., pushing a heavy wall).

Unbalanced Forces: When a net non-zero force acts on an object, it changes its speed or direction of motion (e.g., kicking a stationary football).

2. Mini Experiment: The Coin and Card Trick (Inertia of Rest)

- **Objective:** To demonstrate Newton's First Law of Motion (Inertia).
- **Materials Required:** A smooth playing card/postcard, an empty glass tumbler, and a coin (₹5 or ₹10).
- **Procedure:** Place the card over the glass mouth and put the coin right at its center. Flick the card sharply with your finger sideways.
- **Observation:** The card flies away, but the coin drops straight into the glass.
- **Scientific Explanation:** Due to inertia, the coin tends to remain in its state of rest even when the card is removed suddenly by the external force. Gravity then pulls it downward into the glass.

[Space for Student Diagram: Card, Coin, and Glass Setup]

1. Understanding Momentum & Newton's Second Law

Momentum (p): The product of mass and velocity. $p = m \times v$ (SI unit: $\text{kg} \cdot \text{m/s}$).

Second Law: The rate of change of momentum of an object is proportional to the applied unbalanced force in the direction of force. Formula: $F = m \times a$.

2. Real-World Case Study: Catching a Cricket Ball

A fielder pulls their hands backward while catching a fast-moving cricket ball. Why? By pulling hands back, the time (t) taken to stop the ball increases. Since $F = \frac{m(v-u)}{t}$, increasing time decreases the impact force on the hands, preventing injury.

3. Numerical Practice Problem

Problem: What is the acceleration produced by a force of 50 N acting on a mass of 10 kg ? Also, calculate its velocity after 3 seconds starting from rest.

Solution Steps:

- **Given:** Force $F = 50 \text{ N}$, Mass $m = 10 \text{ kg}$, Initial velocity $u = 0$, Time $t = 3 \text{ s}$.
- **Acceleration (a):** $a = \frac{F}{m} = \frac{50}{10} = 5 \text{ m/s}^2$.
- **Final Velocity (v):** $v = u + at = 0 + (5 \times 3) = 15 \text{ m/s}$.

1. Newton's Third Law of Motion

To every action, there is an equal and opposite reaction. They always act on two different bodies simultaneously.

2. Illustrated Examples in Nature

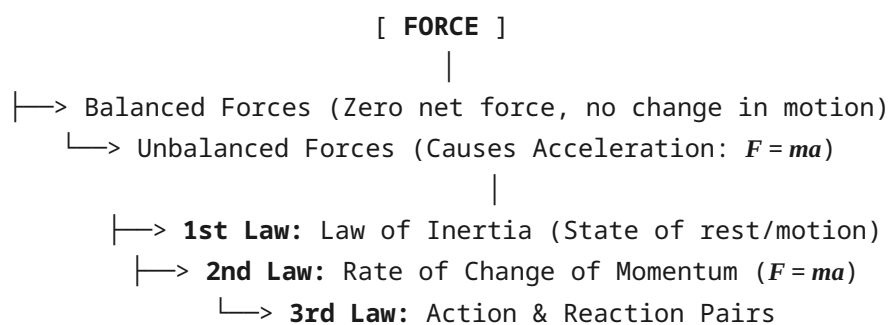
- **Swimmer in Water:** A swimmer pushes the water backward (action), and the water pushes the swimmer forward with equal force (reaction).
- **Balloon Rocket:** Escaping air rushes downward/backward out of the nozzle (action), propelling the balloon upward/forward (reaction).

[Space for Student Sketch: Balloon Rocket or Swimmer Action-Reaction Diagram]

3. Why don't Action and Reaction cancel each other?

Action and reaction forces are equal in magnitude and opposite in direction, but they act on **two different objects**, not the same object. Therefore, they do not result in zero net force on a single body.

1. Concept Summary Map



2. Student Learning Reflection

What was the most interesting concept you discovered while compiling this portfolio?

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.....

