

AUTUMN BREAK HOMEWORK

CLASS IX, SUB:- SCIENCE

A. Write the following activities from science lab manual

1) Preparation of:

- a) A true solution of common salt, sugar and alum
- b) A suspension of soil, chalk powder and fine sand in water
- c) A colloidal solution of starch in water and egg albumin/milk in water and distinguish between these on the basis of
 - transparency
 - filtration criterion
 - stability

2) Preparation of stained temporary mounts of

- (a) Onion peel
 - (b) Human cheek cells and to record observations and draw their labelled diagrams
- 3) Identification of Parenchyma, Collenchyma and Sclerenchyma tissues in plants, striped, smooth and cardiac muscle fibres and nerve cells in animals from prepared slides. Draw their labelled diagrams.**

7) Verification of the laws of reflection of sound.

B. Prepare your portfolio and make all the diagrams of the chapter Cell: The Building Block of Life and Tissues in action in white A4 paper or project paper.

कक्षा नवीं के लिए शरदावकाश हेतु गृहकार्य , सत्र: 2026-27.

1. स्वतंत्रता सेनानियों की सूची बनाकर अपने क्षेत्र के किसी महान स्वतन्त्रता सेनानी का सचित्र वर्णन कर परियोजना कार्य तैयार करना है ।
2. छुट्टियों के दौरान की गई या अन्य अपनी यात्रा को लिपिबद्ध कीजिए अर्थात यात्रा वृत्तांत लिखिए ।
3. प्रदत्त कार्य के अंतर्गत हिंदी सिनेमा जगत के गायकों की सूची बनाकर अपने किसी एक पसंदीदा गायक/गायिका की जीवनी लिखनी है ।
4. अपने स्वैच्छिक विषयों पर दो संवाद लिखने हैं ।

विषय शिक्षक

जितेन्द्र कुमार प्रशिक्षित स्नातक शिक्षक हिंदी

पीएम श्री केंद्रीय विद्यालय छ. संभाजीनगर छावनी द्वितीय पाली

पोर्टफोलियो

हिंदी विषय • कक्षा 10 वीं

“मेरी पहचान • मेरी रुचियाँ • मेरे लक्ष्य • मेरी सीख”

विद्यार्थी का नाम	
कक्षा / अनुभाग	
अनुक्रम	
सत्र	2026–27
हिंदी शिक्षक/शिक्षिका	

मेरा परिचय

♦ 1. मेरी व्यक्तिगत जानकारी

मेरा पूरा नाम :

मेरा जन्मदिन और जन्मस्थान :

मेरा निवास स्थान :

मेरे परिवार के बारे में (संक्षेप में) :

♦ 2. मेरी पहचान

मेरी तीन अच्छी आदतें :

मेरी तीन प्रमुख विशेषताएँ :

मेरी सबसे बड़ी ताकत :

मुझे अपने अंदर किस गुण पर गर्व है?

मेरी रुचियाँ और पसंद

♦ 3. मेरी रुचियाँ

मेरा पसंदीदा विषय और उसका कारण :

मेरा पसंदीदा शौक / गतिविधि :

मेरी पसंदीदा पुस्तक / कहानी :

मेरा पसंदीदा व्यक्तित्व और उससे मिलने वाली प्रेरणा :

♦ 4. हिंदी से मेरा जुड़ाव

हिंदी की कौन-सी विधा मुझे सबसे अधिक पसंद है—कविता, कहानी, नाटक, संस्मरण आदि? क्यों?

हिंदी विषय में मेरी सबसे अच्छी क्षमता :

हिंदी में मुझे किस क्षेत्र में सुधार की आवश्यकता है?

मेरा लक्ष्य और मेरी कार्ययोजना

◆ 5. मेरा भविष्य

मेरा जीवन-लक्ष्य :

मैं भविष्य में किस क्षेत्र में करियर बनाना चाहता/चाहती हूँ?

इस लक्ष्य को चुनने का कारण :

मेरे आदर्श व्यक्तित्व से मुझे क्या प्रेरणा मिलती है?

◆ 6. लक्ष्य प्राप्ति की मेरी कार्ययोजना

मैं प्रतिदिन अध्ययन के लिए कितना समय दूँगा/दूँगी?

अपने लक्ष्य के लिए मेरी तीन प्राथमिकताएँ :

मेरी एक ऐसी आदत जिसे मैं बदलना चाहता/चाहती हूँ :

अगले छह महीनों में मैं कौन-सी उपलब्धि प्राप्त करना चाहता/चाहती हूँ?

मेरी रचनात्मक अभिव्यक्ति

♦ 7. रचनात्मक लेखन

निम्नलिखित विषयों में से किसी एक विषय पर 120-150 शब्दों में लिखिए :

- (क) मेरा सपना – मेरा भविष्य
- (ख) मेरे जीवन का यादगार दिन
- (ग) मेरा आदर्श व्यक्तित्व

♦ 8. मेरी रचनात्मक पसंद

मैंने ऊपर दिए गए विषय में से यही विषय क्यों चुना?

आत्म-मूल्यांकन एवं शिक्षक मूल्यांकन

♦ 9. मेरा आत्म-मूल्यांकन

क्षेत्र	मैं स्वयं को आँकता/आँकती हूँ	मेरी अगली कार्ययोजना
पठन कौशल	उत्कृष्ट / अच्छा / सुधार अपेक्षित	_____
लेखन कौशल	उत्कृष्ट / अच्छा / सुधार अपेक्षित	_____
व्याकरण	उत्कृष्ट / अच्छा / सुधार अपेक्षित	_____
मौखिक अभिव्यक्ति	उत्कृष्ट / अच्छा / सुधार अपेक्षित	_____
नियमित अध्ययन	उत्कृष्ट / अच्छा / सुधार अपेक्षित	_____

♦ 10. शिक्षक द्वारा मूल्यांकन – 05 अंक

मापदंड	अधिकतम अंक	प्राप्त अंक
व्यक्तिगत जानकारी एवं संपूर्णता	1	_____
विषय-वस्तु एवं आत्म-अभिव्यक्ति	1	_____
भाषा, वर्तनी एवं व्याकरण	1	_____
रचनात्मकता एवं प्रस्तुतीकरण	1	_____
स्वच्छता एवं समयबद्धता	1	_____

कुल प्राप्तांक : _____ / 05

शिक्षक की टिप्पणी : _____

विद्यार्थी के हस्ताक्षर : _____

अभिभावक के हस्ताक्षर : _____

शिक्षक के हस्ताक्षर : _____

प्राचार्य

KENDRIYA VIDYALAYA GUMLA
AUTUMN BREAK HOLIDAY HOMEWORK
Academic Session 2026–27

Class	IX
Subject	Mathematics
Subject Teacher	Sumit, PGT Mathematics
Textbook	Ganita Manjari
Chapters	4. Exploring Algebraic Identities; 5. I'm Up and Down, and Round and Round
Total Questions	100 (50 from each chapter)

General Instructions

1. Attempt all 100 questions in a separate Mathematics notebook.
2. Show complete calculations and logical steps.
3. Questions are arranged in increasing order of difficulty.
4. The last 10 questions of each chapter are competency-based.
5. Draw neat and properly labelled figures wherever required.
6. Use the identities and geometric results studied in Ganita Manjari.

SECTION A: EXPLORING ALGEBRAIC IDENTITIES

Chapter 4 – Total Questions: 50

Level I – Easy Questions (1–10)

Question 1. Expand and simplify:

$$(x + 3)^2.$$

Question 2. Expand and simplify:

$$(a - 5)^2.$$

Question 3. Expand using a suitable identity:

$$(x + 4)(x - 4).$$

Question 4. Expand and simplify:

$$(2x + 3)^2.$$

Question 5. Expand and simplify:

$$(3a - 2b)^2.$$

Question 6. Find the product:

$$(x + 2)(x + 5).$$

Question 7. Simplify:

$$(a + b)^2 - (a - b)^2.$$

Question 8. Factorise:

$$x^2 - 25.$$

Question 9. Factorise:

$$x^2 + 10x + 25.$$

Question 10. Simplify:

$$\frac{x^2 - 9}{x - 3}, \quad x \neq 3.$$

Level II – Moderate Questions (11–25)

Question 11. Expand and simplify:

$$(x + 2y + 3z)^2.$$

Question 12. Expand:

$$(a + b + c)^2.$$

Question 13. Using an identity, evaluate:

$$103^2.$$

Question 14. Using an identity, evaluate:

$$98 \times 102.$$

Question 15. Factorise completely:

$$4x^2 - 12x + 9.$$

Question 16. Factorise:

$$9a^2 - 16b^2.$$

Question 17. Factorise:

$$x^2 + 7x + 12.$$

Question 18. Factorise:

$$x^2 - 2xy + y^2 - z^2.$$

Question 19. Simplify:

$$(x + y)^2 + (x - y)^2.$$

Question 20. Simplify:

$$(a + b + c)^2 - (a - b - c)^2.$$

Question 21. Factorise:

$$8x^3 + 27y^3.$$

Question 22. Factorise:

$$27a^3 - 8b^3.$$

Question 23. Simplify:

$$\frac{x^2 - 16}{x + 4}, \quad x \neq -4.$$

Question 24. Simplify:

$$\frac{x^2 + 5x + 6}{x + 2}, \quad x \neq -2.$$

Question 25. Factorise:

$$x^3 + 3x^2 + 3x + 1.$$

Level III – Difficult Questions (26–40)

Question 26. Expand and simplify:

$$(2x - 3y + z)^2.$$

Question 27. Using algebraic identities, simplify:

$$(x + y + z)^2 - (x - y - z)^2.$$

Question 28. Factorise completely:

$$x^4 - 16.$$

Question 29. Factorise:

$$a^2 + 2ab + b^2 - c^2.$$

Question 30. Factorise completely:

$$x^3 - 8.$$

Question 31. Factorise completely:

$$8x^3 + 12x^2 + 6x + 1.$$

Question 32. Simplify:

$$\frac{x^2 - 4}{x^2 + 4x + 4}, \quad x \neq -2.$$

Question 33. Simplify:

$$\frac{x^2 - 9}{x^2 - 6x + 9}, \quad x \neq 3.$$

Question 34. Factorise:

$$x^2 - y^2 + 2x + 1.$$

Question 35. If $a + b = 12$ and $ab = 32$, find $a^2 + b^2$ without calculating a and b separately.

Question 36. If $x - y = 5$ and $xy = 6$, find $x^2 + y^2$.

Question 37. If $a + b + c = 0$, prove that

$$a^3 + b^3 + c^3 = 3abc.$$

Question 38. Factorise:

$$x^3 + y^3 + z^3 - 3xyz.$$

Question 39. Simplify:

$$\frac{x^2 - 4}{x^2 - 4x + 4} \times \frac{x - 2}{x + 2},$$

stating all restrictions on x .

Question 40. Prove that

$$\begin{aligned}(a+b)^2 + (b+c)^2 + (c+a)^2 \\ = 2(a^2 + b^2 + c^2 + ab + bc + ca).\end{aligned}$$

Level IV – Competency-Based Questions (41–50)

Question 41. Area of a Square: A square has side length $(x+3)$ units. (i) Express its area as an algebraic expression. (ii) Expand the expression using an identity. (iii) Find the area when $x = 7$.

Question 42. Mental Calculation: A student wants to calculate 1002^2 without long multiplication. Use a suitable algebraic identity to find the answer and explain why the method is efficient.

Question 43. Rectangular Garden: A rectangular garden has length $(x+5)$ m and breadth $(x-5)$ m. (i) Find its area in terms of x . (ii) Express the area using an algebraic identity. (iii) Find the area when $x = 13$.

Question 44. Error Detection: A student writes

$$(a+b)^2 = a^2 + b^2.$$

Identify the error, write the correct identity and verify it for $a = 2$ and $b = 3$.

Question 45. Cost Calculation: The cost of one item is Rs. $(x+4)$. Find the total cost of $x+4$ such items as an algebraic expression. Expand it and calculate the cost when $x = 6$.

Question 46. Number Pattern: Two consecutive integers are n and $n+1$. Express the square of their sum algebraically and expand it. Evaluate the expression for $n = 4$.

Question 47. Area Comparison: A square has side $(a+b)$ units. Another square has side $(a-b)$ units. Find the difference between their areas and simplify it using an algebraic identity.

Question 48. Error Detection in Factorisation: A student factorises

$$x^2 + 9 = (x+3)(x-3).$$

Is this correct? Explain the error and verify your answer by expanding the proposed factors.

Question 49. Algebraic Reasoning: If $x+y = 15$ and $xy = 44$, find $x^2 + y^2$ using an identity. Explain why it is unnecessary to find x and y separately.

Question 50. Case Study – Designing a Frame: A square picture frame has outer side length $(x+2)$ cm and inner square side length $(x-2)$ cm, where $x > 2$. (i) Find the outer area. (ii) Find the inner area. (iii) Find the area of the frame material. (iv) Simplify the result using an algebraic identity. (v) Calculate the material area when $x = 10$.

SECTION B: I'M UP AND DOWN, AND ROUND AND ROUND

Chapter 5 – Circles – Total Questions: 50

Level I – Easy Questions (51–60)

- Question 51.** Define a circle. What is meant by its centre and radius?
- Question 52.** Define the following terms: (i) chord, (ii) diameter, (iii) arc, and (iv) circumference.
- Question 53.** A circle has radius 7 cm. Find its diameter.
- Question 54.** How many circles can pass through a single fixed point? Explain your answer.
- Question 55.** How many circles can pass through two distinct fixed points? Describe the possible positions of their centres.
- Question 56.** How many distinct circles can pass through three non-collinear points?
- Question 57.** What is a chord of a circle? Is every chord a diameter? Give a reason.
- Question 58.** What is meant by a cyclic quadrilateral?
- Question 59.** State the relation between the angle subtended by a diameter at a point on the circle and a right angle.
- Question 60.** State the relation between opposite angles of a cyclic quadrilateral.

Level II – Moderate Questions (61–75)

- Question 61.** A chord of a circle passes through its centre. What special type of chord is it? Explain.
- Question 62.** Two equal chords of a circle are given. What can you say about their distances from the centre? State the relevant result.
- Question 63.** A perpendicular is drawn from the centre of a circle to a chord. What does this perpendicular do to the chord?
- Question 64.** In a circle with centre O , OM is perpendicular to chord AB . If $AB = 16$ cm, find AM and MB .
- Question 65.** A circle has radius 13 cm. The perpendicular distance of a chord from the centre is 5 cm. Find the length of the chord.
- Question 66.** A chord of length 24 cm lies in a circle of radius 13 cm. Find the perpendicular distance of the chord from the centre.
- Question 67.** Two equal chords AB and CD of a circle are given. If the distance of AB from the centre is 4 cm, find the distance of CD from the centre.
- Question 68.** An angle subtended by chord AB at a point P on the circle is 55° . Find the angle subtended by the same chord at another point Q on the same segment.
- Question 69.** A chord subtends an angle of 40° at a point on the major arc. Find the angle subtended by the chord at the centre, assuming the point lies on the major arc.
- Question 70.** In a circle, AB is a diameter and C is a point on the circle. Find $\angle ACB$. Give a reason.
- Question 71.** In a cyclic quadrilateral $ABCD$, if $\angle A = 75^\circ$, find $\angle C$.

