



SHRI KENDRIYA VIDYALAYA KHAMMAM



AUTUMN BREAK HOLIDAY HOMEWORK

Classes VI to XII

Academic Session: 2026-27

Autumn Break: From 15.10.2026 to 25.10.2026

GENERAL INSTRUCTIONS

1. Complete all assignments neatly and independently.
2. Write all written work in the appropriate subject notebooks.
3. Use A4 sheets or project files wherever specified.
4. Draw neat diagrams, maps, tables and illustrations wherever required.
5. Read English and Hindi books regularly during the holidays.
6. Complete the activities using your own ideas and creativity.
7. Submit all holiday homework on the first working day after the break.
8. Parents are requested to encourage students to complete the work without doing it on their behalf.

CLASS VI

ENGLISH

I) Prepare a POCKET DICTIONARY containing at least 50 new English words in alphabetical order (A–Z). Write the following for each word:

- Word
- Synonyms
- Antonyms
- One sentence using the word

Instructions: Make your pocket dictionary attractive, creative and easy to carry.

II) Prepare an attractive bookmark with an inspiring English quotation.

Bookmark Making – Process

- Cut coloured paper or cardboard into a rectangular shape.
- Decorate it with colours, drawings and designs.

- Write an inspiring English quotation on it.
- Add your name, class and section.
- Attach a ribbon at the top.
- Laminate the bookmark with transparent tape to make it durable.

Note: Make it creative and attractive.

III) Read any one short story from a storybook or newspaper and write a story review and your personal reflection in **100–120** words. Include the ***title, author, main characters, central idea***, what you liked about the story, and the lesson you learned. Write the short story review and your personal reflection on **A4-size sheets**.

IV) Attempt the half-yearly question paper independently. Write only the answers on A4-size sheets without rewriting the questions. Reflect on your learning, identify your strengths, and work on areas that need improvement.

SOCIAL

1. Chapter 2 draw the Indian map locate states & capitals, mountains and oceans (sea's)
2. Draw the world map locate continents and oceans.
3. Draw the Flow chart of Sources of History.
 - Text book-based Questions and answers
4. Gross root democracy part-1
5. Sectors of Indian economy

HINDI

अवधि: 10 दिन

विद्यार्थियों के लिए निर्देश:

- प्रत्येक कार्य पर दिन संख्या और शीर्षक अवश्य लिखें।
- जहाँ आवश्यक हो, चित्र/पोस्टर स्वयं बनाएँ।
- विद्यालय खुलने पर गृहकार्य हिंदी शिक्षक को जमा करें।

दिन 1: अपनी हिंदी पाठ्यपुस्तक में पढ़ाए गए किसी एक पाठ को ध्यानपूर्वक पढ़िए और उसके पाँच नए शब्द अर्थ सहित लिखिए।

दिन 2: पढ़ाए गए किसी एक गद्य-पाठ के आधार पर पाँच प्रश्न और उनके उत्तर लिखिए।

दिन 3: 'मेरा विद्यालय' विषय पर 100–120 शब्दों में अनुच्छेद लिखिए।

दिन 4: संज्ञा और सर्वनाम की परिभाषा लिखिए तथा प्रत्येक के पाँच-पाँच उदाहरण दीजिए।

दिन 5: अपनी पाठ्यपुस्तक से कोई एक कविता पढ़िए और उसका केंद्रीय भाव 5–6 वाक्यों में लिखिए।

दिन 6: दैनिक जीवन में उपयोग होने वाले दस शब्द लिखिए और उनके विलोम शब्द लिखिए।

दिन 7: 'स्वच्छता का महत्त्व' विषय पर पाँच नारे लिखिए और एक आकर्षक पोस्टर बनाइए।

दिन 8: अपने मित्र को अवकाश में पढ़ी गई पुस्तक/कहानी के बारे में बताते हुए अनौपचारिक पत्र लिखिए।

दिन 9: पढ़ाए गए पाठ से दस कठिन शब्द चुनकर उनका शुद्ध वर्तनी-अभ्यास तीन-तीन बार कीजिए।

दिन 10: अवकाश के अनुभव पर 8-10 वाक्य लिखिए। अपने लेखन में विराम-चिह्नों का सही प्रयोग कीजिए।

SANSKRIT

प्रश्न 1. Write वर्णानां नामानि (colour names in sanskrit)

प्रश्न 2. Write question formations (प्रश्न निर्माणम्) from बुद्धि: सर्वार्थसाधिका lesson

प्रश्न 3. Write numbers in Sanskrit word (1-30)

प्रश्न 4. Complete the MDP (**Topic - Save the food** Update and add some new things to previous MDP).

NOTE - Write this homework in back side of the classwork

MATHEMATICS

I. Complete the MDP(paste any 5 or 6 chocolate wrappers in A4 sheet papers and their perimeter and area)

II.Complete the class work notes

III.SOLVE THE GIVEN PROBLEMS. in classwork notes.

1. The length of a rectangle is 150 cm. If its breadth is 1m, then its perimeter is

(a) 7 m (b) 5 m (c) 6 m (d) none of these

2. The side of a square is 8 cm. If its side is doubled, then its new perimeter is

(a) 64 cm (b) 81 cm (c) 121 cm (d) none of these

3. If the sides of a square are halved, then its area

(a) remains same (b) becomes half

(c) becomes one fourth (d) becomes double

4. If the area of a square is 64 cm^2 , then its perimeter is

(a) 25 cm (b) 32 cm (c) 15 cm (d) none of these

5. If the area of rectangle increases from 2 cm^2 to 4 cm^2 the perimeter will

(a) increase (b) decrease (c) remains same (d) none of these

6. What is the perimeter of a regular hexagon (6 equal sides) whose side length is 4.5 cm?

(a) 27 cm (b) 22.5 cm (c) 18 cm (d) 36 cm

7. A square wooden board of side 10 cm has a square of side 2 cm cut out from its center. What is the area of the remaining board?