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Student's Signature

Teacher's Signature & Grade

KENDRIYA VIDYALAYA GUNUPUR

SUBJECT: MATHEMATICS

CLASS: IX

AUTUMN BREAK HOLIDAY HOME WORK

SESSION: 2026-27

- 1) Solve your PT-2 Question Paper in your Home-work notebook.**
- 2) Complete your Portfolio.**
- 3) Solve the attached Sample Paper in A4 Pages.**

SUBJECT: MATHEMATICS

CLASS : IX

MAX. MARKS : 40

DURATION : 1½ hrs

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Which of the following fractions has a terminating decimal expansion?
(a) $\frac{23}{72}$ (b) $\frac{19}{150}$ (c) $\frac{27}{320}$ (d) $\frac{11}{84}$
2. Which of the following is irrational?
(a) $\frac{31}{17}$ (b) 0.818181... (c) $\sqrt{108}$ (d) 6.125
3. A rational number exactly halfway between $\frac{1}{3}$ and $\frac{2}{3}$ is
(a) $\frac{1}{2}$ (b) $\frac{4}{9}$ (c) $\frac{5}{9}$ (d) $\frac{3}{4}$
4. The decimal expansion of $\frac{39}{2500}$ terminates after
(a) 2 decimal places (b) 3 decimal places (c) 4 decimal places (d) 5 decimal places
5. Three students factorise $49x^2 - 16$ as follows.
Rahul: $(7x - 4)^2$
Sneha: $(7x + 4)(7x - 4)$
Aman: $(49x - 16)(49x + 16)$
Who is correct?
(a) Rahul only (b) Sneha only (c) Aman only (d) Rahul and Aman
6. Which expression expands to $x^2 - 18x + 81$?
(a) $(x + 9)^2$ (b) $(x - 9)^2$ (c) $(x + 9)(x - 9)$ (d) $(x - 18)^2$
7. A student writes $(x + 7)(x - 7) = x^2 + 49$.
Which statement is correct?
(a) The sign of 49 should be negative.
(b) The coefficient of x^2 is incorrect.
(c) The answer should contain a middle term.
(d) The solution is correct.
8. If $(x + \square)^2 = x^2 + 24x + 144$, the missing number is
(a) 10 (b) 12 (c) 24 (d) 144

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

9. Assertion (A): Rational number lying between two rational numbers x and y is $\frac{1}{2}(x + y)$.

Reason (R): There is one rational number lying between any two rational numbers.

10. Assertion (A): If $(x + 8)^2 = x^2 + 16x + 64$, then the coefficient of x is twice the product of x and 8.

Reason (R): In the identity $(a + b)^2 = a^2 + 2ab + b^2$, the middle term is always equal to $2ab$.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Without performing long division, determine whether $\frac{91}{160}$ has a terminating decimal expansion. Also state the number of decimal places.

12. Convert $0.727272\dots$ into the form $\frac{p}{q}$

13. A student starts expanding $(7x - 4)^2$ as follows: $(7x - 4)^2 = (7x)^2 - 2(7x)(4) + \square$
Complete the missing step and write the final answer.

14. A student factorises $343x^3 - 125$ as $(7x - 5)(49x^2 - 35x + 25)$.
Is the factorisation correct? If not, write the correct factorisation.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Without expanding completely, determine which is greater: $(1002)^2$ or $(998)^2$.
Justify your answer using algebraic identities.

16. Prove that $\sqrt{5}$ is an irrational number.

17. Represent $\sqrt{2}$ on the real number line.

SECTION – D

Questions 18 carry 5 marks each.

18. A city authority is developing a Smart Sports Complex. The chief engineer has prepared three alternative designs for the central play zone.
Design A is a square with side $(x + 8)$ metres.
Design B is a square with side $(x - 8)$ metres.
Design C is a rectangular practice arena having length $(x + 8)$ metres and breadth $(x - 8)$ metres.
The planning committee wants to compare the three designs without carrying out lengthy multiplication.
Using suitable algebraic identities, answer the following questions.
(a) Write the algebraic expression for the area of Design A.