Question 72. In a cyclic quadrilateral, one pair of opposite angles is $(2x + 10)^\circ$ and $(3x - 5)^\circ$. Find x and both angles.

Question 73. Three non-collinear points A, B, C are given. Explain why there is exactly one circle passing through all three points.

Question 74. A circle has centre O . The perpendicular bisector of chord AB intersects AB at M . What can you say about OA and OB ? Explain using the definition of a circle.

Question 75. In a cyclic quadrilateral $ABCD$, if $\angle B = 110^\circ$ and $\angle A = 65^\circ$, find $\angle D$ and $\angle C$.

Level III – Difficult Questions (76–90)

Question 76. Prove that the perpendicular drawn from the centre of a circle to a chord bisects the chord.

Question 77. Prove that equal chords of the same circle are equidistant from the centre.

Question 78. Prove that chords equidistant from the centre of the same circle are equal.

Question 79. In a circle with centre O , chord $AB = 16$ cm and $OM \perp AB$. If the radius is 10 cm, find OM .

Question 80. In a circle, two chords have lengths 12 cm and 16 cm. The radius is 10 cm. Find the perpendicular distance of each chord from the centre and compare them.

Question 81. Prove that the angle subtended by an arc at the centre of a circle is twice the angle subtended by it at any point on the remaining part of the circle.

Question 82. In a circle, chord AB subtends an angle of 35° at a point C on the remaining circumference. Find the angle subtended by the same arc at the centre, using the appropriate theorem.

Question 83. AB is a diameter of a circle and C is a point on the circle. If $\angle BAC = 32^\circ$, find $\angle ABC$ and $\angle ACB$.

Question 84. In a cyclic quadrilateral $ABCD$, $\angle A = 3x^\circ$ and $\angle C = (2x + 25)^\circ$. Find x , $\angle A$ and $\angle C$.

Question 85. Prove that opposite angles of a cyclic quadrilateral are supplementary.

Question 86. In a cyclic quadrilateral $ABCD$, $\angle A = (x + 20)^\circ$ and $\angle C = (2x + 10)^\circ$. Find all four angles if $\angle B = 80^\circ$.

Question 87. A chord of a circle is 10 cm long and its distance from the centre is 12 cm. Find the radius of the circle.

Question 88. Two chords AB and CD of the same circle are equal. If the perpendicular distance of AB from the centre is $(2x + 1)$ cm and that of CD is $(3x - 4)$ cm, find x .

Question 89. A quadrilateral has angles 80° , 100° , 95° and 85° . Can it be a cyclic quadrilateral? Check the condition on opposite angles and justify your answer.

Question 90. Four points A, B, C, D lie on a circle. If $\angle ABC = 72^\circ$ and $\angle ADC = 108^\circ$, verify the supplementary-angle property for the cyclic quadrilateral and explain your reasoning.

Level IV – Competency-Based Questions (91–100)

Question 91. Circular Park: A circular park has centre O and a straight path AB is a chord. The shortest distance from O to AB meets the chord at M . (i) State the relation between AM and MB .

(ii) If $AB = 30$ m, find AM and MB . (iii) Name the circle theorem used.

Question 92. Designing a Circular Window: A circular window has radius 10 cm. A horizontal chord lies 6 cm from the centre. (i) Draw a labelled diagram. (ii) Find half the chord length. (iii) Find the full chord length using the right triangle formed by the radius and perpendicular distance.

Question 93. Equal Chords in Architecture: Two decorative chords in the same circular design are equal. The distance of the first chord from the centre is 7 cm. Find the distance of the second chord from the centre. State the theorem that justifies your answer.

Question 94. Clock Face: Three points A, B, C lie on the circumference of a circular clock. Chord AB subtends an angle of 38° at C . Find the angle subtended by the same arc at the centre, assuming the central angle corresponds to that same arc. Explain the theorem used.

Question 95. Circular Roof: A circular roof has a diameter AB . A support point C lies on the circumference. (i) Find $\angle ACB$. (ii) Explain why the angle is fixed regardless of the position of C on the semicircle. (iii) Identify the theorem involved.

Question 96. Error Detection: A student claims that every chord of a circle passes through the centre. Explain why this is incorrect. Draw or describe a chord that does not pass through the centre and distinguish it from a diameter.

Question 97. Cyclic Design: A quadrilateral-shaped window has all four vertices on a circle. One interior angle is 112° . (i) Find its opposite angle. (ii) Explain why this result holds for every cyclic quadrilateral. (iii) What would you conclude if the opposite angle were measured as 75° ?

Question 98. Surveying a Circular Boundary: Three non-collinear survey points A, B, C lie on the boundary of a circular field. (i) Explain why these three points determine a unique circle. (ii) Describe how the centre can be located using perpendicular bisectors. (iii) Explain why the three points must not be collinear.

Question 99. Comparing Two Chords: A circular fountain has radius 13 m. Chord AB is 10 m from the centre, and chord CD is 5 m from the centre. (i) Find the length of each chord. (ii) Which chord is longer? (iii) State the geometric result that explains the comparison.

Question 100. Case Study – Circular Garden: A circular garden has centre O and two chords AB and CD . The perpendicular distances of the chords from O are 5 m and 12 m respectively, and the radius is 13 m. (i) Find the length of chord AB . (ii) Find the length of chord CD . (iii) Which chord is longer? (iv) Explain how the relationship between chord length and distance from the centre helps in planning paths in the garden.

Submission Guidelines

1. Complete all 100 questions with proper numbering.
2. Show complete working for numerical questions.
3. Draw neat, labelled diagrams for circle-related questions.
4. Revise the relevant Ganita Manjari examples and exercises.
5. Submit the completed notebook on the first working day after the Autumn Break.

Sumit
PGT Mathematics
Kendriya Vidyalaya Gumla

Autumn Break Assignment-2026

Subject - English

Class-IX

1. Write a diary entry about how you spent your autumn break in about 80-100 words.

2. Fireworks and crackers are known to create pollution during festivals. As an environmentalist, design a poster in about 50 words to create awareness of their ill effects.

3. You are a resident of Shivaji Nagar Pune. You are concerned about the increasing number of road mishaps in your city. Write a letter to the editor of a local magazine "Jan Chetna" highlighting the problem and suggesting measures to check the problem. (100-120)

4. Answer the following questions:

i. How did the author teach her grandmother?

ii. Why is each vocation important and how?

iii. How is pankha culturally related to Indian culture?

iv. Who actually required vitamin M and why?

v. How did the poet remember his mother?

5. Do as directed:

i. We will visit to grandparents. (Change into Simple Present Perfect)

ii. They completed their work and left for home. (Indirect Speech)

iii. He said, "What a beautiful scene!"

iv. Some Children _____ (was/were) reading a novel.

v. Students _____ (is /are) eager to learn new things.

vi. Ritu and Raunak have _____ (complete/completed) their task.

HOLIDAY HOME WORK FOR AUTUMN BREAK 2026-27

CLASS-IX

ARTIFICIAL INTELLIGENCE (417)

- Q1. What do you mean by communication? What is the importance of communication skill?
- Q2. What is data security and data privacy? How are they related to Artificial Intelligence?
- Q3. What are the 7Cs of effective communication?
- Q4. What are the domains of self-management skills?
- Q5. What are the various sources of data collection?
- Q6. Draw the block diagram of a computer system. Explain each unit.
- Q7. What are the steps involved in the Data Literacy Process Framework?
- Q8. What is self-motivation? How to develop it?
- Q9. What is the role and importance of ICT in our daily life?
- Q10. What is need of AI Project cycle? Explain the all stages of AI Project cycle in details.
- Q11. Write any three applications of AI in daily life.
- Q12. Write any three best practices for Cyber security.
- Q13. Explain any three best practices for acquiring data.
- Q14. Explain any four principles in AI Ethics?
- Q15. Differentiate between ethics and morality.
- Q16. Rakesh wants to be an entrepreneur so tell him any four characteristics of entrepreneurship.
- Q17. What is the probability? Explain the following terms with example.
- (a) Likely event (b) Unlikely event (c) Impossible event (d) Certain event
- Q18. What do you mean by Sustainable Development? What are SDGs?

***** ALL THE BEST *****

KENDRIYA VIDYALAYA GUMLA

AUTUMN BREAK HOMEWORK (2026–27)

CLASS: IX — SOCIAL SCIENCE

1. Which of the following factors is primarily considered a core component of shaping the earth's surface and natural environment over geological timescales?

- (a) Tectonic movements and denudation (b) Parliamentary legislations (c) Market price fluctuations (d) Universal adult franchise

2. The foundational understanding of democratic systems emphasizes that ultimate power rests with:

- (a) A hereditary monarch (b) The citizens through elected representatives (c) Military organizations (d) Centralized financial institutions

3. In economic studies regarding the problem of choice, scarcity of resources implies that:

- (a) Human wants are unlimited while available resources are limited (b) Production has completely stopped globally (c) Money has lost all its intrinsic value (d) Demand for every commodity is zero

4. Which climatic factor predominantly governs the rhythm of seasonal variations and agricultural cycles across the Indian subcontinent?

- (a) Ocean trenches (b) Monsoon wind systems (c) Local industrial thermal output (d) Trans-saharan dust storms

5. The system of free and fair elections ensures that citizens can:

- (a) Freely choose and change their political representatives periodically (b) Permanently appoint government officials without voting (c) Control private market commodity pricing directly (d) Exempt themselves from national taxation policies

6. What is meant by the term 'social science' in understanding human societies and historical evolution?

7. Briefly explain how atmospheric conditions differ fundamentally from long-term climate patterns.

8. What primary role did early human innovations play in transitioning from nomadic foraging to settled agricultural civilizations?

9. Define the central economic problem of choice that arises due to scarce resources and alternative uses.
10. State any two core values or institutional pillars that define a functional democratic polity.
11. How do atmospheric pressure variations influence wind direction and moisture distribution across regions?
12. Describe the significance of written records, artifacts, and archaeological findings in reconstructing early human history.
13. What is the role of market demand and supply forces in determining the price equilibrium of goods?
14. Why is civic participation considered essential for maintaining transparency and accountability in a democratic framework?
15. Explain how institutional structures and state societies evolved across the Indian subcontinent up to 1000 CE.
16. Analyze the dynamic mechanisms of the earth's surface formation, highlighting the combined impact of internal tectonic forces and external erosional agents.
17. Examine the major climatic controls and seasonal characteristics of the Indian monsoon system, detailing its profound impact on human life and agrarian practices.
18. Discuss the transition of early humans from hunter-gatherer societies to the establishment of stable agricultural civilizations. What major socio-economic transformations accompanied this shift?
19. Trace the evolution of state systems, social stratification, and cultural developments across ancient India up to 1000 CE.
20. On an outline map of India, locate and label regions associated with major ancient civilizational sites or historical state capitals up to 1000 CE (such as Pataliputra, Ujjain, or Kanchipuram).

AUTUMN BREAK HOMEWORK

CLASS X SUB :- SCIENCE

1.WRITE THE FOLLOWING EXPERIMENTS IN LAB MANUAL OR PRACTICAL NOTEBOOK (Class X)

1. To study the properties of acids and bases (dilute HCl & dilute NaOH) by their reaction with
 - i) Litmus solution (Blue/Red)
2. To determine the focal length of a
 - a Concave mirror
 - b Convex lens
3. To study the dependence of current (I) on the potential difference (V) across a resistor and determine its resistance. Also plot a graph between V and I
4. To prepare a temporary mount of a leaf peel to show stomata.
5. To study (a) binary fission in *Amoeba* and (b) budding in yeast with the help of prepared slides.
6. a) To observe the action of Zn , metals on the following salt solutions.
 - iii) CuSO_4 (aq.)

2. PREPARE CHEET SHEET(MAIN POINTS) OF SCIENCE AND PUT IT IN YOUR IN YOUR SCIENCE PORTFOLIO

HOLIDAY HOME WORK FOR AUTUMN BREAK 2026-27

SUBJECT: ARTIFICIAL INTELLIGENCE (417)

CLASS-X

Note: 1. Complete your AI notes copy and Practical copy.

2. HW must be completed in AI notes copy only.

Q1. What do you mean by AI Project Cycle? What are six stages of AI Project Cycle? Explain in brief.

Q2. What are three domains of AI? Explain each.

Q3. Draw the graphical representation of Clustering in AI model. Explain in brief.

Q4. Draw the graphical representation of Regression in AI model. Explain in brief.

Q5. Draw the graphical representation of Classification in AI model. Explain in brief.

Q6. Explain any four core ethical principles in AI model?

Q7. Differentiate between rule based and learning based AI model.

Q8. What do you mean by Evaluation? Why do we need model evaluation?

Q9. Differentiate between Deep Learning, Artificial Intelligence and Machine Learning. Also draw a labelled Venn diagram depicting the relationship between AI, ML and DL.

Q10. What do you mean by Bioethics and its Principles?

Q11. Explain Train-test split technique with respect to machine learning algorithm.

Q12. An AI model has been developed to test specimens of blood/urine/cough etc. to diagnose ailments (diabetes/liver infection etc.). The model was tested on a data-set of about 630 tests and the resulting confusion matrix is as follows:

Confusion Matrix		Reality	
		Yes	No
Prediction	Yes	110	60
	No	50	410

Calculate Accuracy, Precision, Recall and F1 Score.

Q13. Calculate Accuracy, Precision, Recall and F1 Score for the following Confusion Matrix on Water Shortage in Schools: Also suggest which metric would not be a good evaluation parameter here and why?

Confusion Matrix		Reality	
		Yes	No
Prediction	Yes	75	5
	No	5	15

Q14. Explain any five applications of NLP in brief.

***** ALL THE BEST *****

KENDRIYA VIDYALAYA GUMLA

AUTUMN BREAK HOLIDAY HOMEWORK (MATHEMATICS - CLASS X)

Class: X

Subject: Mathematics (041)

Duration: 10 Days

Syllabus: NCERT Chapters 1 to 8

Day 1: Real Numbers (Chapter 1)

HCF, LCM & Proofs

- Revise Fundamental Theorem of Arithmetic and prime factorisation method.
- Verify the property: $HCF(a, b) \times LCM(a, b) = a \times b$ for 5 pairs of integers.
- Solve 3 problems on proving irrationality (e.g., Prove that $\sqrt{5}$ or $3 + 2\sqrt{5}$ is irrational).

Day 2: Polynomials (Chapter 2)

Zeroes & Coefficients

- Geometrical meaning of zeroes of a polynomial from graph exercises.
- Verify relationship between zeroes and coefficients for quadratic polynomials ($ax^2 + bx + c$).
- Find a quadratic polynomial if sum and product of its zeroes are given (-3 and 2). Solve 5 related NCERT questions.

Day 3: Pair of Linear Equations in Two Variables (Chapter 3)

Algebraic Methods

- Review consistency conditions for intersecting, parallel, and coincident lines ($a_1/a_2, b_1/b_2, c_1/c_2$).
- Solve 4 pairs of linear equations using the *Substitution* and *Elimination* methods.
- Solve 3 word problems on age, fractions, and speed-distance.