(a) 100 sq cm (b) 4 sq cm (c) 96 sq cm (d) 40 sq cm

8. The sides of a rectangle are in the ratio 5: 4. If its perimeter is 72 cm, then its length is

(a) 40 cm (b) 20 cm (c) 30 cm (d) 60 cm

9. The side of a square is 10 cm. How many times will the new perimeter become if the side of the square is doubled?

(a) 2 times (b) 4 times (c) 6 times (d) 8 times

10. The cost of fencing a rectangular field 34 m long and 18 m wide at Rs 2.25 per metre is

(a) Rs 243 (b) Rs 234 (c) Rs 240 (d) Rs 334

11. A regular octagon has a perimeter of 168 cm. What is the length of one of its sides?

12. A room is 4 m long and 3 m 50 cm wide. How many square metres of carpet are needed to cover the floor of the room?

13. Two sides of a triangle are 12 cm and 14 cm. The perimeter of the triangle is 36 cm. What is its third side?

14. The lid of a rectangular box, with sides 40 cm by 10 cm, is sealed all around with tape. What is the length of the tape required?

15. A rectangular piece of land measures 0.7 km by 0.5 km. Each side is to be fenced with 4 rows of wires. What is the length of the wire needed?

16. Five square flower beds, each of sides 1 m, are dug on a piece of land 5 m long and 4 m wide. What is the area of the remaining part of the land?

17. The length and breadth of the three rectangles are as given below:

(a) 9 m and 6 m (b) 17 m and 3 m (c) 4 m and 14 m

Which one has the largest area, and which one has the smallest?

18. Sweety runs around a square park of side 75 m. Bulbul runs around a rectangular park with a length of 60 m and a breadth of 45 m. Who covers less distance?

19. Find the perimeter and area of the figures in maths textbook [pg.no](#) 148.

20. Draw the any two different figures of i) equal Area ii) equal Perimeter

SCIENCE

1. Prepare a MDP on the below mentioned topic - **Food and nutrition** (On A4 sheets). Include the following points in MDP-

(a) Balanced diet and healthy eating habits.

(b) One-Day Food Diary

Record the foods you eat in a day, draw their diagram and identify the different food groups they represent.

2. Answer the following questions in your HW notebook-

(a) Find out different types of thermometers which are used for measuring the temperature. Draw their diagrams.

(b) Convert the following into km-

(i) 1560m

(ii) 800000 cm

(iii) 18900 cm

3. Complete your CW and HW notebooks.

4. Solve Term-1 End question paper in your HW notebook. (Write only answers)

5. Prepare a working model for SCIENCE EXHIBITION which will be held in the month of November.

6. Make a rotating paper wheel ART showing the life cycle of a butterfly or frog, or seed germination and plant growth.

Link for help- <https://youtu.be/f2tjqcpzoq4?si=DuOP69Y5J3wrOtWS>

Artificial Intelligence (AI)

General Instructions:

- Complete all activities neatly in your AI notebook or on A4 sheets.
- Draw pictures wherever required.
- Use your own ideas and creativity.

Section A: Written Work

1. What is Artificial Intelligence (AI)? Write any two examples.
2. Write five examples of AI used in our daily lives.
3. What is pattern recognition? Give two examples.
4. What is decision-making? How can AI help us make decisions?

Activity 1: AI or Not AI?

5. Write AI or Not AI for each of the following.

- I. A traditional wall clock
- II. A voice assistant
- III. A smart face-recognition system
- IV. An ordinary pencil
- V. A chatbot
- VI. VIA basic calculator

Activity 2: AI Around Me

6. Observe your surroundings and list any five devices or applications that use AI. Write one use of each.

7. AI or Not AI? Prepare a table of ten everyday devices or applications and classify them as AI-based or non-AI-based. Give a reason for each choice.

8. Creative Activity: Draw and label an AI-powered smart home. Show at least four smart devices and write their uses.

CLASS VII

ENGLISH

1. Learn and write 20 new word meanings, Opposite words and write a sentence in your own words in A4 sheet.

2. Read moral stories and write the moral of two stories in A4 sheet.

3. Solve Half Yearly Examination Question Paper in A4 sheet.

4. Write two pages how did you spend your Dussehra Vacation in A4 sheet.

SOCIAL

1. 1. Read and write the question and answers, Half yearly social question paper in A4 sheets.

2. 2. locate the following places in Indian political maps -5

- Mountains
- Rivers
- Mahajanapadas
- Hills
- Historical places (Golkonda Fort, Thousand pillars, Brihadeshwaralayam, Aayodhya, Bhadrachalam)

3. World maps-5

- Country names (Any 15)
- Continents
- Oceans

HINDI

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- जहाँ आवश्यक हो, चित्र/पोस्टर स्वयं बनाएँ।
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दिन 1: पढ़ाए गए किसी एक पाठ को पढ़कर दस कठिन शब्द अर्थ सहित लिखिए।

- दिन 2: पाठ्यपुस्तक के किसी एक गद्य-पाठ से पाँच बोध-प्रश्न तैयार कर उनके उत्तर लिखिए।
- दिन 3: 'समय का सदुपयोग' विषय पर 120–150 शब्दों का अनुच्छेद लिखिए।
- दिन 4: संज्ञा, सर्वनाम और विशेषण की परिभाषाएँ लिखिए तथा प्रत्येक के पाँच उदाहरण दीजिए।
- दिन 5: पाठ्यपुस्तक में पढ़ाए गए किसी दोहे/कविता का भावार्थ अपने शब्दों में लिखिए।
- दिन 6: दस पर्यायवाची और दस विलोम शब्द लिखिए।
- दिन 7: 'जल संरक्षण' विषय पर एक पोस्टर बनाइए और उसके लिए पाँच प्रभावशाली नारे लिखिए।
- दिन 8: अपने मित्र को जन्मदिन पर आमंत्रित करते हुए अनौपचारिक पत्र लिखिए।
- दिन 9: किसी समाचार-पत्र से एक छोटी हिंदी खबर पढ़िए और उसका सार 6–8 वाक्यों में लिखिए।
- दिन 10: 'मेरे अवकाश के अनुभव' विषय पर 150 शब्दों पर एक अनुच्छेद लिखिए

SANSKRIT

1. Draw a wall clock and mark the time below mentioned in Sanskrit numbers and words
 - a. 6:30
 - b. 7:15
 - c. 9:00
 - d. 12:40
 - e. 10:30
2. Write answers for questions of unseen passage.