- (b) Write the algebraic expression for the area of Design B.
 (c) Find the algebraic expression for the area of Design C.
 (d) If $x = 18$, determine: Area of Design A, Area of Design B and Area of Design C

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Case Study -1: Rational Numbers in School Attendance Analysis

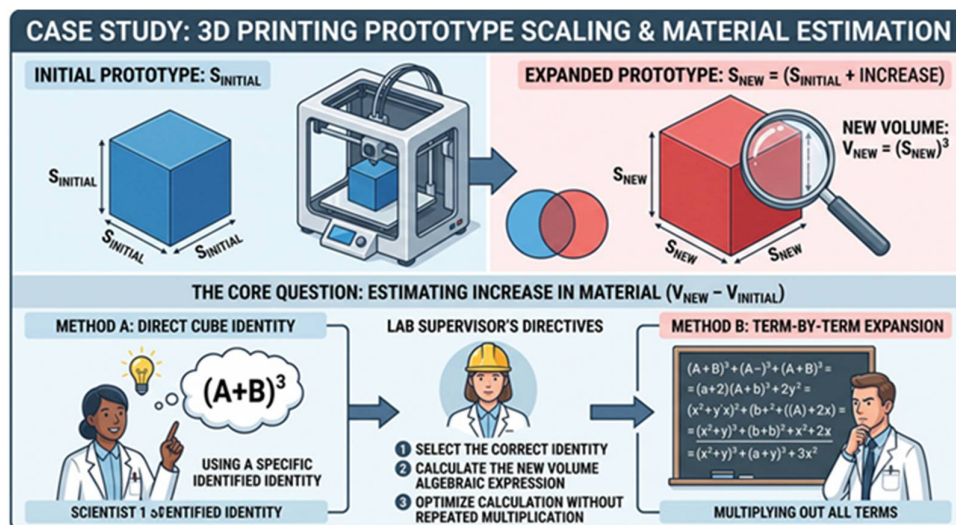
A group of students visited a Mathematics Exhibition where a large "Number Line Wall" was displayed. The wall showed various rational numbers marked between 0 and 1. Students observed that between any two rational numbers, more rational numbers could always be inserted. To verify this idea, they selected the numbers $\frac{2}{5}$ and $\frac{3}{5}$ and repeatedly found averages of the two numbers. They discovered that no matter how many rational numbers were inserted, there was always room to place another rational number. This helped them understand an important property of rational numbers called the **density property**.



- (a) Find four rational numbers between $\frac{3}{4}$ and $\frac{4}{5}$. (2)
 (b) Find one rational number between $\frac{2}{5}$ and $\frac{3}{5}$. (1)
 (c) How many rational numbers exist between two rational numbers? (1)

20. Case Study – 2: 3D Printing Laboratory

A research laboratory manufactures **cube-shaped prototypes** using advanced 3D printers. Initially, each prototype has side x cm. To test improved designs, the side is increased to $(x + 3)$ cm. The research team wants to estimate the increase in material required without performing repeated multiplication. One scientist recommends using the cube identity directly, while another suggests first expanding the expression term by term. The laboratory supervisor asks the team to identify the correct identity and then calculate the algebraic expression representing the new volume.



- (a) Which algebraic identity should be used to expand $(x + 3)^3$? (1)
- (b) Expand $(x + 3)^3$. (2)
- (c) If $x = 7$, find the volume of the new cube. (1)

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अभ्यासाद् जायते सिद्धिः

१. अधः प्रदत्तानां प्रश्नानां पूर्णवाक्येन उत्तराणि लिखत —

- (क) खुदीरामस्य जन्म कुत्र अभवत् ?
- (ख) खुदीरामः किमर्थं व्यथितः भवति स्म ?
- (ग) सत्येन्द्रनाथः किम् उपदिष्टवान् ?
- (घ) खुदीरामः कदा पर्यन्तं पादत्राणं न धरिष्यामि इति प्रतिज्ञातवान् ?
- (ङ) किमर्थं न्यायाधीशः आङ्गलाः अधिकारिणः च चकिताः ?