Day 4: Quadratic Equations (Chapter 4)

Roots & Discriminant

- Find roots of quadratic equations by factorization and quadratic formula ($x = [-b \pm \sqrt{b^2 - 4ac}] / 2a$).
- Determine the nature of roots using Discriminant ($D = b^2 - 4ac$) for 5 distinct equations.
- Solve 3 word problems from NCERT Exercise 4.3/4.4 (Time & Work or Water Tap problems).

Day 5: Arithmetic Progressions (Chapter 5)

nth Term & Sum Formulae

- Identify arithmetic progressions (APs), common difference d , and write general form.
- Apply $a_n = a + (n - 1)d$ to find specified terms and check term positions.
- Calculate the sum of first n terms using $S_n = (n/2)[2a + (n - 1)d]$ for 5 practical AP problems.

Day 6: Triangles (Chapter 6)

Thales Theorem & Similarity

- State and prove Basic Proportionality Theorem (Thales Theorem) with a neat labeled diagram.
- Learn criteria for similarity of triangles (AA, SSS, SAS).
- Solve 5 numerical problems based on similarity ratios and areas of similar triangles.

Day 7: Coordinate Geometry (Chapter 7)

Distance & Section Formula

- Apply the Distance Formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ to verify geometric shapes (squares/triangles).
- Use the Section Formula to find coordinates dividing a line segment in a given ratio $m_1 : m_2$.
- Solve 4 problems including finding the coordinates of mid-points and centroids.

Day 8: Introduction to Trigonometry (Chapter 8)

Trigonometric Ratios

- Memorize trigonometric ratios (sin, cos, tan, cosec, sec, cot) and standard angle table (0° , 30° , 45° , 60° , 90°).
- Evaluate 6 numerical expressions using standard angle values and complementary angle ratios.
- Solve 4 identity-proving questions from NCERT Exercise 8.4.

Day 9: Board Exam Formula Chart & Project

Creative Assignment

- **Formula Chart:** Prepare a comprehensive chart booklet of all important formulas from Chapters 1 to 8.
- **Project Work:** Choose any one topic for a 2-page project report:
 - (a) Real-life applications of Quadratic Equations or Trigonometry in surveying/height measurement.
 - (b) Contribution of Indian Mathematicians (Aryabhata or Brahmagupta) in Algebra and Number Systems.

Day 10: Class X Board Mock Test & Doubt Log

Self-Assessment

- Attempt a self-administered 30-mark board pattern mock test covering Chapters 1 to 8.
- Compile a "**Doubt Log**" of challenging problems to discuss with your mathematics teacher when school reopens after the break.

General Guidelines & Submission Instructions

- **Notebook:** Complete all homework neatly in a separate thin homework register or punched A4 portfolio sheets inside a folder.
- **Geometry:** Use sharp pencils, scales, and compasses for all diagrams and geometric proofs.
- **Step Marking:** Write formulas explicitly before substituting values for all numerical problems.
- **Deadline:** Submission on the very first reopening day of the school.

KENDRIYA VIDYALAYA GUMLA
AUTUMN BREAK HOMEWORK (2026–27)

CLASS: X SOCIAL SCIENCE

1. Which of the following events marked the formal beginning of the Civil Disobedience Movement?

- (a) Jallianwala Bagh Massacre (b) Arrival of the Simon Commission
(c) Violation of the Salt Law at Dandi (d) Lahore Session of Congress (1929)

2. Power sharing is desirable because:

- (a) It increases conflict between social groups. (b) It is a good way to ensure the stability of political order.
(c) It promotes majoritarianism. (d) It leads to administrative inefficiencies.

3. Continuous use of groundwater in agricultural states like Punjab and Haryana has led to:

- (a) Increase in soil fertility (b) Over-utilization and depletion of water tables
(c) Better monsoon patterns (d) Reduction in soil salinity

4. Which sector has emerged as the largest producing sector in India in terms of GDP contribution in recent decades?

- (a) Primary Sector (b) Secondary Sector (c) Tertiary Sector (d) Quaternary Sector

5. Under MGNREGA 2005, how many days of guaranteed employment are provided by the government?

- (a) 50 days (b) 100 days (c) 150 days (d) 365 days

6. What was the objective of the Simon Commission? Why was it boycotted by Indians?

7.Distinguish between 'Holding Together' and 'Coming Together' federations with one example each.

8.Why is energy required for all economic activities? Give two reasons.

9.Differentiate between public and private sectors with one suitable example for each.

10.Explain the role of folklore, songs, icons, and symbols in reviving national pride and creating a sense of collective belonging in late 19th-century India.

11."Power sharing can take many forms in modern democracies." Explain any three forms with appropriate examples.

12.Why is sustainable development essential for economic growth? State any three measures to achieve resource sustainability.

13.Explain the functioning of Self-Help Groups (SHGs) for the rural poor. How do they reduce dependence on informal credit channels?

14.Describe any three major problems faced by Indian consumers in the marketplace prior to the enactment of consumer protection laws.

15.How did the Non-Cooperation Movement unfold in the countryside? Explain the role of Baba Ramchandra and peasant movements in Awadh.

16.On an outline political map of India, locate and label the following items:

(i) The place where the Indian National Congress session was held in December 1920

(ii) The site of the Jallianwala Bagh incident (Amritsar)

(iii) Bhakra Nangal Dam

(iv) Tarapur Nuclear Power Plant

(v) Noida Software Technology Park

KENDRIYA VIDYALAYA, GUMLA

AUTUMN BREAK HOLIDAY HOMEWORK

Class: X

Subject: English Language and Literature

Subject Code: 184

Prescribed Books: First Flight & Footprints Without Feet

SECTION B: WRITING SKILLS & GRAMMAR:

a) Write a letter to the Editor of a national daily expressing concern about the increasing use of plastic and suggesting measures to reduce plastic pollution.

b) Write a letter to the Municipal Commissioner complaining about the poor condition of roads and inadequate street lighting in your locality.

Q4. Analytical Paragraph Study the following data and write an analytical paragraph in 100–120 words.

Mode of Transport	Percentage of Students
School Bus	40%
Bicycle	20%
Walking	15%
Private Car	15%
Public Transport	10%

Analyse the data, highlighting the most and least preferred modes of transport and what the figures suggest.

Q5. Grammar Practice

Attempt the following questions in your English notebook.

A. Reported Speech Change the following into reported speech.

1. The teacher said, "Honesty is the best policy."
2. Riya said to me, "Are you preparing for the examination?"
3. The principal said to the students, "Work hard to achieve your goals."

4. Mohan said, "I have completed my homework."
5. The captain said, "Let us begin the match."

B. Subject–Verb Agreement Choose the correct option.

1. Each of the students _____ present. (was/were)
2. Neither Rohan nor his friends _____ arrived. (has/have)
3. The quality of these products _____ excellent. (is/are)
4. Mathematics _____ an interesting subject. (is/are)
5. A number of students _____ participating in the competition. (is/are)

C. Editing and Error Correction

Identify and correct the error in each sentence.

1. He do not like wasting time.
 2. Each of the girls have submitted her assignment.
 3. She is senior than me.
 4. The news are very encouraging.
 5. One of my friend lives in Delhi.
-

SECTION C: LITERATURE

Prescribed Textbooks: First Flight & Footprints Without Feet

Q6. Reference to Context and Short-Answer Questions

Answer the following questions in 40–50 words each.

1. How did Lencho demonstrate his firm faith in God in *A Letter to God*?
2. Why did Nelson Mandela consider freedom indivisible?
3. How did the young seagull overcome his fear of flying in *His First Flight*?
4. Why did Anne Frank decide to keep a diary?
5. How did the postmaster respond to Lencho's letter, and why?
6. What role did education play in Richard Ebright's journey in *The Making of a Scientist*?

Q7. Long-Answer Questions

Answer any TWO in 100–120 words each.

1. *Nelson Mandela: Long Walk to Freedom* highlights the importance of courage, equality and freedom. Discuss with reference to the chapter.

2. In *The Thief's Story*, how does Anil's kindness and trust transform Hari Singh?
3. How does Richard Ebright's curiosity and perseverance help him become a successful scientist? Discuss with reference to *The Making of a Scientist*.
4. In *The Proposal*, how does Anton Chekhov use humour and arguments to expose the weaknesses of the characters?

Q8. Poetry Appreciation

Answer the following questions.

1. How does the poet convey the tiger's helplessness in *A Tiger in the Zoo*?
 2. What message does the poem *Dust of Snow* convey?
 3. How does *Fire and Ice* explore human emotions and their destructive power?
 4. What does the poem *Amanda!* reveal about a child's desire for freedom?
-

SECTION E: BOARD EXAM PREPARATION

Q10. Writing and Revision Practice

1. Revise all the literature chapters and poems taught in class.
 2. Write the meanings of 20 difficult words from the prescribed textbooks.
 3. Prepare a list of 10 important questions from *First Flight* and 10 from *Footprints Without Feet*.
 4. Solve one CBSE Class X English sample paper under timed conditions.
 5. Practise five questions each on reported speech, subject–verb agreement and editing.
-

Happy Autumn Break!

Keep learning, keep growing, and keep shining!

कक्षा दसवीं के लिए शरदावकाश हेतु गृहकार्य , सत्र: 2026-27.

1. स्वतंत्रता सेनानियों की सूची बनाकर अपने क्षेत्र के किसी महान स्वतन्त्रता सेनानी का सचित्र वर्णन कर परियोजना कार्य तैयार करना है ।
2. छुट्टियों के दौरान की गई अपनी यात्रा को लिपिबद्ध कीजिए अर्थात यात्रा वृत्तांत लिखिए ।
3. कक्षा समूह में दिए गए परिशिष्ट प्रश्नपत्र को हल करके अपनी हिंदी की उत्तर-अभ्यास पुस्तिका में लिखना है ।
4. प्रदत्त कार्य के अंतर्गत हिंदी सिनेमा जगत के शहनाई वादकों की सूची बनाकर अपने किसी एक पसंदीदा वादक/वादिका की जीवनी लिखनी है ।
5. अपने स्वैच्छिक विषयों पर दो संदेश और दो विज्ञापन लिखने हैं ।

विषय शिक्षक

जितेन्द्र कुमार प्रशिक्षित स्नातक शिक्षक हिंदी

KENDRIYA VIDYALAYA GUMLA

CLASS XI

HOLIDAY HOMEWORK

Academic Session 2026–27

Subjects: Mathematics • Physics • Chemistry • Biology • English • Hindi • Computer Science

KENDRIYA VIDYALAYA GUMLA
AUTUMN BREAK HOLIDAY HOMEWORK
Academic Session 2026–27

Class	XI
Subject	Mathematics
Subject Teacher	Sumit, PGT Mathematics
Chapters	Straight Lines; Sequence and Series (AP and GP)
Total Questions	100 (50 from each section)

General Instructions

1. Attempt all 100 questions in a separate Mathematics notebook.
2. Show complete calculations and necessary steps.
3. Questions are arranged in increasing order of difficulty.
4. The last 10 questions of each section are competency-based.
5. Revise the relevant NCERT examples, exercises and formulas.
6. AP questions are included for foundational revision.

SECTION A: STRAIGHT LINES

Total Questions: 50

Level I – Easy Questions (1–10)

- Question 1.** Find the slope of the line passing through the points $A(2, 3)$ and $B(5, 9)$.
- Question 2.** Find the slope of a line making an angle of 45° with the positive direction of the x -axis.
- Question 3.** Find the slope of the line $2x + 3y - 6 = 0$.
- Question 4.** Find the equation of the line passing through $(2, 3)$ and having slope 4.
- Question 5.** Find the equation of the line with slope -2 and y -intercept 5.
- Question 6.** Find the equation of the line passing through $(1, 2)$ and $(3, 6)$.
- Question 7.** Find the equation of the line parallel to the x -axis and passing through $(3, 5)$.
- Question 8.** Find the equation of the line parallel to the y -axis and passing through $(-2, 4)$.
- Question 9.** Find the intercepts on the coordinate axes of the line $3x + 2y = 12$.
- Question 10.** Find the distance between the parallel lines $3x + 4y - 5 = 0$ and $3x + 4y + 10 = 0$.

Level II – Moderate Questions (11–25)

- Question 11.** Find the angle between the lines whose slopes are 1 and -1 .
- Question 12.** Find the equation of the line passing through $(4, -1)$ and perpendicular to $2x - 3y + 5 = 0$.

- Question 13.** Find the equation of the line passing through $(2, 3)$ and parallel to $4x - 2y + 7 = 0$.
- Question 14.** Find the equation of the line whose intercepts on the coordinate axes are 4 and -3 .
- Question 15.** Find the equation of the line passing through the origin and making an angle of 60° with the positive x -axis.
- Question 16.** Find the equation of the line passing through $(1, -2)$ and $(4, 7)$ in slope-intercept form.
- Question 17.** Find the equation of the line passing through $(3, 4)$ and having equal intercepts on the positive coordinate axes.
- Question 18.** Find the angle between the lines $y = 2x + 3$ and $y = -x + 1$.
- Question 19.** Determine whether the lines $3x + 2y - 5 = 0$ and $6x + 4y + 7 = 0$ are parallel. Give a reason.
- Question 20.** Find the distance of the point $(3, 4)$ from the line $3x + 4y - 10 = 0$.
- Question 21.** Find the equation of the line passing through $(2, -1)$ and having x -intercept 5.
- Question 22.** Find the equation of the line passing through $(1, 3)$ and making an angle of 135° with the positive x -axis.
- Question 23.** Find the equation of the line passing through $(2, 5)$ and perpendicular to the line joining $(1, 2)$ and $(3, 6)$.
- Question 24.** Find the equation of the line whose intercepts on the coordinate axes have magnitudes 3 and 4, respectively, and which passes through the first quadrant.
- Question 25.** Find the equation of the line passing through the intersection of $x + y = 5$ and $2x - y = 1$, and parallel to $3x + 4y - 7 = 0$.

Level III – Difficult Questions (26–40)

- Question 26.** Find the equation of the line passing through the intersection of $2x + y - 5 = 0$ and $x - y + 1 = 0$ and perpendicular to $3x - 2y + 4 = 0$.
- Question 27.** Find the value of k if the lines $kx + 3y - 5 = 0$ and $2x - 4y + 7 = 0$ are perpendicular.
- Question 28.** Find the value of k if the lines $3x + ky - 7 = 0$ and $6x + 4y + 1 = 0$ are parallel.
- Question 29.** Find the equation of the line passing through $(3, 2)$ such that the sum of its intercepts on the coordinate axes is 10.
- Question 30.** Find the equation of the line passing through the intersection of $x + 2y = 8$ and $3x - y = 3$ and having slope $-\frac{1}{2}$.
- Question 31.** Find the equation of the line passing through $(2, 3)$ and equidistant from the points $(1, 1)$ and $(5, 1)$.
- Question 32.** Find the distance between the parallel lines $6x - 8y + 15 = 0$ and $3x - 4y - 10 = 0$.
- Question 33.** Find the equation of the line passing through $(1, 2)$ and perpendicular to the line joining $(2, 3)$ and $(6, 5)$.
- Question 34.** Find the equation of the line passing through the intersection of $x + y = 4$ and $2x - y = 2$ and making an angle of 45° with the positive x -axis.
- Question 35.** Find the equation of a line whose perpendicular distance from the origin is 4 units and

whose normal makes an angle of 60° with the positive x -axis.

Question 36. A line has equation $ax + by + c = 0$. State the condition on a and b for the line to be parallel to the x -axis and the condition for it to be parallel to the y -axis.