MATHEMATICS

1. Complete maths MDP WORK(Collect data and pictures about historical monuments consists congruent figures)
2. complete class work write question paper 1 time in class work.
3. Answer the following questions

1. Congruent figures have the same _____.

A) Colour B) Shape and size C) Name D) Position

2. The symbol for congruence is .

A) = B) $\parallel$ C) $\cong$ D) $\angle$

3. If two triangles have the same shape and size, they are called _____ triangles.

A) Similar B) Congruent C) Unequal D) Right-angled

4. If $\triangle ABC \cong \triangle PQR$, then vertex A corresponds to _____.

A) P B) Q C) R D) B

5. Which of the following is a congruence rule? A) SSS B) ABC C) XYZ D) PQR

6. SSS stands for _____.

A) Side-Side-Side B) Side-Side-Angle C) Shape-Size-Side D) Same-Same-Same

7. If all three corresponding sides of two triangles are equal, the triangles are congruent by _____.

A) SSS rule B) Addition rule C) Subtraction rule D) Division rule

8. If two triangles have equal corresponding sides and angles, they are _____.

A) Different B) Congruent C) Parallel D) Unequal

9. Two triangles are congruent. If one has a side of 5 cm, its corresponding side is _____.

A) 3 cm B) 4 cm C) 5 cm D) 7 cm

10. Which of these letters represents an angle?

A) $\angle A$ B) AB. C) 5 cm. D) 7cm

11. Two triangles have three equal corresponding sides. Which congruence rule can be used?

12. In triangles ABC and PQR, $AB=PQ$, $BC=QR$, and $AC=PR$. Are the triangles congruent?
13. If $\triangle ABC \cong \triangle DEF$, which side corresponds to BC?
14. Two triangles have two equal sides and the included angle equal. Which congruence rule applies?
15. In triangles ABC and PQR, $AB=PQ$, $AC=PR$, and $\angle A = \angle P$. Are the triangles congruent? Give the rule.
16. If $\triangle ABC \cong \triangle PQR$, and $\angle B = 50^\circ$, find $\angle Q$.
17. Two right-angled triangles have equal hypotenuses and one equal corresponding side. Which congruence rule can be used?
18. If $\triangle ABC \cong \triangle DEF$, $AB = 6$ cm and DE corresponds to AB, find DE.
19. In two triangles, two angles and the included side are equal. Which congruence rule applies?
20. True or False: Two triangles with the same shape, but different sizes are always congruent.

SCIENCE

1. Art Integrated Project – Prepare a poster on the Water Cycle using art materials such as chart paper, crayons, paints, and coloured paper.
2. Learn one page of science lesson daily.
3. MDP- (Water) Conduct a water audit at your home or school for five days. Observe and record the daily water consumption in different activities, such as bathing, washing utensils, cleaning and gardening. Analyse the collected data to identify activities that consume the maximum water and the areas where water is being wasted.

Based on your findings, suggest preventive measures to avoid water wastage and practical methods to conserve water.

Date	Water consumed in litres
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15-10-2026	
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16-10-2026	
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17-10-2026	
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18-10-2026	
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19-10-2026	
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20-10-2026	
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21-10-2026	
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22-10-2026	
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23-10-2026	
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24-10-2026	
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25-10-2026	
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4.Prepare a mind map on “Famous Scientists and Their Achievements”, highlighting their major discoveries and contributions to science.

5.Create a “Best Out of Waste” science model on any science topic using reusable waste materials such as paper cups, ice-cream sticks, cardboard, and plastic bottles.

AI

General Instructions:

- Complete all activities neatly in your AI notebook or on A4 sheets.

- Draw pictures wherever required.
- Use your own ideas and creativity.

Section A: Written Work

1. Define data visualization with two examples.
2. What is data analysis? Why is it important in AI?
3. Differentiate between a bar graph and a pie chart.
4. Observe your graph and write three conclusions based on the data.
5. Name any three tools used for data visualization.
6. What is AI ethics?
7. What is AI bias? Explain with one example.
8. Write any four ethical principles that should be followed while using AI.
9. Write five ways to use AI responsibly and safely.

Activity 1: AI and Decision-Making

Objective: To understand how AI makes decisions.

Task: Imagine you are designing a smart dustbin.

1. What data should the dustbin collect?
2. How can it identify whether an object is recyclable?
3. What decision should it make after identifying the object?

CLASS VIII

ENGLISH

1. Learn and write 20 new word meanings, Opposite words and write a sentence in your own words in A4 sheet.
2. Read moral stories and write the moral of two stories in A4 sheet.
3. Solve Half Yearly Examination Question Paper in A4 sheet.
4. Write two pages how did you spend your Dussehra Vacation in A4 sheet.

SOCIAL

1. Please locate the following maps on pages 9, 14, 24, and 33 of your textbook, including the outline maps.
2. Read and write Half yearly question paper in A4 Sheets.
3. Day wise work sheets

15 OCTOBER 2026

Chapter 1: Natural Resources and Their Use

Question 1 (3 marks): What are natural resources? Classify them with suitable examples.

Question 2 (5 marks): Explain why the conservation and sustainable use of natural resources are important. Suggest three measures.

HINDI

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दिन 2: पढ़े गए पाठ के आधार पर पाँच उच्च-स्तरीय बोध-प्रश्न और उनके उत्तर लिखिए।

दिन 3: 'पर्यावरण संरक्षण में विद्यार्थियों की भूमिका' विषय पर 150-180 शब्दों का अनुच्छेद लिखिए।

दिन 4: 10 पर्यायवाची शब्द और 10 विलोम शब्द लिखें।

दिन 5: पाठ्यपुस्तक में पढ़ी गई किसी कविता का भावार्थ और उससे मिलने वाली सीख लिखिए।

दिन 6: दस मुहावरे उनके अर्थ और वाक्य-प्रयोग सहित लिखिए।

दिन 7: 'पुस्तकें हमारी सच्ची मित्र हैं' विषय पर एक पोस्टर/चित्र सहित संदेश तैयार कीजिए।

दिन 8: विद्यालय के पुस्तकालय में नई हिंदी पुस्तकें उपलब्ध कराने हेतु प्रधानाचार्य को औपचारिक पत्र लिखिए।

दिन 9: किसी हिंदी समाचार का चयन कर शीर्षक, मुख्य तथ्य और 100 शब्दों में सार लिखिए।