२. अधः प्रदत्तेषु वाक्येषु किं वाक्यं सत्यं किं च असत्यम् इति सूचयत —

- (क) देशभक्तानां जीवनं राष्ट्राय समर्पितं भवति । (सत्यम्/असत्यम्)
- (ख) निर्दयः किङ्गजफोर्ड् बालान् अपि दण्डयति स्म । (सत्यम्/असत्यम्)
- (ग) खुदीरामस्य आक्रमणेन किङ्गजफोर्ड् मृतः । (सत्यम्/असत्यम्)
- (घ) खुदीरामः किङ्गजफोर्ड्महोदयस्य रथस्य उपरि विस्फोटकं क्षिप्तवान् । (सत्यम्/असत्यम्)
- (ङ) खुदीरामः बालानां सङ्घटनं कृत्वा पदयात्राम् आयोजयति स्म । (सत्यम्/असत्यम्)

३. अधः प्रदत्तानां संवत्सराणां शब्दानाम् अङ्कैः सह मेलनं कुरुत —

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|--|---------|
| (क) सप्तचत्वारिंशदधिक-नवदशशततमं वर्षम् | १. १९०५ |
| (ख) अष्टाधिक-नवदशशततमं वर्षम् | २. १८८९ |
| (ग) पञ्चाशदुत्तर-नवदशशततमं वर्षम् | ३. १९४७ |
| (घ) पञ्चाधिक-नवदशशततमं वर्षम् | ४. १९०८ |
| (ङ) नवाशीत्यधिक-अष्टादशशततमं वर्षम् | ५. १९५० |



आत्मनेपदीनां धातूनां पञ्चसु लकारेषु प्रयोगाः

‘वृधु’- धातुः, लट् - लकारः			
पुरुषः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमपुरुषः	वर्धते	वर्धेते	वर्धन्ते
मध्यमपुरुषः	वर्धसे	वर्धेथे	वर्धध्वे
उत्तमपुरुषः	वर्धे	वर्धावहे	वर्धामहे
‘लभ्’- धातुः, लट् - लकारः			
पुरुषः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमपुरुषः	लभते	लभेते	लभन्ते
मध्यमपुरुषः	लभसे	लभेथे	लभध्वे
उत्तमपुरुषः	लभे	लभावहे	लभामहे
‘वृध्’- धातोः रूपाणां वाक्येषु प्रयोगः			
पुरुषः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमपुरुषः	वृक्षः वर्धते ।	वृक्षौ वर्धेते ।	वृक्षाः वर्धन्ते ।
मध्यमपुरुषः	त्वं वर्धसे ।	युवां वर्धेथे ।	यूयं वर्धध्वे ।
उत्तमपुरुषः	अहं वर्धे ।	आवां वर्धावहे ।	वयं वर्धामहे ।
एवमेव भाषते, वर्तते, कम्पते, स्पर्धते, लभते, सेवते, स्पन्दते, यतते, रोचते, एधते, मोदते, वन्दते, रमते, शोभते, सहते, ईक्षते, शिक्षते चेत्यादयः ।			

‘वृधु’- धातुः, लृट् लकारः			
पुरुषः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमपुरुषः	वर्धिष्यते	वर्धिष्येते	वर्धिष्यन्ते
मध्यमपुरुषः	वर्धिष्यसे	वर्धिष्येथे	वर्धिष्यध्वे
उत्तमपुरुषः	वर्धिष्ये	वर्धिष्यावहे	वर्धिष्यामहे

४. अधः प्रदत्तानि पदानि आधृत्य चित्रं दृष्ट्वा पञ्च वाक्यानि लिखत —



उद्यानं, गृहाणि, पक्षिणः, पुष्पाणि, स्वच्छता, द्विचक्रिका,
पर्वतः, वृक्षाः, सूर्यः, मेघाः

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(ग)

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८. पाठे कदाचित्, कस्यचित्, इति एवं विधानि पदानि सन्ति । एतानि 'चित्' प्रत्यययुक्तानि अव्ययानि भवन्ति । एतानि पदानि विशेषणानि भवन्ति । चित् प्रत्ययस्य योजनेन अर्थे अनिश्चयस्य भावः सूच्यते । यथा —

कदा + चित्	कदाचित्	कस्य + चित्	कस्यचित्
केन + चित्	केनचित्	कुत्र + चित्	कुत्रचित्
कति + चित्	कतिचित्	कुतः + चित्	कुतश्चित्
कथं + चित्	कथञ्चित्	का + चित्	काचित्
कः + चित्	कश्चित्	किं + चित्	किञ्चित्