Question 37. Find the equation of the line passing through the intersection of $2x - y = 4$ and $x + 3y = 7$ and parallel to $5x - 2y + 9 = 0$.

Question 38. Find all possible values of k if the distance of the point $(k, 2)$ from the line $3x + 4y - 10 = 0$ is 2 units.

Question 39. Find the equation of a line passing through $(4, 3)$ and forming a triangle of area 6 square units with the coordinate axes. Consider all possible lines.

Question 40. A line has equation $ax + by + c = 0$, where a, b, c are real constants. Explain why a and b cannot both be zero for this equation to represent a straight line.

Level IV – Competency-Based Questions (41–50)

Question 41. Road Construction: A straight road joins two points $A(2, 3)$ and $B(6, 11)$ on a map. Find its slope and equation. Determine the value of y at $x = 10$.

Question 42. Ramp Design: A ramp begins at $(0, 0)$ and ends at $(8, 2)$. Find the slope of the ramp and the angle it makes with the horizontal.

Question 43. Parallel Roads: A road is represented by $2x + 3y - 6 = 0$. Find the equation of another road passing through $(3, 2)$ and parallel to it.

Question 44. Shortest Distance: A school is represented by $P(4, 5)$ and a straight road by $3x + 4y - 20 = 0$. Find the perpendicular distance from the school to the road.

Question 45. Boundary Planning: A side of a rectangular field lies on the line $y = 2x + 1$. Find the slope of a line perpendicular to this side and explain how this slope can help in planning an adjacent boundary.

Question 46. Navigation: Two paths have equations $y = 2x + 1$ and $y = -\frac{1}{2}x + 5$. Determine whether they intersect at right angles. Justify your answer.

Question 47. Cost and Layout: A straight boundary cuts the coordinate axes at $(6, 0)$ and $(0, 4)$. Find its equation and the area of the triangle formed with the coordinate axes.

Question 48. Error Detection: A student states that the slope of $4x + 2y - 8 = 0$ is 2. Identify the error, find the correct slope and explain the method.

Question 49. Surveying: Two survey points are $A(1, 4)$ and $B(5, 2)$. Find the equation of the line through them. Also find the equation of a perpendicular line passing through $(2, 3)$.

Question 50. Case Study – School Campus: The main entrance of a school is at $A(2, 1)$ and the library is at $B(8, 4)$. A straight pathway joins them. (i) Find the equation of the pathway. (ii) Find its slope. (iii) Find the equation of a pathway perpendicular to it through $(3, 5)$. (iv) Explain how perpendicular pathways can be useful in campus planning.

SECTION B: SEQUENCE AND SERIES (AP AND GP)

Total Questions: 50

Level I – Easy Questions (51–60)

- Question 51.** Write the next three terms of the sequence 2, 5, 8, 11, ... and identify its common difference.
- Question 52.** Determine whether 3, 6, 12, 24, ... is a GP. If so, find its common ratio.
- Question 53.** Find the 10th term of the AP 4, 7, 10, 13, ...
- Question 54.** Find the 7th term of the GP 2, 6, 18, 54, ...
- Question 55.** Find the arithmetic mean between 8 and 18.
- Question 56.** Find the positive geometric mean between 4 and 16.
- Question 57.** Find the sum of the first 10 terms of the AP 2, 4, 6, 8, ...
- Question 58.** Find the sum of the first 5 terms of the GP 3, 6, 12, 24, ...
- Question 59.** Write the first five terms of a GP whose first term is 5 and common ratio is 2.
- Question 60.** Insert one arithmetic mean between 12 and 30.

Level II – Moderate Questions (61–75)

- Question 61.** Find the 20th term of the AP whose first term is 7 and common difference is 3.
- Question 62.** Which term of the AP 5, 9, 13, 17, ... is 81?
- Question 63.** Find the sum of the first 25 terms of the AP 3, 7, 11, 15, ...
- Question 64.** Find the number of terms in the AP 8, 13, 18, ..., 103.
- Question 65.** Find the 8th term of a GP whose first term is 3 and common ratio is 2.
- Question 66.** Find the sum of the first 6 terms of the GP 2, 6, 18, ...
- Question 67.** Find the sum to infinity of the GP 12, 6, 3, $\frac{3}{2}$, ...
- Question 68.** Insert two positive geometric means between 4 and 108.
- Question 69.** If a, b, c are in GP, prove that $b^2 = ac$.
- Question 70.** If a, b, c are in AP, prove that $2b = a + c$.
- Question 71.** Find the arithmetic mean and geometric mean of 4 and 25. Verify that $AM \geq GM$.
- Question 72.** Find all possible real values of x if 2, x , 18 are consecutive terms of a GP.
- Question 73.** The first term of a GP is 5 and the common ratio is 3. Find the sum of its first 5 terms.
- Question 74.** Find the sum of the first n terms of the GP 4, 12, 36, ...
- Question 75.** The 3rd term of a GP is 12 and the 6th term is 96. Find the first term and common ratio, assuming a positive common ratio.

Level III – Difficult Questions (76–90)

Question 76. The 5th term of an AP is 18 and its 12th term is 46. Find the first term, common difference and sum of the first 20 terms.

Question 77. The sum of the first n terms of an AP is $S_n = 3n^2 + 2n$. Find its first term, common difference and 15th term.

Question 78. The 2nd and 5th terms of a GP are 6 and 162, respectively. Find the first term and common ratio, assuming a positive common ratio.

Question 79. The sum of the first three terms of a GP is 21 and their product is 216. Find possible positive terms of the GP.

Question 80. Find three positive numbers in AP whose sum is 21 and product is 315.

Question 81. Find three positive numbers in GP whose sum is 26 and product is 216.

Question 82. If a, b, c are positive numbers in GP, prove that $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are also in GP.

Question 83. A GP has first term a and common ratio r , where $|r| < 1$. Derive the sum to infinity and explain why the condition $|r| < 1$ is necessary.

Question 84. Find the sum to infinity of $8 - 4 + 2 - 1 + \frac{1}{2} - \dots$.

Question 85. If a, b, c are positive numbers in AP, prove that $b^2 \geq ac$.

Question 86. Insert three arithmetic means between 5 and 25.

Question 87. Insert three positive geometric means between 2 and 162.

Question 88. The first term of a GP is 2 and its sum to infinity is 8. Find its common ratio.

Question 89. A ball is dropped from a height of 16 m and rebounds to $\frac{3}{4}$ of its previous height after each bounce. Find the height reached after the fourth rebound and the total distance travelled until it reaches that height, including the initial fall.

Question 90. A sequence is defined by $a_1 = 3$ and $a_{n+1} = 2a_n$. Write its first five terms, find its general term and calculate the sum of its first 10 terms.

Level IV – Competency-Based Questions (91–100)

Question 91. Stadium Seating: The first row of a stadium has 18 seats. Each succeeding row has 4 more seats than the preceding row. Find the number of seats in the 15th row and the total seats in the first 15 rows.

Question 92. Monthly Savings: A student saves Rs. 200 in the first month and increases the saving by Rs. 50 each month. Find the saving in the 12th month and the total savings over 12 months.

Question 93. Population Growth: A bacterial culture has 500 bacteria initially and doubles every hour. Assuming ideal exponential growth, find the population after 6 hours.

Question 94. Compound Growth Model: An investment of Rs. 10,000 grows by 10% each year. Represent the yearly amounts as a GP and find the amount after 5 years, assuming annual compounding.

Question 95. Folding Paper: A sheet of paper has thickness 0.1 mm. Assuming its thickness doubles with every fold, find the theoretical thickness after 10 folds. Explain why this is a mathematical model rather than a practical folding prediction.

Question 96. Error Detection: A student claims that $2, 4, 8, 16, \dots$ is an AP because its terms

increase. Explain why this claim is incorrect and identify the correct type of sequence.

Question 97. Planning a Hall: A hall has 20 seats in the first row and each successive row contains 3 more seats than the previous row. If there are 15 rows, find the number of seats in the last row and the total seating capacity.

Question 98. Fractal Pattern: A pattern has 1 square at Stage 1, 3 squares at Stage 2, 9 squares at Stage 3 and continues with the same multiplicative rule. Find the number of squares at Stage 7 and the total number of squares counted across Stages 1 to 7.

Question 99. Comparing Growth: Plan A gives a student Rs. 100 in the first week and increases the weekly amount by Rs. 50. Plan B gives Rs. 100 in the first week and doubles the amount each week. For each plan, calculate the amount received in Week 6 and the total received over six weeks. Which plan gives the larger total?

Question 100. Case Study – Bouncing Ball: A ball is dropped from a height of 20 m and each rebound reaches $\frac{1}{2}$ of the previous height. (i) Find the heights of the first five rebounds. (ii) Find the height of the fifth rebound. (iii) Find the total upward distance over the first five rebounds. (iv) Find the total distance travelled if the ball continues bouncing indefinitely, assuming the same ratio at every rebound.

Submission Guidelines

1. Complete all 100 questions with proper numbering.
2. Show complete working for every numerical question.
3. Draw diagrams wherever necessary.
4. Revise the relevant NCERT examples and exercises.
5. Submit the completed notebook on the first working day after the Autumn Break.

Sumit
PGT Mathematics
Kendriya Vidyalaya Gumla

KENDRIYA VIDYALAYA GUMLA

AUTUMN BREAK ASSIGNMENT (10-DAY PLAN)

Class: XI (Science) | Subject: Physics (042) | Duration: 10 Days

GENERAL INSTRUCTIONS

- This assignment is designed as a 10-day vacation plan in alignment with NEP 2020 competency goals.
- Complete one question daily in your Physics homework notebook.
- Submit the notebook on the day school reopens.

10-DAY SCHEDULED COMPETENCY QUESTIONS

Day 1 | Units & Measurements

Q1. A student measures the diameter of a wire using a screw gauge of least count 0.001 cm . If the measured value is 0.224 cm , calculate the percentage error. Differentiate between systematic and random errors.

Day 2 | Dimensional Analysis

Q2. Derive an expression for the velocity v of water waves depending on wavelength λ , density ρ , and acceleration due to gravity g using dimensional analysis. State one limitation of this method.

Day 3 | Motion in a Straight Line

Q3. A car moving at 108 km/h stops in 200 m under uniform retardation. (a) Calculate stopping time. (b) Draw the velocity-time graph.

Day 4 | Relative Velocity in 2D

Q4. Rain falls vertically at 35 m/s . A woman rides a bicycle at 12 m/s from East to West. Find the direction in which she must hold her umbrella.

Day 5 | Projectile Motion

Q5. A football is kicked at 20 m/s at an angle of 30° to the horizontal. Calculate: (a) Maximum height, (b) Time of flight, and (c) Horizontal range. ($g = 9.8 \text{ m/s}^2$)

Day 6 | Laws of Motion

Q6. A pendulum bob of mass 0.5 kg hangs in a train accelerating horizontally at 3 m/s^2 . Find the angle made by the string with the vertical and the tension in the string.

Day 7 | Friction & Banking of Roads

Q7. A car negotiates a banked curved road of radius 35 m at 15° banking. If static friction coefficient is 0.2 , calculate the maximum safe speed to prevent skidding.

Day 8 | Work-Energy Theorem

Q8. A spring ($k = 500 \text{ N/m}$) compressed by 10 cm releases a block of mass 0.2 kg . Find the velocity of the block using the Work-Energy Theorem.

Day 9 | Practical Home Task (Experiential Learning)

Q9. Perform a simple experiment at home using an inclined hardcover book and different objects (eraser, coin) to determine the angle of repose θ and coefficient of static friction $\mu_s = \tan \theta$. Record observations in a table.

Day 10 | Creative Summary / Mind Map

Q10. Prepare a 1-page formula sheet and mind map summarizing key concepts from Units & Measurements, Vectors, Kinematics, and Laws of Motion.

Note: Solve each day's question neatly in your homework notebook. Refer to NCERT Class 11 Physics for reference.

CLASS XI • CHEMISTRY HOLIDAY HOMEWORK

Questions: 20

Session 2026–27

Practice Worksheet (Questions 01 to 20)

Important Instruction: Solve all questions neatly with full steps in your regular **Chemistry Class Notebook**. Do not make any separate notebook, project copy, or folder.

Reference Constants: $R = 8.314 \text{ J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$ $h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$ $c = 3.0 \times 10^8 \text{ m/s}$ $N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$ $m_e = 9.11 \times 10^{-31} \text{ kg}$
 $1 \text{ L}\cdot\text{atm} = 101.3 \text{ J}$

01. A compound contains 4.07% hydrogen, 24.27% carbon, and 71.65% chlorine by mass. Its molar mass is 98.96 g/mol.
(a) Determine its empirical formula. | (b) Determine its molecular formula. [C = 12 u, H = 1 u, Cl = 35.5 u]
02. Calculate the molarity and molality of a 20% (by mass) aqueous solution of potassium iodide (KI), given that the density of the solution is 1.202 g/mL. (Molar mass of KI = 166 g/mol).
03. In a chemical reaction: $2\text{A} + 4\text{B} \rightarrow 3\text{C} + 4\text{D}$. When 5.0 moles of A react with 6.0 moles of B:
(a) Identify the limiting reagent. | (b) Calculate the theoretical yield of C formed in moles.
04. Calculate the total number of electrons present in 1.4 g of dinitrogen gas (N_2). Also determine the volume occupied by this gas sample at standard temperature and pressure (STP).
05. Calculate the wavelength of light emitted when an electron in a hydrogen atom undergoes a transition from energy level $n = 4$ to $n = 2$ ($R_H = 1.097 \times 10^7 \text{ m}^{-1}$). Name the spectral series to which this line belongs.
06. Calculate the de Broglie wavelength associated with an electron moving with a velocity of $2.05 \times 10^7 \text{ m/s}$. ($m_e = 9.11 \times 10^{-31} \text{ kg}$, $h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$).
07. Write the complete set of four quantum numbers (n, l, m_l, m_s) for:
(a) The valence electron of a sodium atom ($Z = 11$). | (b) The unpaired electron in a chlorine atom ($Z = 17$).
08. State Hund's Rule of Maximum Multiplicity and the Aufbau Principle. Using these rules, write the ground-state electronic configuration of Cr ($Z = 24$) and explain the reason for its anomalous stability.
09. Explain the following periodic observations using effective nuclear charge and electronic configurations:
(a) Nitrogen has a higher first ionization enthalpy than oxygen. | (b) Beryllium has a higher first ionization enthalpy than boron.
10. The electron gain enthalpy of fluorine is unexpectedly less negative than that of chlorine. Account for this anomaly based on atomic size and interelectronic repulsions in the compact 2p subshell.