दिन 10: 'तकनीक और विद्यार्थी जीवन' विषय पर 150-180 शब्दों का अनुच्छेद लिखिए।

SANSKRIT

प्रश्न 1. Write answers for questions of unseen passage

अधोलिखितम् अनुच्छेदं पठित्वा प्रदत्तप्रश्नानामुत्तराणि लिखत ।

विद्यालये प्रतिवर्षं वृक्षारोपणकार्यक्रमः आयोजितः भवति । अस्मिन् वर्षे अपि सर्वे छात्राः अध्यापकाः च उत्साहेन सहभागित्वम् अकुर्वन् । प्रत्येकः छात्रः एकं वृक्षं आरोपितवान् । अध्यापकाः छात्रेभ्यः वृक्षाणां महत्त्वं व्याख्यातवन्तः । ते अवदन्—"वृक्षाः अस्मभ्यं प्राणवायुम्, फलानि, छायां च यच्छन्ति । यदि वयं अधिकान् वृक्षान् रोपयामः, तर्हि पर्यावरणं स्वच्छं भविष्यति ।" कार्यक्रमस्य अन्ते सर्वे छात्राः प्रतिज्ञाम् अकुर्वन् यत् ते नित्यं वृक्षाणां संरक्षणं करिष्यन्ति ।

I. एकपदेन उत्तरत – (1x2=2)

i) प्रत्येकः छात्रः किम् आरोपितवान् ? _____

ii) अध्यापकाः छात्रेभ्यः केषां महत्त्वं व्याख्यातवन्तः? _____

II. पूर्णवाक्येन उत्तरत –(2x2=4)

i) वृक्षाः अस्मभ्यं किं किं यच्छन्ति ? _____

ii) कार्यक्रमस्य अन्ते के प्रतिज्ञाम् अकुर्वन् ? _____

III. निर्देशानुसारेण प्रश्नान् उत्तरत –(1x2=2)

i) पर्यावरणं स्वच्छं भविष्यति - अत्र किं क्रियापदम् अस्ति ? ()

(क) पर्यावरणम् (ख) भविष्यति (ग) स्वच्छम् (घ) न किमपि

प्रश्न 2. Write question formations (प्रश्न निर्माणम्) from मञ्जुल मञ्जूषा सुन्दरसुरभाषा lesson

प्रश्न 3. Write numbers in Sanskrit word (1-40)

प्रश्न 4. Complete the MDP (Topic - Save the trees Update and add some new things to previous MDP).

NOTE - Write this homework in back side of the classwork

MATHEMATICS

I COMPLETE THE MDP(climate changes from 2020-2026,write in percentage, decimal and fraction)

II.COMplete THE CLASS WORK NOTES

III.SOLVE THE GIVEN PROBLEM

in classwork notes.

1. A school collected 720 kg of recyclable material during an environmental campaign. Of this, 35% was paper, 25% was plastic and the remaining material was metal and glass. What percentage of the collected material was metal and glass together?

(a) 35% (b) 40% (c) 45% (d) 50%

2. A student says, "40% of 250 is greater than 25% of 400 because 40% is greater than 25%." Which statement correctly evaluates the student's reasoning?

- (a) Correct, because a larger percentage always gives a larger quantity.
- (b) Incorrect, because 40% of 250 and 25% of 400 are both equal to 100.
- (c) Correct, because 250 is greater than 400.
- (d) Incorrect, because percentages cannot be used to compare quantities.

3. A school bus has completed $\frac{7}{100}$

of its scheduled route. Which statement represents the same situation?

- (a) The bus has completed 7.0% of its route.
- (b) The bus has completed 17% of its route.
- (c) The bus has completed 70% of its route.
- (d) The bus has completed 0.07% of its route.

4. A shopkeeper marks an article at ₹2,400 and offers a discount of 15%. The selling price is therefore:

- (a) ₹2,040 (b) ₹2,085 (c) ₹2,160 (d) ₹2,280

5. A farmer harvested 480 kg of wheat last year and 600 kg this year. The present harvest as a percentage of last year's harvest is:

- (a) 120% (b) 125% (c) 130% (d) 135%

6. A trader buys an article for ₹800 and sells it for ₹920. His percentage profit, calculated with respect to the cost price, is: (a) 12% (b) 15% (c) 18% (d) 20%

7. A machine worth ₹50,000 depreciates by 8% in one year. Its value after one year is:

- (a) ₹42,000 (b) ₹44,000 (c) ₹46,000 (d) ₹48,000

8. A quantity is increased by 20% and then decreased by 20%. Which statement is correct?

- (a) The final quantity is exactly equal to the original quantity.
- (b) The final quantity is 4% greater than the original quantity.
- (c) The final quantity is 4% less than the original quantity.
- (d) The final quantity is 20% less than the original quantity.

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

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

9. Assertion (A): If the price of an article increases from ₹400 to ₹460, the percentage increase is 15%.

Reason (R): Percentage increase is calculated by dividing the increase by the original price and multiplying by 100.

10. Assertion (A): If an amount is compounded annually at a fixed positive rate, the interest added in the second year is greater than the interest added in the first year.

Reason (R): Under compounding, the interest earned in one year is added to the principal for calculating interest in the next year.

11. During a school mathematics exhibition, 240 visitors entered the exhibition on the first day. $\frac{3}{8}$ of the visitors participated in the mathematics activity zone.

Find: (i) the number of visitors who participated in the activity zone, and

(ii) the percentage of all visitors represented by these participants.

12. A mixture contains millet and water in the ratio 3: 7. A student claims that millet constitutes 30% of the mixture. Examine the claim mathematically and determine the exact percentage of millet in the mixture. Also state whether the student's claim is correct.

13. The price of a school bag was ₹1,600. During a clearance sale, its price was reduced to ₹1,360. Calculate the percentage decrease in the price. Show clearly which quantity is taken as the base while calculating the percentage decrease.

14. A shopkeeper purchases a study table for ₹2,500 and fixes a profit margin of 24% on the cost price. During a sale, he gives a discount of 10% on the resulting selling price.

Determine whether he finally makes a profit or a loss, and find the corresponding amount.

15. A student scored 54 marks out of 75 in Mathematics and 68 marks out of 90 in Science.

(i) Convert both scores into percentages.

(ii) Identify in which subject the student obtained the higher percentage.

(iii) Explain why comparing only the marks obtained would not give a fair comparison.

16. A shopkeeper buys a jacket for ₹2,400 and marks it at ₹3,000. He offers a discount of 12% on the marked price.

Find: (i) the selling price, (ii) the profit earned, and

(iii) the percentage profit with respect to the cost price.

17. A bank offers 8% annual interest on a fixed deposit. Riya deposits ₹25,000 for 2 years. Calculate the final amount in each of the following cases:

(i) interest is paid separately every year without compounding,

(ii) interest is compounded annually.

Hence, find how much more money is received under annual compounding.