उदाहरणानुसारं चित्-प्रत्ययान्तपदानि प्रयुज्य रिक्तस्थाने पूर्णवाक्यं लिखत —

कश्चित्, काचित्, किञ्चित्, कुत्रचित्, कदाचित्

- (क) बालकः गच्छति । कश्चित् बालकः गच्छति ।
- (ख) बालिका गच्छति ।
- (ग) फलं खादतु ।
- (घ) लेखनी लुप्ता ।
- (ङ) सः आगच्छेत् ।

‘त्’ कारान्तः स्त्रीलिङ्गः ‘सरित्’ शब्दः

विभक्तिः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमा	सरिद्, सरित्	सरितौ	सरितः
द्वितीया	सरितम्	सरितौ	सरितः
तृतीया	सरिता	सरिद्भ्याम्	सरिद्भिः
चतुर्थी	सरिते	सरिद्भ्याम्	सरिद्भ्यः
पञ्चमी	सरितः	सरिद्भ्याम्	सरिद्भ्यः
षष्ठी	सरितः	सरितोः	सरिताम्
सप्तमी	सरिति	सरितोः	सरित्सु
सम्बोधनम्	हे सरिद्, हे सरित्	हे सरितौ	हे सरितः

‘त्’ कारान्तः स्त्रीलिङ्गः ‘विद्युत्’ शब्दः

विभक्तिः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमा	विद्युद्, विद्युत्	विद्युतौ	विद्युतः
द्वितीया	विद्युतम्	विद्युतौ	विद्युतः
तृतीया	विद्युता	विद्युद्भ्याम्	विद्युद्भिः
चतुर्थी	विद्युते	विद्युद्भ्याम्	विद्युद्भ्यः
पञ्चमी	विद्युतः	विद्युद्भ्याम्	विद्युद्भ्यः
षष्ठी	विद्युतः	विद्युतोः	विद्युताम्
सप्तमी	विद्युति	विद्युतोः	विद्युत्सु
सम्बोधनम्	हे विद्युद्, हे विद्युत्	हे विद्युतौ	हे विद्युतः

‘स्’ कारान्तः नपुंसकलिङ्ग ‘छन्दस्’ शब्दः

विभक्तिः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमा	छन्दः	छन्दसी	छन्दांसि
द्वितीया	छन्दः	छन्दसी	छन्दांसि
तृतीया	छन्दसा	छन्दोभ्याम्	छन्दोभिः
चतुर्थी	छन्दसे	छन्दोभ्याम्	छन्दोभ्यः
पञ्चमी	छन्दसः	छन्दोभ्याम्	छन्दोभ्यः
षष्ठी	छन्दसः	छन्दसोः	छन्दसाम्
सप्तमी	छन्दसि	छन्दसोः	छन्दःसु, छन्दस्सु
सम्बोधनम्	हे छन्दः	हे छन्दसी	हे छन्दांसि

‘ष्’ कारान्तः नपुंसकलिङ्ग ‘चक्षुष्’ शब्दः

विभक्तिः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमा	चक्षुः	चक्षुषी	चक्षूंषि
द्वितीया	चक्षुः	चक्षुषी	चक्षूंषि
तृतीया	चक्षुषा	चक्षुभ्याम्	चक्षुर्भिः
चतुर्थी	चक्षुषे	चक्षुभ्याम्	चक्षुर्भ्यः
पञ्चमी	चक्षुषः	चक्षुभ्याम्	चक्षुर्भ्यः
षष्ठी	चक्षुषः	चक्षुषोः	चक्षुषाम्
सप्तमी	चक्षुषि	चक्षुषोः	चक्षुःषु, चक्षुष्षु
सम्बोधनम्	हे चक्षुः	हे चक्षुषी	हे चक्षूंषि