HOLIDAY HOMEWORK • PART II (QUESTIONS 11 TO 20)

11. Define isoelectronic species. Arrange the following ions in order of increasing ionic radius and justify the trend based on effective nuclear charge: N^{3-} , O^{2-} , F^- , Na^+ , Mg^{2+} , Al^{3+} .
12. Why do second electron gain enthalpies of elements (such as the addition of an electron to O^- to form O^{2-}) always have positive values (endothermic)?
13. Using VSEPR theory, predict the electron pair geometry, molecular shape, and hybridization of the central atom for:
(a) SF_4 | (b) ClF_3 | (c) XeF_4
14. Draw the Molecular Orbital (MO) energy level diagram for the O_2 molecule. Determine its bond order and magnetic behavior. What happens to its bond order when it is oxidized to O_2^+ ?
15. Explain why the net dipole moment of NH_3 (1.47 D) is significantly higher than that of NF_3 (0.24 D), even though fluorine is far more electronegative than nitrogen.
16. Differentiate clearly between intermolecular and intramolecular hydrogen bonding using *ortho*-nitrophenol and *para*-nitrophenol as examples. Which has a higher boiling point and why?
17. State the First Law of Thermodynamics mathematically. A gas expands from 2.0 L to 5.0 L against a constant external pressure of 3.0 atm. During this expansion, it absorbs 400 J of heat from the surroundings. Calculate the change in internal energy (ΔU).
18. For a chemical reaction: $\Delta H = -35.5 \text{ kJ}\cdot\text{mol}^{-1}$ and $\Delta S = -83.6 \text{ J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$. At what temperature range will this reaction be spontaneous at constant pressure?
19. State Hess's Law of Constant Heat Summation. Given the following thermochemical equations:
(i) $\text{C}(\text{graphite}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$ [$\Delta H^\circ = -393.5 \text{ kJ/mol}$]
(ii) $\text{H}_2(\text{g}) + \frac{1}{2} \text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\text{l})$ [$\Delta H^\circ = -285.8 \text{ kJ/mol}$]
(iii) $\text{CH}_4(\text{g}) + 2 \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2 \text{H}_2\text{O}(\text{l})$ [$\Delta H^\circ = -890.3 \text{ kJ/mol}$]
Calculate the standard enthalpy of formation ($\Delta_f H^\circ$) of methane, $\text{CH}_4(\text{g})$.
20. Define extensive and intensive properties. Classify each of the following into extensive or intensive properties:
(a) Density | (b) Enthalpy | (c) Molar heat capacity | (d) Volume | (e) Temperature.

Submission Reminder: Show complete step-by-step formulas and calculations in your regular Chemistry notebook. Work will be evaluated after school reopens.

KENDRIYA VIDYALAYA GUMLA
BIOLOGY — CLASS XI
AUTUMN BREAK HOMEWORK | ASSIGNMENTS 2026-27

Student's Name: _____	Class/Section: _____
Roll No.: _____	Submission: After the Autumn Break

PART A: WRITTEN ASSIGNMENT

Section I: Answer the Following Questions

Answer each question in about 30–50 words.

Chapter 8: Cell: The Unit of Life

1. Why are mitochondria called the powerhouse of the cell?
2. Differentiate between prokaryotic and eukaryotic cells.
3. Write the functions of the Golgi apparatus and the endoplasmic reticulum.

Chapter 9: Biomolecules

4. Differentiate between carbohydrates, proteins and lipids.
5. What are enzymes? Write any three characteristics of enzymes.

Chapter 10: Cell Cycle and Cell Division

6. Differentiate between mitosis and meiosis.
7. What happens during the S phase of the cell cycle?
8. Why is meiosis important in organisms that reproduce sexually?

Chapter 11: Photosynthesis in Higher Plants

9. Differentiate between cyclic and non-cyclic photophosphorylation.
10. What is the importance of the Calvin cycle?

Section II: Diagram Practice

Draw and label any FIVE of the following diagrams in your notebook:

1. Digestive system of a frog
2. Monocot seed
3. Mitochondrion
4. Chloroplast
5. Stages of mitosis

Note: Draw the diagrams neatly in pencil and label all parts correctly.

PART B: INVESTIGATORY PROJECT / ACTIVITY

Complete ANY ONE project from the options given below.

Project 1: Preparation of a Mini Herbarium

Title: Study and Documentation of Local Plants

Collect and document 5–8 fallen leaves or naturally shed plant parts from different plants in your surroundings.

For each specimen, record:

- Common name
- Botanical name, if known
- Type of leaf: simple or compound
- Leaf venation: reticulate or parallel
- Leaf arrangement, if it can be observed
- One interesting feature of the plant

Presentation: Arrange the dried specimens neatly on A4 sheets and prepare a small herbarium file.

Important: Collect only naturally fallen leaves. Do not pluck leaves, uproot plants or collect protected species.

Project 2: Study of Leaf Venation

Title: A Comparative Study of Leaf Venation in Local Plants

Observe 8 different leaves and classify them according to their venation: reticulate or parallel.

Prepare an observation table with the following headings:

- Serial number
- Name of the plant
- Type of venation
- Simple or compound leaf
- Photograph or drawing

Write a short conclusion based on your observations.

Project 3: Botanical Diversity Around My School/Home

Title: Documentation of Local Plant Diversity

Observe 8–10 plants around your home or school. Record the following information:

- Common name
- Plant habit: herb, shrub, tree or climber
- Leaf venation
- Root system, if known
- One characteristic feature

Present your findings in a table and add drawings or photographs of any five plants.

PART C: PROJECT FILE FORMAT

Arrange your project in the following order:

1. Cover Page
2. Title of the Project
3. Aim or Objectives
4. Introduction (100–150 words)
5. Materials Required
6. Methodology
7. Observations
8. Result and Conclusion
9. Bibliography

Assessment Criteria

Assessment criterion	What will be assessed
Scientific accuracy	Correct biological facts and terminology
Neatness and presentation	Clear, organised and legible work
Original observations	Student's own observations and records
Proper labelling	Correct labels on diagrams/specimens
Conclusion	A conclusion supported by observations

Submission: Submit the completed written assignment and ONE project after the Autumn Break.

Do your work independently, maintain scientific accuracy, and present it neatly.

Autumn Break Assignment-2026

Subject English Core (301)

Class-XI

1. Complete the investigatory Project Assigned. Submit it when the school reopens on 26-10-2026.

2. You are Sameera/Sameer the owner of Pink Power, a café run only by women. You are looking for an interior designer to design the interiors of the café. Draft a suitable advertisement for the same, in about 50 words to be published in the classified columns of the National Daily, the local newspaper.

3. You are a fitness trainer in a college. Design a poster in not more than 50 words, to be put up on the college notice board, to emphasise the importance of yoga in maintaining mental and physical fitness. You are Vishal / Vishali.

4. You are Rakhi/ Rajesh and you feel disturbed at the growing trend of violence among the youth nowadays. Write a speech to be delivered in the school assembly on the topic, 'Growing violence among the teens'. Give suggestions on how to curb this trend.

5. Answer the following questions:-

- i. How did the sparrow pay tribute to the narrator's grandmother on her death?
- ii. How did the children support their father even in the hard time during the voyage?
- iii. Why did the boys return the horse to its rightful owner?
- iv. Why were Doris and Cyril surprised about the behaviour of their mother?
- v. Why is the goldfinch called the engine of her family?

शरदकालीन अवकाश गृहकार्य 2026

विषय - हिन्दी

कक्षा - 11 वीं

1. कक्षा में पढ़ाए गए सभी अध्यायों की पुनरावृत्ति करें ।
2. दिये गए तीन अप्रत्याशित विषयों में से किन्हीं दो विषयों पर 120 शब्दों में रचनात्मक लेख लिखें -
(क) शिक्षा के क्षेत्र में कृत्रिम बुद्धिमत्ता (ए. आई.) के बढ़ते चरण
(ख) ऑनलाइन शॉपिंग : समय की माँग
(ग) कैरियर और संघर्ष
3. आपके क्षेत्र में बढ़ती बेरोजगारी की समस्या गंभीर रूप ले चुकी है । इस समस्या के कारण युवाओं में निराशा और असंतोष बढ़ रहा है। इस विषय पर चिंता व्यक्त करते हुए किसी समाचार पत्र के संपादक को एक विस्तृत पत्र लिखें और अपने सुझाव प्रस्तुत करते हुए सरकार से ठोस कदम उठाने की माँग करें ।
4. आपके क्षेत्र में लंबे समय से सड़कों की मरम्मत नहीं हुई है। सड़क पर जगह-जगह गड्ढे होने के कारण लोगों को आने-जाने में परेशानी होती है तथा दुर्घटनाओं की आशंका बनी रहती है। इस समस्या के समाधान हेतु नगर निगम के अधिकारी को पत्र लिखें ।
5. 'राजस्थान की रजत बूँदें' पाठ के आधार पर कुंई के निर्माण प्रक्रिया को स्पष्ट करें ।
6. पठित अध्याय (आरोह -1) में से किसी एक कवि का चयन कर उनके जीवन परिचय व साहित्यिक योगदान पर विस्तृत परियोजना तैयार करें तथा उनके द्वारा लिखी पाठ पर अपनी राय प्रस्तुत करें । (A4 Size file में)

HOLIDAY HOME WORK FOR AUTUMN BREAK 2026-27**Class: XI****Subject: Computer Science**

1	What is the full form of ALU? (i) Arithmetic and Logical Unit (ii) Arithmetic and Logic Unit (iii) Arithmetic and Legal Unit (iv) None of the above
2	Operating System is a type of: (i) System Software (ii) Hardware (iii) Application Software (iv) None of the above
3	Which of the following is not input device? (i) Keyboard (ii) Microphone (iii) Scanner (iv) Headphones
4	1024 GB is equal to: (i) 1 PB (ii) 1 TB (iii) 1024 PB (iv) 1024 TB
5	Arrange the following in ascending order: Byte, TB, Bit, MB, KB, GB, Nibble
6	Which of the following is the decimal equivalent of $(10010)_2$? (i) 28 (ii) 18 (iii) 20 (iv) 22
7	Which of the following is not a binary number? (i) 111 (ii) 101 (iii) 11E (iv) 000
8	What is base of Octal Number System? (i) 2 (ii) 10 (iii) 8 (iv) 16
9	What is full form of ISCII? (i) International Standard Code for Information Interchange. (ii) Indian Standard Code for Information Interchange. (iii) International Script Code for Information Interchange. (iv) None of these.
10	Which gate returns true if both inputs are similar otherwise false. (i) NAND (ii) XNOR (iii) XOR (iv) None of the above
11	A _____ gate gives the output as 1 only if all the inputs signals are 1. (i) AND (ii) OR (iii) EXOR (iv) NOR

12	Boolean algebra is defined as a set of _____ (i) One value (ii) Two value (iii) Three value (iv) Four value
13	What will be the output of the below python code? <pre>>>>city="Piccadola" >>>city[-4:]</pre> (i) Picc (ii) dola (iii) Picca (iv) olod
14	The return type of the input() function is _____ (i) string (ii) integer (iii) list (iv) tuple
15	What will be the output of the following python expression? <pre>>>>'a'<'b'<'c'</pre> (i) True (ii) False (iii) Syntax error (iv) 0
16	Single line comments in Python begin with _____ symbol. (i) # (ii) " (iii) ''' (iv) %
17	Assertion: Python is a dynamically typed language. Reason : The data type of a variable is declared as per the type of value assigned. (A) Both Assertion and reason are true and reason is correct explanation of assertion. (B) Assertion and reason both are true but reason is not the correct explanation of assertion. (C) Assertion is true, reason is false. (D) Assertion is false, reason is true.
19	What is difference between interpreter and compiler? (Any two)

20	(i) Write the binary equivalent of following octal numbers. (a) 2306 (b) 5610 (ii) Express the following octal numbers into their equivalent decimal. (a) 145 (b) 6760
21	Convert the following program from for loop to while loop. <pre> N=int(input("Input a number to find Factorial")) f = 1 for ele in range(N,1,-1): f = f * ele print("Factorial is ", f) </pre>
22	Express the following binary numbers into their equivalent octal number. (a) 100101111 (b) 111011010 (c) 1010011 (d) 10011101
23	Verify the following using truth table: (i) $a.(a+b) = a$ (ii) $X.(Y+Z) = X.Y + X.Z$
24	(a) Name the following law and verify them using a truth table: (i) $x + xy = x$ (ii) $(x + y)' = x'.y'$ (b) Draw the logic circuit for the following Boolean expression: $(X' + Y).Z + W'$
25	(a) What is dynamic typing in python? Give an example. (b) Write Python expressions to represent the following situations: a) Find the square root of the sum of 8 and 43. b) Find the integral part of the quotient when 100 is divided by 32.
26	Identify the logic gates that can implement the following Boolean expression: (a) $A.B$ (b) $X+Y.Z'$ (c) $PQR + (QR)'$

27	(a) Rewrite the following program after correcting errors if any and underline the correction: <pre> X = int (input("Enter First Number")) Y = Int (input("Enter Second Number")) sum = 0 for Ele in Range (X,Y+1,) : if ele % 2 == 0: sum =+ Y Print(The value is", sum) </pre> (b) Write a Python program to find the sum of the following series: $X^1 + X^2 + X^3 + X^4 + X^5 + \dots + X^N$
28	Consider the following Python program: <pre> n=int(input("Enter value of n:")) i=1 sum=0 while(i<n): if (i%2==0): sum = sum + i i=i+1 print(sum) </pre> What will be the output when the value of n is : (i) 5 (ii) 3 (iii) 1
29	Write a Python program to find the sum of the following series: $1, 2, 4, 8, 16, \dots, 1024 \dots 2^n$
30	(a) Write a program to print the following pattern of a string "RAHUL". <pre> R RA RAH RAHU RAHUL </pre> (b) Write a program to print the following pattern. <pre> 1 1 2 1 2 3 1 2 3 4 </pre>

31	Write a program to find the cost of the article if the user enters total cost of the article, according to the table below. <table> <tr> <th>TOTAL COST</th><th>DISCOUNT</th></tr> <tr> <td>Less than 2000</td><td>5%</td></tr> <tr> <td>2001 to 5000</td><td>15%</td></tr> <tr> <td>Above 5000</td><td>30%</td></tr> </table>	TOTAL COST	DISCOUNT	Less than 2000	5%	2001 to 5000	15%	Above 5000	30%
TOTAL COST	DISCOUNT								
Less than 2000	5%								
2001 to 5000	15%								
Above 5000	30%								
32	a) What will be the final value of I after this loop executes:- <pre>for I in range (3): pass</pre> (i) 0 (ii) 1 (iii) 2 (iv) 3 b) Consider the following while loop: <pre>j=10 while j>=5: print("X") j = j - 1</pre> Which of the following for loops will generate the same output as the loop shown above:- i) for j in range (-1,-5,-1) : print("X") ii) for j in range (0,5) : print("X") iii) for j in range (10,-1,-2) : print("X") iv) for j in range (10, 5) : print("X") (c) Write a program to swap two numbers without using a third variable. .(d) What will be the final value of ' i ' after the loop? <pre>for i in range (10): break</pre> (i) 10 (ii) 0 (iii) Error (iv) 9 (b) What is the output produce when this code executes? <pre>l=1 while l <=7: l *=2 print(l)</pre> (i) 8 (ii) 16 (iii) 4 (iv) 14								