18. A community centre is planning a large educational fair. The organisers estimate that 40% of the total expected visitors will be students, 35% will be parents and the remaining visitors will be teachers and other guests. The organisers expect 2,400 visitors in all.

On the day of the fair, the actual number of visitors is 15% greater than the expected number. Answer the following:

- (i) Find the expected number of students, parents and teachers/other guests separately.
- (ii) Find the actual number of visitors on the day of the fair.
- (iii) If 60% of the actual visitors are adults, find the number of adult visitors.
- (iv) Express the actual number of visitors as a percentage of the expected number.

SCIENCE

1. Prepare a MDP on the topic **CLIMATE CHANGE** on A4 sheets . Write about the following points in your MDP-

(a) Climate Change in India : Changing monsoon patterns, extreme heat, floods, droughts, and impacts on agriculture.

(b) A Greener Future: Solutions to Climate Change.

2. Complete your CW and HW notebooks.

3. Answer the following questions in your HW notebook after reading from textbook -

(a) Draw and label diagrams showing the arrangement of particles in:

- Solids
- Liquids
- Gases

(b) Write two differences between the particle arrangement in solids and gases.

(c) A student adds a spoonful of sugar to water and stirs it. The sugar is no longer visible. Has the sugar disappeared completely? Explain your answer.

4. Solve Term-1 End question paper in your HW notebook. (Write only answers)

5. Prepare a working model for **RSBVP SCIENCE EXHIBITION** which will be held in the month of November.

Theme: Science, Technology, and Innovation for a Sustainable and Viksit Bharat

Sub-themes:

- 1. Artificial Intelligence (AI) for Better Life**
- 2. Green Energy & Environmental Conservation**
- 3. Mathematical Modelling and Computational Thinking**

4. Health, Hygiene, and Sanitation

5. Indigenous Agricultural Practices

6. Science for Rural Transformation

7. Disaster Management

Note: Sub-themes mentioned above are suggestive in nature. Students may develop innovative models on any other sub-theme pertaining to the main theme, i.e., Science and Technology for Society.

6. Create an eco-friendly collage on A4 sheet using recycled materials. Take help from below link-
<https://youtu.be/NasyEuxzKMs?feature=shared>

AI

General Instructions:

- Complete all activities neatly in your AI notebook or on A4 sheets.
- Draw pictures wherever required.
- Use your own ideas and creativity.

Section A: Written Work

1. Write any three principles of responsible AI.
2. Why should AI-generated information be checked before using it in school assignments?
3. What is data in Artificial Intelligence? Give two examples.
4. What is meant by fairness in AI?
5. What is responsible AI?
6. Why is privacy important when using AI tools?

Project Title: My Responsible AI Guide

Prepare a one-page guide containing:

7. Five do's and don'ts of using AI.
8. Two examples of unfair AI decisions.
9. Three ways to protect personal data.
10. One slogan on fairness and responsible AI

CLASS IX

ENGLISH

1. Learn and write 20 new word meanings, Opposite words and write a sentence in your own words in A4 sheet.
2. Solve the Second Periodic Test (PT-2) Question Paper in A4 Sheet.
3. Learn and write meanings and questions and answers of the poem “ Nine Gold Medals” in C.W.

SOCIAL

1. Write PT-2 questions and answers in C/W note book.
2. locate the following places in India's political map.
 - Mahajanapadas
 - Sapta sindhava rivers
 - Kingdoms and empires flourishing between 3rd and 10th century CE
 - The prominent universities and advanced centres of learning in early India.

Complete the C/W till Last two chapters (Elections & price puzzle)

HINDI

अवधि: 10 दिन

विद्यार्थियों के लिए निर्देश:

- प्रत्येक कार्य पर दिन संख्या और शीर्षक अवश्य लिखें।
- जहाँ आवश्यक हो, चित्र/पोस्टर स्वयं बनाएँ।
- विद्यालय खुलने पर गृहकार्य हिंदी शिक्षक को जमा करें।

दिन 1: पाठ्यक्रम में पढ़ाए गए किसी एक गद्य-पाठ का सारांश लिखिए और दस शब्दों के अर्थ लिखिए।

दिन 2: पाठ से पाँच विश्लेषणात्मक प्रश्न तैयार कीजिए और पाठ के आधार पर उत्तर दीजिए।

दिन 3: 'सोशल मीडिया का जिम्मेदार उपयोग' विषय पर 180-200 शब्दों का अनुच्छेद लिखिए।

दिन 4: उपमा, रूपक और अनुप्रास अलंकार की परिभाषाएँ तथा प्रत्येक के दो-दो उदाहरण लिखिए।

दिन 5: पाठ्यक्रम में पढ़ी गई किसी कविता का केंद्रीय भाव, संदेश और काव्य-सौंदर्य अपने शब्दों में लिखिए।

दिन 6: दस मुहावरे और पाँच लोकोक्तियाँ अर्थ तथा वाक्य-प्रयोग सहित लिखिए।

दिन 7: अपने क्षेत्र में कचरा प्रबंधन की समस्या के समाधान हेतु नगर-पालिका अधिकारी को औपचारिक पत्र लिखिए।

दिन 8: किसी समसामयिक विषय पर हिंदी समाचार पढ़कर 120 शब्दों में सारांश लिखिए और अपना मत दीजिए।

दिन 9: 'अनुशासन और सफलता' विषय पर 180-200 शब्दों का अनुच्छेद लिखिए।

SANSKRIT

प्रश्न 1. Write शरीरस्य अङ्गानि (Sanskrit names of Body parts) reference - After all lessons see परिशिष्टम् - 2

प्रश्न 2. संस्कृत मासानां नामानि (Names of Sanskrit months) reference - After all lessons see परिशिष्टम् - 4

प्रश्न 3. Write numbers in Sanskrit word (1-50)

प्रश्न 4. Complete the portfolio. (Soft copy of portfolio will be shared in class group)

MATHEMATICS

Chapters Covered (for revision)

- Ch 1 - Orienting Yourself: The Use of Coordinates
- Ch 2 - Introduction to Linear Polynomials
- Ch 3 - The World of Numbers
- Ch 4 - Exploring Algebraic Identities
- Ch 5 - I'm Up and Down, and Round and Round (Circles)
- Ch 6 - Measuring Space: Perimeter and Area
- Ch 7 - The Mathematics of Maybe (Introduction to Probability)
- Ch 8 - Predicting What Comes Next (Sequences and Progressions)

Instructions for Students

1. Attempt one worksheet each day. Do all the work neatly in your Maths notebook.
2. Write the question number and then the complete solution, showing each step.
3. Draw diagrams and graphs with a pencil and ruler wherever needed.
4. Revise the chapter from the textbook before starting that day's worksheet.
5. This is revision work only, based on what has already been taught in class.