शब्दरूपाणि



0902CH15

पुंलिङ्गशब्दाः

'न्' कारान्तः पुंलिङ्गः 'ब्रह्मन्' शब्दः			
विभक्तिः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमा	ब्रह्मा	ब्रह्माणौ	ब्रह्माणः
द्वितीया	ब्रह्माणम्	ब्रह्माणौ	ब्रह्मणः
तृतीया	ब्रह्मणा	ब्रह्मभ्याम्	ब्रह्मभिः
चतुर्थी	ब्रह्मणे	ब्रह्मभ्याम्	ब्रह्मभ्यः
पञ्चमी	ब्रह्मणः	ब्रह्मभ्याम्	ब्रह्मभ्यः
षष्ठी	ब्रह्मणः	ब्रह्मणोः	ब्रह्मणाम्
सप्तमी	ब्रह्मणि	ब्रह्मणोः	ब्रह्मसु
सम्बोधनम्	हे ब्रह्मन्	हे ब्रह्माणौ	हे ब्रह्माणः

'न्' कारान्तः पुंलिङ्गः 'गुणिन्' शब्दः			
विभक्तिः	एकवचनम्	द्विवचनम्	बहुवचनम्
प्रथमा	गुणी	गुणिनौ	गुणिनः
द्वितीया	गुणिनम्	गुणिनौ	गुणिनः
तृतीया	गुणिना	गुणिभ्याम्	गुणिभिः
चतुर्थी	गुणिने	गुणिभ्याम्	गुणिभ्यः
पञ्चमी	गुणिनः	गुणिभ्याम्	गुणिभ्यः
षष्ठी	गुणिनः	गुणिनोः	गुणिनाम्
सप्तमी	गुणिनि	गुणिनोः	गुणिषु
सम्बोधनम्	हे गुणिन्	हे गुणिनौ	हे गुणिनः

शब्दः	अर्थः	हिन्दी	English
प्रयत्नः	उच्चारणे प्रयुज्यमानं बलम्	उच्चारण में प्रयुक्त 'बल' अथवा 'दबाव'	'Effort' in Speech
अभ्यन्तरे	अन्तः	अन्दर	Inside
आभ्यन्तरम्	अन्तःस्थितम्	अन्दर स्थित	Internal
आभ्यन्तर-प्रयत्नः	अन्तःप्रयत्नः / आस्यस्य अभ्यन्तरे करणस्य स्थानं प्रति प्रयुक्तं बलम्	मस्तक के अन्दर, करण का – स्थान के प्रति प्रयुक्त 'बल' अथवा 'दबाव'	'Internal-Effort' in Articulation (exerted by the 'Tool' – towards the 'Place', inside the Head)
स्पृष्टः	स्पर्श कृतः	स्पर्श किया हुआ	Touched
ईषत्	अल्पम्	थोड़ा	Slightly / Little
ईषत्-स्पृष्टः	अल्पं स्पर्श कृतः	थोड़ा स्पर्श किया हुआ	Slightly Touched
विवृतः	उद्घाटितः	खुला हुआ	Opened
विवरः	छिद्रः / अन्तरालः	अन्तराल	Opening / Gap
ईषद्-विवृतः	अल्पम् उद्घाटितः	थोड़ा खुला हुआ	Slightly Opened
संवृतः	अविस्तृतः	सिकुड़ा हुआ	Constrained / Contracted
संकोचः	संकोचनम्	सिकुड़ना	Compress
संकुचितः	संकीर्णः / संकोचं कृतः	सिकुड़ा गया	Constricted / Narrow

वर्णाः

वर्णमाला

(१) स्वराः

समानाक्षराणि
सन्ध्यक्षराणि

अ
- आ अ३ इ ई इ३ उ ऊ उ३
ऋ ऋ३ ॠ ॠ३ ॡ ॡ३
ए ए३ ऐ ऐ३ ओ ओ३ औ औ३

आभ्यन्तर-प्रयत्नः

संवृत-
प्रयत्नः

विवृत-
प्रयत्नः

(२) व्यञ्जनानि

स्पर्शाः (वर्गीयाः)
अन्तःस्थाः (अर्ध-स्वराः)
ऊष्माणः
अनुस्वारः
विसर्गः

क ख ग घ ङ
च छ ज झ ञ
ट ठ ड ढ ण
त थ द ध न
प फ ब भ म
य र ल व
श ष स ह
अं
अः

स्पृष्ट-
प्रयत्नः

ईषत्-स्पृष्ट-
प्रयत्नः

ईषद्-विवृत
प्रयत्नः