	(c) Write a program to swap two numbers using a third variable. .
33	(a)Nicolus is a Python programmer. He has written a code to find the sum of individual digits of a number entered by the user. He knows the logic of the program that If the user enters 4587 Then the sum is $4+5+8+7 = 24$ but he missed some code while writing python program. As a Python expert help him to complete the following code based on the requirement given below :- Python Code: <pre> N = int(_____) # Statement 1 s = 0 while _____: # Statement 2 rem = _____ # Statement 3 s = s + rem N = _____ #Statement 4 print ("Sum of Digits is" , _____) #Statement 5 </pre> (i) Write statement 1 to enter a number for finding sum of digits. (ii) Write statement 2, Condition for running while loop. (iii) Write statement 3, for finding the last digit of the number . (iv) Write statement 4, removing last digit of the number. (v) Write statement 5, to print the sum of the digits of the number. (b)Rizwan is a Python programmer.He has written a code to remove vowels from a string entered by the user .He has written the following code but he missed some code while writing python program. As a Python expert help him to complete the following code based on the requirement given below :- Python Code: <pre> str1= _____ # Statement 1 str2="" for l in range(_____): # Statement 2 if str1[i] _____ 'aeiouAEIOU': # Statement 3 str2 = str2 _____ str1[i] # Statement 4 print(str1) print(_____) # Statement 4 </pre>

	(i) Write Statement 1, to enter a string. (ii) Write Statement 2, for fetching the value of l upto the length of the string. (iii) Write Statement 3, for checking that the string does not contain vowel. (iv) Write Statement 4, String concatenation operator. (v) Write Statement 5, for printing the string after removing the vowel.
34	(a) As a homework assignment, your teacher has given a code to accept a number from user and display whether the number is a Palindrome or not. There are some places in the code marked as <u><1></u>, <u><2></u>, <u><3></u>, <u><4></u>, <u><5></u> to be filled with statement expressions so that the code should run properly. The code is shown below :- <pre> Orig = <u><1></u> (input("Enter a number:-")) num = orig rev=0 while <u><2></u> : digit=num%10 rev= <u><3></u> num = <u><4></u> (num/10) if <u><5></u> : print('Not a Palindrome') else: print('Palindrome') print("Program Over") </pre> (i) What will be the statement <1> to typecast string into integer. (ii) What will be the statement <2> to run the loop till the number is greater than Zero(0). (iii) What will be the statement <3>, to add the digits in reverse order. (iv) What will be the statement <4>, to remove the decimal part of the number. (iv) What will be the statement <5>, to compare the original number with reverse number. (b) As a homework assignment, your teacher has given a code to accept a decimal number and display its binary number. There are some places in the code marked as <u><1></u>, <u><2></u>, <u><3></u>, <u><4></u>, <u><5></u> to be filled with statement expressions so that the code should run properly. The code is shown below :- <pre> n= <u><1></u> a =0 m =0 c = <u><2></u> while n>0: a = <u><3></u> m=m+a*c c=c*10 </pre>

	n= <u><4></u> print(<u><5></u>) (i) What will be the statement <1> to input an integer value from user. (ii) What will be the statement <2> to initialize the value of 'c' . (iii) What will be the statement <3>, to find the remainder 0 or 1. (iv) What will be the statement <4>, to remove the decimal part of the number. (iv) What will be the statement <5>, to print the binary number.
35	John and Michal are python programmer , John is good in making flow chart and Michal is good in programming, they got project from their school The project is to “Enter a three digit number from user and check whether it is Armstrong or not “ . Michal who is good in programming , explained to John about the Armstrong number that :- “An Armstrong number of three digits is an integer such that the sum of the cubes of its digits is equal to the number itself”. He has also given an example that number 371 is an Armstrong number since $3^3 + 7^3 + 1^3 = 371$. Now, help John to make a flowchart from the above help given by the Michal. Make sure that John used the correct symbol for drawing the flowchart.

HOLIDAY HOME WORK FOR AUTUMN BREAK 2026-27
COMPUTER SCIENCE (083)
CLASS-XII

Note: 1. Complete your CS notes copy.

2. Complete your CS Practical copy.

3. Write Questions with Answers in CS copy.

Q1. Write the definition of a python function named LongLines() which reads the contents of a text file named 'LINES.TXT' and displays those lines from the file which have at least 10 words in it.

Q2. Write a function, vowelCount() in Python that counts and displays the number of vowels in the text file named Poem.txt.

Q3. Write a function in Python to read a text file, Alpha.txt and displays those lines which begin with the word 'You'.

Q4. Write a function count_Dwords() in Python to count the words ending with a digit in a text file "Details.txt".

Q5. Write a user defined function in Python named showInLines() which reads contents of a text file named STORY.TXT and displays every sentence in a separate line.

Q6. Write a function, c_words() in Python that separately counts and displays the number of uppercase and lowercase alphabets in a text file, Words.txt.

Q7. Write a function remove_element() in Python that accepts a list L and a number n. If the number n exists in the list, it should be removed. If it does not exist, print a message saying "Element not found".

Q8. Write a Python function add_contact() that accepts a dictionary phone_book, a name, and a phone number. The function should add the name and phone number to the dictionary. If the name already exists, print "Contact already exists" instead of updating it.

Q9. Write a Python function that displays the number of times the word "Python" appears in a text file named "Prog.txt".

Q10. Write and call a Python function to read lines from a text file STORIES.TXT and display those lines which doesn't start with a vowel (A, E, I, O, U) irrespective of their case.

Q11. Write a Python function that displays all the words containing @email from a text file "Emails.txt".

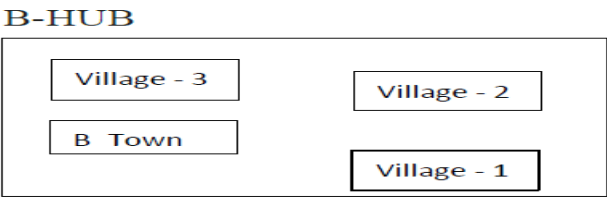
Q12. Write a Python function that finds and displays all the words longer than 5 characters from a text file "Words.txt".

Q13. 'Reliance IT' is a knowledge and skill community which has an aim to uplift the standard of knowledge and skills in the society. It is planning to set-up its training centers in

multiple towns and villages in India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as follows. As a network consultant, you have to suggest the best network related solutions for their issues/problems raised in (i) to (v) keeping in mind the distances between various locations and other given parameters.

A-HUB

Head Office



Distance between different locations

Village – 1 to B_Town	2 KM
Village – 2 to B_Town	1 KM
Village – 3 to B_Town	1.5 KM
Village – 1 Village –2	3.5 KM
Village –1 Village –3	4.5 KM
Village –2 Village –3	2.5 KM
A_CITY Head Office – B_Hub	25 KM

Number of computers

B_Town	120PC
Village – 1	15PC
Village – 2	10PC
Village – 3	15PC
A_CITY Head Office	6PC

Note: In Villages, there are community centers, in which one room has been given as training center to this organization to install computers. The organization has got financial support from the government and top IT companies.

- (i) Suggest the most appropriate location of the SERVER in the B_HUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer.
- (ii)Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various location within the B_HUB.
- (iii) Which hardware device will you suggest to connect all the computers within each location of B_HUB?
- (iv) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at all locations of B_HUB?
- (v) Which hardware device will you suggest to be procured by the company to be installed to protect and control the Internet uses within the campus?

Q14. Write a function in Python PUSH_ODD (Arr), where Arr is a list of numbers. From this list, push all odd numbers into a stack implemented by using a list.

Q15. Write the full forms of DDL and DML. Explain any two commands of DML in SQL with example.

AUTUMN BREAK HOLIDAY HOMEWORK (2026)

Department of Chemistry • Senior Secondary Section

Class: XII (Science)

Subject: Chemistry (043)

Session: 2026–27

Submission: First Working Day

1. Chemistry Investigatory Project

- Complete and neatly bind your **Investigatory Project File** on your assigned topic.
- Make sure your file includes:
 - Cover Page, Certificate, and Acknowledgement
 - Aim, Principle/Theory, and Required Chemicals & Apparatus
 - Step-by-step Procedure, Observation Table, and Final Result
 - Precautions and Bibliography

2. Organic Chemistry Reaction Chart

- Completely fill and solve the distributed **Organic Reaction Chart**.
- Revise and write all important **Name Reactions** and **Chemical Conversions**.
- Use this chart for quick memory revision during board exam preparation.

3. Solve CBSE Board Question Papers (PYQs)

- Solve the following papers completely in your dedicated **Chemistry Practice Notebook**:
 - CBSE Board Paper 2023
 - CBSE Board Paper 2024
 - CBSE Board Paper 2025
 - CBSE Board Paper 2026
 - Official CBSE Sample Paper (Current Session)
- Write step-by-step answers for all sections (MCQs, Short Answers, Long Answers, and Case Studies).

Important Instructions:

- All notebooks and project files will be checked on the **first working day** after school reopens.
- Keep your work clean, authentic, and well-organized.

Autumn Break Assignment-2026

Subject English Core (301)

Class-XII

1. Complete the investigatory Project Assigned. Submit it when the school reopens on 26-10-2026.
2. Complete the CBSE Sample Paper supplied to you.
3. Write a notice as your school is going to close on account of durga puja. Give all the necessary details required. Sign in as Punam / Puneet.
4. Bal Vidya Public School, Bhilai, urgently requires a post-graduate teacher to teach political science for which they have placed an advertisement in The Bhilai Express. You are Sanjay/Sanjana Sharma from 21, Vasant Marg, Bhilai. Draft a letter including a CV, applying for the advertised post. (120 – 150 words)
5. MMD School, Nashik, recently organised a science symposium on the topic: 'Effect of pollution on quality of life'. You are Amit/Amita Raazdan, editor of the school magazine. Write a report on the event for your school magazine. (120 – 150 words)

HOLIDAY HOME WORK FOR AUTUMN BREAK 2026-27

COMPUTER SCIENCE (083)

CLASS-XII

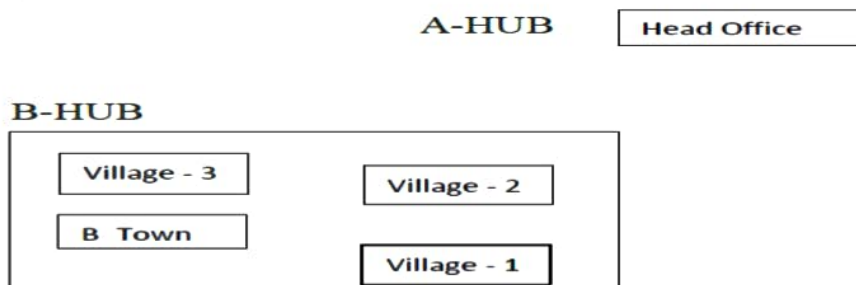
Note: 1. Complete your CS notes copy.

2. Complete your CS Practical copy.

3. Write Questions with Answers in CS copy.

- Q1. Write the definition of a python function named LongLines() which reads the contents of a text file named 'LINES.TXT' and displays those lines from the file which have at least 10 words in it.
- Q2. Write a function, vowelCount() in Python that counts and displays the number of vowels in the text file named Poem.txt.
- Q3. Write a function in Python to read a text file, Alpha.txt and displays those lines which begin with the word 'You'.
- Q4. Write a function count_Dwords() in Python to count the words ending with a digit in a text file "Details.txt".
- Q5. Write a user defined function in Python named showInLines() which reads contents of a text file named STORY.TXT and displays every sentence in a separate line.
- Q6. Write a function, c_words() in Python that separately counts and displays the number of uppercase and lowercase alphabets in a text file, Words.txt.
- Q7. Write a function remove_element() in Python that accepts a list L and a number n. If the number n exists in the list, it should be removed. If it does not exist, print a message saying "Element not found".
- Q8. Write a Python function add_contact() that accepts a dictionary phone_book, a name, and a phone number. The function should add the name and phone number to the dictionary. If the name already exists, print "Contact already exists" instead of updating it.
- Q9. Write a Python function that displays the number of times the word "Python" appears in a text file named "Prog.txt".
- Q10. Write and call a Python function to read lines from a text file STORIES.TXT and display those lines which doesn't start with a vowel (A, E, I, O, U) irrespective of their case.
- Q11. Write a Python function that displays all the words containing @email from a text file "Emails.txt".
- Q12. Write a Python function that finds and displays all the words longer than 5 characters from a text file "Words.txt".
- Q13. 'Reliance IT' is a knowledge and skill community which has an aim to uplift the standard of knowledge and skills in the society. It is planning to set-up its training centers in

multiple towns and villages in India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as follows. As a network consultant, you have to suggest the best network related solutions for their issues/problems raised in (i) to (v) keeping in mind the distances between various locations and other given parameters.



Distance between different locations

Village – 1 to B_Town	2 KM
Village – 2 to B_Town	1 KM
Village – 3 to B_Town	1.5 KM
Village – 1 Village –2	3.5 KM
Village –1 Village –3	4.5 KM
Village –2 Village –3	2.5 KM
A_CITY Head Office – B_Hub	25 KM

Number of computers

B_Town	120PC
Village – 1	15PC
Village – 2	10PC
Village – 3	15PC
A_CITY Head Office	6PC

Note: In Villages, there are community centers, in which one room has been given as training center to this organization to install computers. The organization has got financial support from the government and top IT companies.

- Suggest the most appropriate location of the SERVER in the B_HUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer.
- Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various location within the B_HUB.
- Which hardware device will you suggest to connect all the computers within each location of B_HUB?
- Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at all locations of B_HUB?
- Which hardware device will you suggest to be procured by the company to be installed to protect and control the Internet uses within the campus?

Q14. Write a function in Python PUSH_ODD (Arr), where Arr is a list of numbers. From this list, push all odd numbers into a stack implemented by using a list.

Q15. Write the full forms of DDL and DML. Explain any two commands of DML in SQL with example.

शरदकालीन अवकाश गृहकार्य 2026

विषय - हिन्दी

कक्षा - 12 वीं

1. कक्षा में पढ़ाए गए सभी अध्यायों की पुनरावृत्ति करें ।
2. सी.बी. एस. ई. प्रदत्त परिशिष्ट प्रश्न-पत्रों के उत्तर हिन्दी की कॉपी में लिखकर अभ्यास करें ।
3. किन्हीं दो विषयों पर 120 शब्दों में रचनात्मक लेख लिखें -
(क) त्योहारों पर बाजार की चहल - पहल
(ख) किशोरों में बढ़ती स्क्रीन लत
(ग) स्वच्छता : एक अनिवार्य कदम
4. फीचर व आलेख लेखन से क्या समझते हैं? उदाहरण सहित स्पष्ट करें ।
5. 'मुअनजो-दड़ो' और 'हड़प्पा' को भारत के ही नहीं दुनिया के सबसे पुराने उत्कृष्ट शहर के रूप में क्यों जाना जाता है? 'अतीत में दबे पाँव' पाठ के आधार पर कारण सहित लिखिए।
6. पठित अध्याय (आरोह -2) में से किसी एक कवि का चयन कर उनके जीवन परिचय व साहित्यिक योगदान पर विस्तृत परियोजना तैयार करें तथा उनके द्वारा लिखी पाठ पर अपनी राय प्रस्तुत करें । (A4 Size file में)

AUTUMN BREAK ASSIGNMENT

CLASS XII – BIOLOGY (CBSE)

Session 2026–27 | Subject Code: 044

Name: _____ Class/Section: _____ Roll No.: _____

General Instructions

- Complete the written work neatly in your Biology notebook or in a separate assignment file.
- Attempt all chapter-wise questions. Draw well-labelled diagrams wherever required.
- Choose ONE project topic from the list below unless your teacher assigns a specific topic.
- Use textbooks and reliable sources, write in your own words, and mention references.
- For surveys, use anonymous responses and do not collect personal or sensitive information.