Day 1: Orienting Yourself: The Use of Coordinates

1. Plot the points (2, 3), (-2, 4), (-3, -2) and (4, -1) on a graph and name the quadrant of each.
2. Write the coordinates of one point on the x-axis and one point on the y-axis.
3. Find the distance between the points (2, 3) and (2, 8).
4. Find the distance between the origin and the point (3, 4).
5. In which quadrant does the point (-5, 6) lie?
6. Write the coordinates of the reflection of the point (3, -4) in the x-axis.
7. Find the distance between (-1, 2) and (2, -2).
8. The point (0, y) lies on which axis? Give one example.

Day 2: Introduction to Linear Polynomials

1. Identify the terms, coefficients and variables in $5x - 3y + 7$.
2. Find the degree of the polynomial $4x^3 - 2x + 1$.

- Which of these are linear polynomials: $2x + 5$, $x^2 + 1$, $3x - 7$, 4 ?
- Evaluate the polynomial $p(x) = 2x + 3$ at $x = 4$.
- Find the n th term of the pattern 3, 7, 11, 15, ...
- Complete the table for $y = 2x + 1$ for $x = 0, 1, 2$ and 3, and plot the graph.
- Write the slope and the y -intercept of the line $y = 3x - 2$.
- Two lines have slopes 2 and 2. Are they parallel?

Day 3: The World of Numbers

- Classify each as natural, integer, rational or irrational: -3, 0, $\frac{2}{5}$, $\sqrt{7}$, 5.
- Prove that the square root of 2 is irrational.
- Write the recurring decimal 0.333... as a fraction.
- Find two rational numbers between $\frac{1}{3}$ and $\frac{1}{2}$.
- Express 0.36 as a fraction in lowest terms.
- State whether the square root of 16 is rational or irrational.
- Describe how you would represent the square root of 2 on the number line.
- State whether the decimal expansion of $\frac{7}{8}$ is terminating or non-terminating.

Day 4: Exploring Algebraic Identities

- Expand $(x + 3)^2$ using an identity.
- Expand $(2a - 5)^2$.
- Evaluate 99^2 using an identity.
- Factorise: $x^2 - 9$.
- Expand $(x + 2)(x - 2)$.
- Evaluate 103×97 using an identity.
- Expand $(a + b)^3$.
- Factorise: $x^2 + 6x + 9$.

Day 5: I'm Up and Down, and Round and Round (Circles)

- The perpendicular drawn from the centre of a circle to a chord _____ the chord.
- Find the length of a chord of a circle of radius 5 cm that is at a distance of 3 cm from the centre.
- Complete: the angle subtended by an arc at the centre is _____ the angle it subtends at any point on the remaining part of the circle.
- Find the measure of the angle in a semicircle.
- In a cyclic quadrilateral, one angle is 70 degrees. Find its opposite angle.
- Two chords of a circle are each at a distance of 4 cm from the centre. Are they equal in length?
- The diameter of a circle is 14 cm. Find its radius and the length of the longest chord.
- An arc subtends an angle of 100 degrees at the centre. Find the angle it subtends at a point on the remaining part of the circle.

Day 6: Measuring Space: Perimeter and Area

- Find the perimeter of a rectangle of length 12 cm and breadth 8 cm.

2. Find the area of a triangle of base 10 cm and height 6 cm.
3. Find the area of an equilateral triangle of side 4 cm.
4. Find the area of a triangle with sides 3 cm, 4 cm and 5 cm using Heron's formula.
5. Find the circumference of a circle of radius 7 cm.
6. Find the area of a circle of radius 14 cm.
7. Find the area of a sector of angle 60 degrees in a circle of radius 21 cm.
8. The perimeter of a square is 36 cm. Find its area.

Day 7: The Mathematics of Maybe (Probability)

1. Write the sample space when a coin is tossed once.
2. Find the probability of getting a head when a fair coin is tossed once.
3. Find the probability of getting an even number when a fair die is rolled once.
4. Find the probability of getting a number greater than 4 on a die.
5. A bag has 3 red and 5 blue balls. Find the probability of drawing a red ball.
6. Classify each as certain, impossible or likely: (a) the sun rises in the east, (b) getting 7 on a die.
7. Find the probability of drawing an ace from a well-shuffled deck of 52 cards.
8. A die is thrown 100 times and 4 appears 20 times. Find the experimental probability of getting 4.

Day 8: Predicting What Comes Next (Arithmetic Progressions)

1. Find the 10th term of the AP 3, 7, 11, ...
2. Find the common difference of the AP 12, 8, 4, ...
3. Which term of the AP 2, 5, 8, ... is 32?
4. Find the sum of the first 10 terms of the AP 1, 3, 5, ...
5. Find the sum of the first 20 natural numbers.
6. Find the n th term of the sequence 5, 9, 13, 17, ...
7. Is 100 a term of the AP 4, 8, 12, ...? Give a reason.
8. Find the sum of the first 15 terms of the AP 7, 11, 15, ...

Day 9: Sequences and Progressions (Geometric Progressions)

1. Find the common ratio of the GP 3, 9, 27, ...
2. Find the 5th term of the GP 2, 4, 8, ...
3. Find the 6th term of the GP 1, 3, 9, ...
4. Check whether 2, 6, 18, 54 is a GP and find its common ratio.
5. Find the sum of the first 5 terms of the GP 1, 2, 4, ...
6. Find the sum: $1 + 2 + 3 + \dots + 50$.
7. Write the next two terms of the GP 80, 40, 20, ...
8. A pattern of dots grows as 1, 4, 9, 16, ... Find the 10th term.

Day 10: Mixed Revision

1. Find the distance between the points (1, 2) and (4, 6).

2. Find the degree of the polynomial $7x^4 - x + 2$.
3. State whether the square root of 5 is rational or irrational.
4. Evaluate 98^2 using an identity.
5. In a circle, an angle subtended at the centre is 120 degrees. Find the angle at the circumference.
6. Find the area of a triangle with sides 5 cm, 12 cm and 13 cm.
7. Find the probability of getting a prime number when a fair die is rolled once.
8. Find the 12th term of the AP 5, 9, 13, ...