PART A – BIOLOGY PROJECT WORK

Choose one project topic. The report should generally include: Title, Aim/Objectives, Introduction, Materials/Methodology, Observations/Data (where applicable), Discussion, Conclusion, Bibliography, and relevant labelled diagrams or photographs.

1. **Pollination and Pollinator Diversity in the Local Area.** Observe flowers in a garden or nearby safe public area. Record flower colour, shape, and possible pollinators. Explain how flower features support pollination. Do not disturb insects or collect specimens.
2. **Seed Germination Under Different Conditions.** Compare germination of the same type of seed under two or three safe conditions, such as light/dark or different watering levels. Keep other factors as similar as possible; record observations in a table.
3. **Menstrual Health and Reproductive Health Awareness.** Prepare an evidence-based awareness booklet or poster on menstrual hygiene, reproductive health, and myths versus facts. Use respectful, age-appropriate language and trusted health sources.
4. **Mendelian Inheritance: A Family-Trait Survey (Anonymous).** Explain dominant and recessive inheritance using textbook examples. Alternatively, model inheritance with coloured beads or paper tokens; do not make medical predictions about real people.
5. **DNA Extraction from Plant Material.** Prepare a school-level report on the principle of DNA extraction from fruit or plant material, with teacher/guardian supervision. Include the scientific principle, observations, precautions, and a labelled flowchart.
6. **Antibiotic Resistance: A Public Health Challenge.** Explain how antibiotic resistance develops, why antibiotics do not treat viral infections, and how responsible use helps. Include a simple infographic and references from credible health organisations.
7. **Microbes in Everyday Life: Fermentation and Food.** Research the role of microbes in curd, bread, idli/dosa batter, and other familiar foods. Compare the organisms/processes and explain useful conditions for fermentation.

8. **8. Waste Segregation and Composting.** Conduct a small observation of household or school waste categories (without handling hazardous waste). Propose a segregation and composting plan and discuss decomposers and nutrient cycling.
9. **9. Biodiversity Audit of a School/Garden.** Record commonly observed plants, birds, and insects from a safe observation area. Make a simple species checklist and suggest practical measures to protect local biodiversity.
10. **10. Ecosystem Study: Food Chains and Energy Flow.** Choose a pond, garden, forest, or grassland ecosystem. Create a labelled food web, identify trophic levels, and explain energy transfer and the role of decomposers.
11. **11. Biotechnology in Medicine and Agriculture.** Prepare a report comparing one medical application (e.g., recombinant insulin or gene therapy) and one agricultural application (e.g., Bt crops), including benefits, limitations, and biosafety considerations.
12. **12. Human Population Growth and Population Interactions.** Use published or teacher-provided data to make a graph of population growth or create a case study of mutualism, competition, predation, or parasitism. Cite the data source.

Suggested Project Presentation

- Length: approximately 6–10 pages, excluding the cover page and bibliography.
- Use clear headings, original diagrams, tables, and captions.
- For an observation-based project, include dates, a small data table, and limitations.
- Do not claim results you did not observe; research-only projects should be clearly identified as literature-based.

PART B – CHAPTER-WISE QUESTION BANK

Attempt all questions. Answers should be written in complete sentences. Practise labelled diagrams, genetic crosses, flowcharts, and application-based explanations wherever relevant.

Chapter 1: Sexual Reproduction in Flowering Plants

13. Draw and label the structure of an anther and a mature embryo sac. State the ploidy of the main cells.
14. Explain microsporogenesis and megasporogenesis. How does a functional megaspore develop into the female gametophyte?
15. Differentiate between autogamy, geitonogamy, and xenogamy, giving one key feature of each.
16. What is double fertilisation? Explain syngamy and triple fusion and state their products.
17. Explain any three outbreeding devices in flowering plants. What are apomixis, parthenocarpy, and polyembryony?

Chapter 2: Human Reproduction

18. Draw and label the male reproductive system or female reproductive system.
19. Describe spermatogenesis and oogenesis. Give two differences between them.
20. Explain the major hormonal changes during the menstrual cycle.
21. Trace the events from fertilisation to blastocyst formation and implantation.

22. State the functions of the placenta. Briefly explain parturition and lactation.

Chapter 3: Reproductive Health

23. What is reproductive health? Explain any four measures that promote it.

24. Compare natural, barrier, intrauterine, and hormonal methods of contraception.

25. What are sexually transmitted infections (STIs)? Give examples and explain general preventive measures.

26. What are IVF, ZIFT, and GIFT? Give a brief explanation of each.

27. What is amniocentesis? Why is its misuse for sex determination prohibited?

Chapter 4: Principles of Inheritance and Variation

28. State Mendel's law of dominance and law of segregation, using a suitable cross.

29. Work out a monohybrid cross between two heterozygous tall pea plants. Give genotypic and phenotypic ratios.

30. Explain incomplete dominance with an example. How does it differ from codominance?

31. Describe the inheritance of ABO blood groups and explain multiple alleles.

32. What are sex-linked traits? Explain inheritance of haemophilia or colour blindness using a genetic cross.

Chapter 5: Molecular Basis of Inheritance

33. Describe the Watson–Crick model of DNA. Mention three features of its structure.

34. Explain DNA replication and why it is called semiconservative.

35. Differentiate between transcription and translation.

36. Explain the lac operon as an example of gene regulation.

37. What is DNA fingerprinting? Mention its principle and two applications.

Chapter 6: Evolution

38. Describe the major evidences supporting biological evolution: fossil, anatomical, embryological, and molecular.

39. Explain Darwin's theory of natural selection with an example.

40. What is the Hardy–Weinberg principle? Write the equation and explain the factors that disturb equilibrium.

41. Differentiate between gene flow and genetic drift.

42. What is adaptive radiation? Explain with one example. Briefly outline major stages in human evolution.

Chapter 7: Human Health and Diseases

43. Differentiate between innate immunity and acquired immunity.

44. Explain the life cycle of the malarial parasite in brief and identify the vector.

45. What are antibodies and vaccines? Explain how vaccination helps protect a population.

46. Write a short note on HIV/AIDS: causative agent, transmission routes, and prevention.

47. What is cancer? Explain why early detection and evidence-based treatment are important. Add a note on

substance misuse and its health risks.

Chapter 8: Microbes in Human Welfare

48. Explain the role of microbes in curd formation and bread making.
49. Describe the major steps of sewage treatment and the role of microbes in secondary treatment.
50. How are microbes used in the production of antibiotics, organic acids, and enzymes? Give examples.
51. Explain biogas production and the role of methanogens.
52. What are biofertilisers and biocontrol agents? Give two examples of each.

Chapter 9: Biotechnology – Principles and Processes

53. Define biotechnology and explain the two core principles used in modern biotechnology.
54. What are restriction endonucleases? Explain their role in recombinant DNA technology.
55. Describe the main steps involved in constructing recombinant DNA and introducing it into a host cell.
56. What are PCR, gel electrophoresis, and cloning vectors? State the function of each.
57. Explain the role of selectable markers and competent host cells in genetic engineering.

Chapter 10: Biotechnology and its Applications

58. Explain how recombinant human insulin is produced. Why was this an important medical advance?
59. What are genetically modified organisms? Discuss one benefit and one concern related to GM crops.
60. Explain the principle behind Bt crops and how they help protect plants from certain insect pests.
61. What is gene therapy? Explain its basic idea with one example.
62. Define biopiracy and patents in the context of biological resources. Why are biosafety checks important?

Chapter 11: Organisms and Populations

63. Define population density, natality, mortality, and age distribution.
64. Draw and explain exponential and logistic population growth curves.
65. Differentiate between mutualism, competition, predation, and parasitism with examples.
66. Explain adaptations of organisms to temperature or water availability.
67. Describe any two population interactions and state whether each species benefits, is harmed, or is unaffected.

Chapter 12: Ecosystem

68. Define ecosystem and describe its biotic and abiotic components.
69. Differentiate between gross primary productivity and net primary productivity.
70. Explain decomposition and list the major factors affecting its rate.
71. Explain the 10% law of energy transfer with a suitable food chain.
72. Draw pyramids of number, biomass, and energy. Which pyramid is always upright and why?

Chapter 13: Biodiversity and its Conservation

73. Define genetic, species, and ecological diversity, with examples.
74. Explain the latitudinal gradient in species diversity and the species–area relationship.
75. Discuss the major causes of biodiversity loss, often summarised as the ‘evil quartet’.
76. Differentiate between in-situ and ex-situ conservation, giving examples.
77. What are biodiversity hotspots, biosphere reserves, national parks, wildlife sanctuaries, and Ramsar sites?

PART C – APPLICATION / HIGHER-ORDER THINKING QUESTIONS

78. A flower is visited by insects but rarely forms seeds when isolated from other plants of the same species. Suggest two possible biological explanations and one way to investigate them.
79. In a monohybrid cross, all F1 offspring show one parental trait, while the F2 generation shows two phenotypes. Explain the result using a genetic cross.
80. A patient is prescribed antibiotics for a bacterial infection. Explain why the complete prescribed course and medical advice matter, and why antibiotics should not be used for viral infections without medical guidance.
81. A lake receives excess nutrient-rich runoff and algal growth increases sharply. Predict two effects on dissolved oxygen and aquatic organisms.
82. A pesticide-resistant insect population becomes more common over several generations. Explain this change using variation and natural selection.
83. A researcher wants many copies of a specific DNA segment. Name the suitable technique and list the essential components needed for it.
84. Two ecosystems have similar plant biomass but different species richness. Explain why biomass alone cannot be used as a complete measure of biodiversity.
85. Explain why energy decreases at successive trophic levels and predict how this limits the length of food chains.

PART D – DIAGRAMS AND FLOWCHARTS FOR PRACTICE

- Anther and pollen grain; anatropous ovule and mature embryo sac; double fertilisation.
- Male and female reproductive systems; seminiferous tubule; stages of embryo development.
- Monohybrid/dihybrid genetic crosses; DNA double helix; DNA replication fork; transcription and translation.
- Antibody structure; life cycle of Plasmodium; sewage treatment; biogas plant.
- Recombinant DNA technology; PCR cycle; ecological pyramids; exponential and logistic growth curves.

ASSESSMENT CHECKLIST

- Scientific accuracy and use of NCERT terminology
- Neat presentation and labelled diagrams

- Original writing and appropriate use of tables/graphs
- Project methodology, observations, conclusion, and references
- Completion of all chapter-wise questions

Have a meaningful and productive Autumn Break!

KENDRIYA VIDYALAYA, GUMLA

AUTUMN BREAK HOMEWORK ASSIGNMENT

CLASS XII – PHYSICS (042)

Session: 2026–27	Subject: Physics (042)	Submission: First day after break
-------------------------	-------------------------------	--

ASSIGNED TASKS

1. Physics Investigatory Project

Complete the Physics Investigatory Project on your allotted/selected topic. The project report must be neatly hand-written in a standard project file, including Aim, Principle, Circuit/Ray Diagrams, Observations, Calculations, and Result/Conclusion.

2. Sample Paper Practice

Solve at least **two (02) complete Sample Question Papers** based on the latest CBSE Board examination pattern. Write full step-by-step solutions with diagrams in a separate homework/practice notebook.

3. Practical File & Activity File Completion

Complete all assigned Physics Practical experiments and Activities in your practical record file. Ensure all circuit diagrams, ray diagrams, and graph plots are accurately drawn using pencil.

Instructions: All work must be completed systematically and presented neatly. The completed homework must be submitted to the physics teacher on the day school reopens.

KENDRIYA VIDYALAYA GUMla
AUTUMN BREAK HOLIDAY HOMEWORK

Academic Session 2026–27

Class	XII
Subject	Mathematics
Subject Teacher	Sumit, PGT Mathematics
Chapters	Determinants and Vector Algebra
Total Questions	100 (50 from each chapter)

General Instructions

1. Attempt all 100 questions in a separate Mathematics notebook.
 2. Show complete calculations, reasoning and necessary steps.
 3. Questions are arranged in increasing order of difficulty.
 4. The last 10 questions of each chapter are competency-based.
 5. Revise the relevant NCERT examples, exercises, properties and formulas.
 6. Maintain neatness and proper question numbering.
-

SECTION A: DETERMINANTS

Total Questions: 50

Level I: Easy Questions (1–10)

1. Evaluate:

$$\begin{vmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{vmatrix}.$$

2. Evaluate:

$$\begin{vmatrix} 2 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 4 \end{vmatrix}.$$

3. Evaluate:

$$\begin{vmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 3 & 6 \end{vmatrix}.$$

4. Evaluate:

$$\begin{vmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \\ 4 & 1 & 5 \end{vmatrix}.$$

5. Find the minor M_{12} and cofactor A_{12} of:

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}.$$

6. Find the cofactors of all the elements of the first row of:

$$\begin{vmatrix} 2 & 1 & 3 \\ 4 & 0 & 5 \\ 1 & 2 & 6 \end{vmatrix}.$$

7. Evaluate by expanding along the first row:

$$\begin{vmatrix} 3 & 2 & 1 \\ 1 & 4 & 2 \\ 2 & 1 & 5 \end{vmatrix}.$$

8. Evaluate by expanding along the second column:

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 10 \end{vmatrix}.$$

9. Evaluate using the properties of determinants:

$$\begin{vmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 5 & 7 \end{vmatrix}.$$

10. Find all values of x for which:

$$\begin{vmatrix} x & 1 & 1 \\ 1 & x & 1 \\ 1 & 1 & x \end{vmatrix} = 0.$$

Level II: Moderate Questions (11–25)

11. Evaluate using the properties of determinants:

$$\begin{vmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 9 \end{vmatrix}.$$

12. Evaluate:

$$\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}.$$

13. Prove that:

$$\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (b-a)(c-a)(c-b).$$

14. Find the values of k for which:

$$\begin{vmatrix} k & 1 & 1 \\ 1 & k & 1 \\ 1 & 1 & k \end{vmatrix} = 0.$$

15. Evaluate using determinant properties:

$$\begin{vmatrix} a+b & b+c & c+a \\ b+c & c+a & a+b \\ c+a & a+b & b+c \end{vmatrix}.$$

16. Verify that interchanging any two rows of a determinant changes its sign, using:

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 10 \end{vmatrix}.$$

17. Evaluate using suitable row operations:

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}.$$

18. Verify that the value of a determinant remains unchanged when its rows are replaced by the corresponding columns:

$$\begin{vmatrix} 2 & 1 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}.$$

19. Evaluate:

$$\begin{vmatrix} x & y & z \\ y & z & x \\ z & x & y \end{vmatrix}.$$

20. Find all real values of x satisfying:

$$\begin{vmatrix} x & 2 & 1 \\ 1 & x & 2 \\ 2 & 1 & x \end{vmatrix} = 0.$$

21. Find the adjoint of:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{bmatrix}.$$

22. Find the inverse of:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{bmatrix}.$$

23. Find the area of the triangle whose vertices are $(1, 1)$, $(4, 2)$ and $(2, 5)$, using determinants.

24. Solve the following system using the inverse matrix method:

$$\begin{aligned} x + y + z &= 6, \\ 2x - y + z &= 3, \\ x + 2y - z &= 2. \end{aligned}$$

25. Determine the values of k for which the matrix

$$A = \begin{bmatrix} k & 1 & 1 \\ 1 & k & 1 \\ 1 & 1 & k \end{bmatrix}$$

is singular.