SCIENCE

BIOLOGY

1. Prepare a project on the topic -

Conservation of Biodiversity. (on A4 sheets)

2. Complete the portfolio.

3. Solve 10 -10 MCQ and ASSERTION REASON QUESTIONS each for the chapters – Cell and tissue

4. Prepare a working model for RSBVP SCIENCE EXHIBITION.

Theme: Science, Technology, and Innovation for a Sustainable and Viksit Bharat

Sub-themes:

1. Artificial Intelligence (AI) for Better Life
2. Green Energy & Environmental Conservation
3. Mathematical Modelling and Computational Thinking
4. Health, Hygiene, and Sanitation
5. Indigenous Agricultural Practices
6. Science for Rural Transformation
7. Disaster Management

PHYSICS

Chapter 1: Describing Motion Around Us

1. Define distance and displacement. Write any two differences between them.
2. Define speed and velocity. Write their SI units and distinguish between them.
3. Derive the three equations of motion using the graphical method.
4. Draw and explain a distance–time graph for a body at rest and a body moving with uniform speed.

Chapter 2: How Force Affects Motion

5. Define force. Explain the effects of force on an object with suitable examples.
6. State Newton's three laws of motion and give one example for each law.
7. Define momentum. Write its formula and SI unit. State the law of conservation of momentum.

Chapter 3: Work, Energy and Simple Machines

8. Define work done. Write its formula and SI unit. Under what conditions is work done zero?
9. Define kinetic energy and potential energy. Derive the expression for kinetic energy, $KE = \frac{1}{2}mv^2$.
10. What is a simple machine? Define mechanical advantage and efficiency. Write their formulas and explain any two simple machines with examples.

Artificial Intelligence(AI)

General Instructions

1. Complete all activities neatly in your AI notebook or project file.
2. Use your own words and give examples from daily life.
3. Include diagrams, tables, screenshots or illustrations wherever required.
4. Complete the practical activities under the guidance of a parent or teacher.
5. Submit the completed homework on the first working day after the autumn break.

Activity 1: Introduction to Artificial Intelligence

1. Define Artificial Intelligence in your own words.
2. Write five examples of AI applications used in everyday life.
3. Explain the difference between natural intelligence and artificial intelligence.
4. Describe any three advantages and three limitations of AI.
5. Write a short paragraph on "How Artificial Intelligence Can Help Students".

Activity 2: AI Project Cycle

Write brief notes on the five stages of the AI Project Cycle:

1. Problem Scoping
2. Data Acquisition
3. Data Exploration
4. Modelling
5. Evaluation

Activity: Choose a problem from your school or neighbourhood, such as waste management or water conservation. Explain how you would use the AI Project Cycle to address it.

Activity 3: Three Domains of AI

Prepare a chart explaining the following domains of Artificial Intelligence:

- **Data:** Finding patterns and insights from information.
- **Computer Vision:** Helping computers interpret images and videos.
- **Natural Language Processing (NLP):** Helping computers understand and generate human language.

For each domain, write two real-life applications and draw or paste a relevant picture.

Activity 4: AI and Ethics

Answer the following questions in 3–5 sentences each.

1. What is AI bias?
2. Why is privacy important when using AI applications?
3. How can AI-generated information be incorrect or misleading?
4. Why should students avoid copying AI-generated answers without understanding them?
5. Write five rules for using AI responsibly and safely.

Activity 5: Data Collection and Representation

Conduct a small survey of 10 classmates or family members on their preferred mode of transport to school or work.

Prepare a table containing:

- Mode of transport
- Number of people
- Percentage of respondents

Represent the results using a bar graph.

Note: Take permission before collecting information. Do not record names, phone numbers or other personal details.

Activity 6: AI in Everyday Life

Prepare a case study on any ONE of the following:

- AI in healthcare
- AI in agriculture
- AI in education
- AI in weather forecasting
- AI in traffic management

Include the following headings:

1. Introduction

2. Problem being addressed
3. How AI helps
4. Benefits
5. Challenges and ethical concerns
6. Conclusion

Suggested length: 300–400 words.

CLASS 10

ENGLISH

1. Read and learn thoroughly the lessons . The Book taht saved the Earth, Bhili, Custard the dragon and the proposal. And write question and answers in your note book.
2. Write one Formal letter(placing an order) and one Analytical paragraph writing of your choice.
3. Practice any 2 Previous year question papers.

SOCIAL

Particulars	Page no	Sign
1. Read and wright PT-2 SST questions and answers in A4 sheets	-	
▪ Locate the following things in Indian maps in Geography text book	-	
2. Soils	08	
3. Important rivers and Dams	24	
4. Important minerals	46	
5. Energy Resources	51	
6. Power Plants	53	
7. Text tile Industry's	63	
8. Iron and industries	63	
9. National Parks and projects		
10. National Highways	73/79	
▪ Golden quadrilateral		
▪ North and south corridor		
▪ East and west corridor		
▪ International Airports		

HINDI**अवधि: 10 दिन**

- प्रत्येक कार्य पर दिन संख्या और शीर्षक अवश्य लिखें।
- जहाँ आवश्यक हो, चित्र/पोस्टर स्वयं बनाएँ।
- विद्यालय खुलने पर गृहकार्य हिंदी शिक्षक को जमा करें।

दिन 1: पाठ्यक्रम के दौरान अब तक जितने भी पाठ पढ़ाए गए हैं प्रत्येक पाठ का सार कम से कम 250 से 300 शब्दों में लिखें

दिन 2: 'कृत्रिम बुद्धिमत्ता और शिक्षा' विषय पर 200-250 शब्दों का विचारात्मक अनुच्छेद लिखिए।

दिन 3: पद परिचय के 20 उदाहरण लिखें

दिन 4: वाक्य विषय के 20 MCQ लिखें

दिन 5: 'विद्यालय में हिंदी पखवाड़ा' आयोजित करने के लिए 50-60 शब्दों की औपचारिक सूचना तैयार कीजिए।

दिन 6: अपने क्षेत्र में सार्वजनिक पुस्तकालय की सुविधा बढ़ाने हेतु संबंधित अधिकारी को औपचारिक पत्र लिखिए।

दिन 7: किसी भी 5 विषय पर विज्ञापन तैयार करें।

दिन 8: 'परिश्रम, समय-प्रबंधन और लक्ष्य-प्राप्ति' विषय पर 200-250 शब्दों का अनुच्छेद लिखिए।

SANSKRIT

1. Write any 8 examples of Time topic.
2. Write 3 examples for each प्रत्यय: (तव्यत्, अनीयर्, त्व, तल्, मतुप्, ठक्, टाप्, डीप्)
3. Write any TWO picture writings.
4. Write 3 examples for each नञ् समासः, अव्ययीभाव समासः, तत्पुरुष समासः
5. Write 5 examples for वाच्य परिवर्तनम् (active voice and passive voice)
6. Complete the portfolio (soft copy of portfolio will be shared in class group)

NOTE - This homework write in back side of classwork.