Level III: Difficult Questions (26–40)

26. Prove that:

$$\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (b-a)(c-a)(c-b).$$

27. Evaluate by applying appropriate determinant properties:

$$\begin{vmatrix} a+b & b+c & c+a \\ b+c & c+a & a+b \\ c+a & a+b & b+c \end{vmatrix}.$$

28. Find all real values of x for which:

$$\begin{vmatrix} x & 1 & 1 \\ 1 & x & 1 \\ 1 & 1 & x \end{vmatrix} = 0.$$

29. Find the inverse of:

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}.$$

30. Solve using the inverse matrix method:

$$\begin{aligned} x + y + z &= 6, \\ 2x - y + z &= 3, \\ x + 2y - z &= 2. \end{aligned}$$

31. Solve using the inverse matrix method:

$$\begin{aligned} x + y + z &= 9, \\ 2x - y + z &= 5, \\ x + 2y + 3z &= 14. \end{aligned}$$

32. Find all values of k for which the matrix

$$A = \begin{bmatrix} k & 1 & 1 \\ 1 & k & 1 \\ 1 & 1 & k \end{bmatrix}$$

is non-singular.

33. Find the area of the triangle whose vertices are $(a, 0)$, $(0, b)$ and (c, d) , using determinants.

34. Prove that:

$$\begin{vmatrix} a & b & c \\ a+x & b+y & c+z \\ x & y & z \end{vmatrix} = 0.$$

35. Evaluate:

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ bc & ca & ab \end{vmatrix}.$$

36. Find the inverse of:

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 3 & 6 \end{bmatrix}.$$

37. Find all real values of k for which:

$$\begin{vmatrix} k+1 & 1 & 1 \\ 1 & k+1 & 1 \\ 1 & 1 & k+1 \end{vmatrix} = 0.$$

38. Find the equation of the line passing through $(2, 3)$ and $(4, 7)$ using:

$$\begin{vmatrix} x & y & 1 \\ 2 & 3 & 1 \\ 4 & 7 & 1 \end{vmatrix} = 0.$$

39. Verify the identity

$$A(\text{adj } A) = |A|I$$

for:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{bmatrix}.$$

40. Solve using the inverse matrix method:

$$3x + 2y - z = 4,$$

$$x - y + 2z = 3,$$

$$2x + 3y + z = 7.$$

Level IV: Competency-Based Questions (41–50)

41. **School Garden:** A triangular garden has vertices $A(2, 1)$, $B(6, 3)$ and $C(4, 7)$. Find its area using a 3×3 determinant. If grass is planted at Rs. 50 per square unit, calculate the total cost.

42. **Quality Control:** A machine uses the matrix

$$A = \begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & 2 \end{bmatrix}$$

to represent a linear transformation. Evaluate $|A|$ and determine whether the matrix is invertible. Explain the significance of the result.

43. **Business Planning:** The production quantities x, y, z of three products satisfy:

$$x + y + z = 60,$$

$$2x + y + 3z = 110,$$

$$x + 2y + z = 80.$$

Form the coefficient matrix and solve the system using the inverse matrix method.

44. **Traffic Survey:** A survey records three categories of vehicles: cars, bikes and three-wheelers. Their numbers x, y, z satisfy:

$$x + y + z = 100,$$

$$4x + 2y + 3z = 280,$$

$$x - y + z = 20.$$

Find the number of vehicles in each category using the inverse matrix method.

45. **Cost Analysis:** A school purchases mathematics, science and computer kits. Their quantities x, y, z satisfy:

$$x + y + z = 30,$$

$$80x + 60y + 100z = 2300,$$

$$2x + y + 2z = 45.$$

Find the quantities using the inverse matrix method and interpret the result.

46. **Geometrical Reasoning:** A student claims that the points $(1, 2)$, $(3, 6)$ and $(5, 10)$ form a triangle of positive area. Test the claim using a 3×3 determinant and justify the conclusion.

47. **Parameter Analysis:** Determine the values of k for which the coefficient matrix of the system

$$kx + y + z = 1,$$

$$x + ky + z = 2,$$

$$x + y + kz = 3$$

is non-singular. Hence, state when the system has a unique solution.

48. **Error Detection:** A student claims that a matrix is invertible whenever at least one of its entries is non-zero. Examine this claim using:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 1 & 0 & 1 \end{bmatrix}.$$

Evaluate its determinant and explain the correct criterion for invertibility.

49. **Resource Allocation:** A school purchases three types of laboratory equipment. Their quantities x, y, z satisfy:

$$\begin{aligned} x + y + z &= 40, \\ 2x + y + 3z &= 75, \\ x + 3y + 2z &= 80. \end{aligned}$$

Find the quantities using the inverse matrix method and explain how the solution assists resource planning.

50. **Case Study – School Garden:** A school plans a triangular garden with vertices $A(1, 2)$, $B(7, 2)$ and $C(4, 8)$. Use a 3×3 determinant to calculate its area. Then find the total boundary length using the distance formula. Explain how these calculations help estimate gardening and fencing costs.

SECTION B: VECTOR ALGEBRA

Total Questions: 50

Level I: Easy Questions (1–10)

1. Find the magnitude of:

$$\vec{a} = 3\hat{i} + 4\hat{j}.$$

2. Find the magnitude of:

$$\vec{a} = 2\hat{i} - 3\hat{j} + 6\hat{k}.$$

3. Find a unit vector in the direction of:

$$3\hat{i} + 4\hat{j}.$$

4. Write the components of:

$$\vec{a} = 2\hat{i} - 5\hat{j} + 3\hat{k}.$$

5. Find $\vec{a} + \vec{b}$, where:

$$\vec{a} = \hat{i} + 2\hat{j}, \quad \vec{b} = 3\hat{i} - \hat{j}.$$

6. Find $2\vec{a} - 3\vec{b}$, where:

$$\vec{a} = \hat{i} + \hat{j} + \hat{k}, \quad \vec{b} = 2\hat{i} - \hat{j} + \hat{k}.$$

7. Find the scalar product of:

$$\vec{a} = 2\hat{i} + 3\hat{j}, \quad \vec{b} = 4\hat{i} - \hat{j}.$$

8. Find the angle between $\hat{i}$ and $\hat{j}$.

9. Evaluate:

$$\hat{i} \times \hat{j}.$$

10. Determine whether the vectors

$$\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}, \quad \vec{b} = 2\hat{i} + 4\hat{j} + 6\hat{k}$$

are parallel.

Level II: Moderate Questions (11–25)

11. Find a unit vector in the direction of:

$$\vec{a} = 2\hat{i} - 3\hat{j} + 6\hat{k}.$$

12. Find a vector of magnitude 10 in the direction of:

$$2\hat{i} - \hat{j} + 2\hat{k}.$$

13. Find the angle between:

$$\vec{a} = \hat{i} + \hat{j}, \quad \vec{b} = \hat{i} - \hat{j}.$$

14. Find
- λ
- if

$$\vec{a} = \lambda\hat{i} + 2\hat{j} + 3\hat{k}$$

is perpendicular to

$$\vec{b} = 2\hat{i} - \hat{j} + \hat{k}.$$

15. Find the scalar projection of

$$\vec{a} = 2\hat{i} + 2\hat{j} + \hat{k}$$

on

$$\vec{b} = \hat{i} + 2\hat{j} + 2\hat{k}.$$

16. Find the vector projection of

$$\vec{a} = 3\hat{i} + 4\hat{j}$$

on

$$\vec{b} = \hat{i} + \hat{j}.$$

17. Find
- $\vec{a} \times \vec{b}$
- , where:

$$\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}, \quad \vec{b} = 2\hat{i} - \hat{j} + \hat{k}.$$

18. Find a vector perpendicular to both:

$$\vec{a} = \hat{i} + \hat{j}, \quad \vec{b} = \hat{j} + \hat{k}.$$

19. Find the area of the parallelogram formed by:

$$\vec{a} = \hat{i} + 2\hat{j}, \quad \vec{b} = 3\hat{i} + \hat{j}.$$

20. Find the area of the triangle formed by the vectors:

$$\vec{a} = 2\hat{i} + \hat{j}, \quad \vec{b} = \hat{i} + 3\hat{j},$$

when both vectors originate from the same vertex.

21. Find
- λ
- if

$$\vec{a} = 2\hat{i} + \lambda\hat{j} + \hat{k}, \quad \vec{b} = \hat{i} + 2\hat{j} - 3\hat{k}$$

are perpendicular.

22. Find
- $\vec{a} \cdot \vec{b}$
- if

$$|\vec{a}| = 4, \quad |\vec{b}| = 5$$

and the angle between them is 60° .

23. Find the angle between:

$$\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}, \quad \vec{b} = \hat{i} + 2\hat{j} + 2\hat{k}.$$

24. Evaluate:

$$(\hat{i} + \hat{j}) \times (\hat{j} + \hat{k}).$$

25. If
- $\vec{a}$
- and
- $\vec{b}$
- are perpendicular unit vectors, find:

$$|\vec{a} + \vec{b}| \quad \text{and} \quad |\vec{a} - \vec{b}|.$$

Level III: Difficult Questions (26–40)

26. Find all real values of
- λ
- for which the angle between

$$\vec{a} = \hat{i} + \lambda\hat{j} + \hat{k}, \quad \vec{b} = \hat{i} + \hat{j} + \hat{k}$$

is 60° .

27. Find a unit vector perpendicular to both:

$$\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}, \quad \vec{b} = 2\hat{i} - \hat{j} + \hat{k}.$$

28. If

$$|\vec{a}| = 3, \quad |\vec{b}| = 4, \quad |\vec{a} + \vec{b}| = 5,$$

find the angle between $\vec{a}$ and $\vec{b}$.

29. If

$$\vec{a} + \vec{b} = 2\hat{i} + 3\hat{j} + 4\hat{k}$$

and

$$\vec{a} - \vec{b} = 4\hat{i} - \hat{j} + 2\hat{k},$$

find $\vec{a}$ and $\vec{b}$.

30. Find the area of the triangle whose vertices have position vectors:

$$\vec{a} = \hat{i} + \hat{j}, \quad \vec{b} = 3\hat{i} + 2\hat{j}, \quad \vec{c} = 2\hat{i} + 5\hat{j}.$$

31. Prove that:

$$|\vec{a} + \vec{b}|^2 + |\vec{a} - \vec{b}|^2 = 2|\vec{a}|^2 + 2|\vec{b}|^2.$$

32. If
- $\vec{a} \cdot \vec{b} = 0$
- , prove that:

$$|\vec{a} + \vec{b}|^2 = |\vec{a}|^2 + |\vec{b}|^2.$$

33. Find the angle between:

$$\vec{a} = 2\hat{i} - 2\hat{j} + \hat{k}, \quad \vec{b} = 4\hat{i} + 2\hat{j} - 4\hat{k}.$$

34. If
- $\vec{a} \times \vec{b} = \vec{0}$
- , what can you conclude about the vectors? State the qualification needed when one or both vectors are zero.

35. Find all real values of
- λ
- if:

$$|\lambda\hat{i} + 2\hat{j} + 2\hat{k}| = 3.$$

36. If
- $\vec{a}$
- and
- $\vec{b}$
- are unit vectors and the angle between them is
- 120°
- , find:

$$|\vec{a} + \vec{b}|.$$

37. Find
- k
- if:

$$\vec{a} = \hat{i} + k\hat{j} + 2\hat{k}, \quad \vec{b} = 2\hat{i} - \hat{j} + \hat{k}$$

are perpendicular.

38. Find the area of the parallelogram whose adjacent sides are:

$$\vec{a} = 2\hat{i} - \hat{j} + \hat{k}, \quad \vec{b} = \hat{i} + 2\hat{j} - 3\hat{k}.$$

39. If

$$|\vec{a}| = |\vec{b}| = 2, \quad \vec{a} \cdot \vec{b} = 2,$$

find $|\vec{a} + \vec{b}|$, $|\vec{a} - \vec{b}|$ and the angle between the vectors.

40. Prove that the magnitude of the vector product of two vectors is equal to the area of the parallelogram formed by them. Hence, obtain the formula for the area of a triangle.

Level IV: Competency-Based Questions (41–50)

41. **Navigation:** An aircraft moves 3 km east and 4 km north. Represent its displacement as a vector and find its magnitude and the angle it makes with the eastward direction.

42. **Work Done:** A force

$$\vec{F} = 4\hat{i} + 3\hat{j} \text{ N}$$

displaces an object through

$$\vec{s} = 5\hat{i} + 2\hat{j} \text{ m.}$$

Calculate the work done using the scalar product.

43. **Construction:** Two adjacent sides of a rectangular platform are represented by perpendicular vectors of magnitudes 6 m and 8 m. Calculate the area of the platform using vector concepts.

44. **Sports Analysis:** A player applies a force

$$\vec{F} = 10\hat{i} + 5\hat{j} \text{ N}$$

and produces a displacement

$$\vec{s} = 2\hat{i} + 4\hat{j} \text{ m.}$$

Calculate the work done and explain the role of the scalar product.

45. **Road Design:** Two roads from a junction are represented by:

$$\vec{a} = 2\hat{i} + \hat{j}, \quad \vec{b} = \hat{i} + 2\hat{j}.$$

Find the angle between the roads using the scalar product.

46. **Engineering Design:** Two supporting beams are represented by:

$$\vec{a} = \hat{i} + 2\hat{j} + 2\hat{k}, \quad \vec{b} = 2\hat{i} - \hat{j} + \hat{k}.$$

Determine whether they are perpendicular. Explain the significance of the result in the design.

47. **Area Estimation:** Two adjacent sides of a triangular metal plate are represented by:

$$\vec{a} = 2\hat{i} + \hat{j} + \hat{k} \text{ m,}$$

$$\vec{b} = \hat{i} - \hat{j} + 2\hat{k} \text{ m.}$$

Calculate the area of the plate using the vector product.

48. **Error Detection:** A student claims that

$$\vec{a} \cdot \vec{b} = 0$$

implies

$$\vec{a} \times \vec{b} = \vec{0}.$$

Is the claim correct? Give a counterexample using two non-zero perpendicular vectors.

49. **Resultant Force:** Two forces

$$\vec{F}_1 = 6\hat{i} + 8\hat{j} \text{ N,} \quad \vec{F}_2 = -2\hat{i} + 3\hat{j} \text{ N}$$

act on an object. Find the resultant force, its magnitude and the angle it makes with the positive x -axis.

50. **Case Study – School Ramp:** A school designs a ramp with horizontal displacement 12 m and vertical displacement 5 m. Represent the displacement as a vector, find its magnitude and determine the angle it makes with the horizontal. If a horizontal force

$$\vec{F} = 100\hat{i} \text{ N}$$

acts along the ramp displacement, calculate the work done by this force.

Submission Guidelines

1. Complete all 100 questions neatly in a separate Mathematics notebook.
2. Maintain the question numbering and show complete step-by-step solutions.
3. Revise the relevant NCERT examples and exercises before attempting the assignment.
4. Submit the completed homework on the first working day after the Autumn Break.

Sumit
PGT Mathematics
Kendriya Vidyalaya Gumla