SCIENCE

1. Complete your CW and HW notebooks.
2. Complete your science record . Write all the practicals shared with you.
3. Solve the 5 CBSE question papers shared with you in your HW notebook.
4. **INVESTIGATORY PROJECT-** on A4 sheets
 - (i) Biodegradable vs Non-Biodegradable Waste: A Decomposition Study
 - (ii) Effect of Pesticides on Food Chains: A Biomagnification Model
 - (iii) Plastic Waste Reduction: An Investigation
 - (iv)Ozone Layer Depletion :Causes ,effects and solutions
- 5.Complete the port folio. Take the printout and start filling it.
- 6.Prepare a working model for **RSBVP SCIENCE EXHIBITION** which will be held in the month of November.

Theme: Science, Technology, and Innovation for a Sustainable and Viksit Bharat

Sub-themes:

- 1. Artificial Intelligence (AI) for Better Life**
- 2. Green Energy & Environmental Conservation**
- 3. Mathematical Modelling and Computational Thinking**
- 4. Health, Hygiene, and Sanitation**
- 5. Indigenous Agricultural Practices**
- 6. Science for Rural Transformation**
- 7. Disaster Management**

Note: Sub-themes mentioned above are suggestive in nature. Students may develop innovative models on any other sub-theme pertaining to the main theme, i.e., Science and Technology for Society.

Artificial Intelligence (AI)

ACTIVITY 1: REVISITING THE AI PROJECT CYCLE

Answer the following questions.

1. Define Artificial Intelligence and explain its importance in modern society.
2. Name the five stages of the AI Project Cycle.
3. Explain Problem Scoping with a suitable real-life example.
4. What is data acquisition? Mention four sources of data.
5. Explain the importance of data exploration in developing an AI solution.
6. Differentiate between training data and testing data.

7. What is model evaluation, and why is it necessary?

Practical task: Select a problem related to your school or neighbourhood, such as traffic congestion, waste segregation or water wastage. Explain how you would apply all five stages of the AI Project Cycle to address it.

ACTIVITY 2: THREE DOMAINS OF ARTIFICIAL INTELLIGENCE

Explain the following AI domains with two examples each.

1. Statistical Data
2. Computer Vision
3. Natural Language Processing (NLP)

Prepare a colourful chart showing the three domains, their functions and real-life applications.

ACTIVITY 3: DATA EXPLORATION AND VISUALISATION

Collect sample data about the preferred mode of transport of 20 people.

Prepare a table with the following information:

- Mode of transport
- Number of respondents
- Percentage of respondents

Represent the information using a bar graph or pie chart.

Answer these questions:

1. Which mode of transport is the most popular?
2. Which mode is the least popular?
3. What conclusions can you draw from the data?
4. How can data visualisation help in decision-making?

Note: Use anonymous responses or hypothetical data. Do not collect unnecessary personal information.

ACTIVITY 4: MACHINE LEARNING AND AI MODELS

Answer the following questions in 3–5 sentences each.

1. What is machine learning?
2. Differentiate between supervised and unsupervised learning.
3. What is a dataset?
4. Explain classification and regression with examples.
5. What is overfitting in machine learning?
6. Why is the quality of data important for an AI model?
7. How can an AI model produce biased results?

ACTIVITY 5: NATURAL LANGUAGE PROCESSING

1. Define Natural Language Processing.
2. Explain how chatbots use NLP.
3. What is sentiment analysis?
4. Write five applications of NLP in everyday life.
5. Explain the difference between a keyword-based chatbot and an AI-powered chatbot.

Practical activity: Choose a short newspaper article or a paragraph from a textbook. Identify its main idea, three important keywords and whether its overall sentiment is positive, negative or neutral. Explain that this is a simple classroom analysis and may not represent a full NLP model.

ACTIVITY 6: COMPUTER VISION

1. Define Computer Vision.
2. Explain the difference between image classification and object detection.
3. Write five real-life applications of Computer Vision.
4. Explain how facial recognition works at a basic level.
5. Mention three privacy or ethical concerns associated with facial recognition.

Creative task: Draw a diagram showing how a computer vision system identifies objects in an image. Label the image input, processing stage and output.

CLASS XI

MATHEMATICS

ADDITIONAL QUESTIONS ON STRAIGHT LINES:

Q 1. A line perpendicular to the line segment joining the points $(1, 0)$ and $(2, 3)$ divides it in the ratio $1: n$. Find the equation of the line.

Q 2. A variable line passes through a fixed-point P . The algebraic sum of the perpendiculars drawn

from the points $(2, 0)$, $(0, 2)$ and $(1, 1)$ on the line is zero. Find the coordinates of the point P .

CASE STUDY BASED QUESTIONS:

Q. 3 A parking lot in a Pharmacy company is triangular shaped with two of its vertices at $B(2,0)$ and $C(1,12)$. The third vertex A is at the midpoint of line joining the points $(1,1)$ and $(3,11)$,



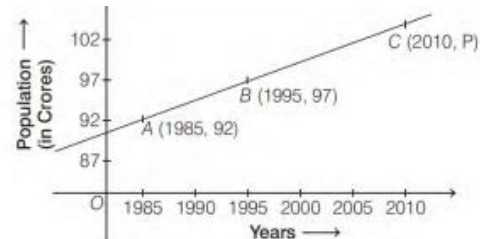
- i) Find the coordinates of A.
- ii) Find the equation of the line that passes through the points B(2,0) and C(1,12).
- iii) Find the equation of the line parallel to BC and passing through vertex A.

Q. 4 Four friends Richa, Sunita, Viki and Raju are sitting on vertices of a rectangle whose coordinates are Richa (2, 6), Raju (6, 4), Sunita (3, 5) and Viki (5, 3)

Based on the above information answer the following question

- i) What is the equation of line formed by Sunita and Raju?
- ii) What is the equation of the line formed by Richa and Viki?
- iii) What is the slope of equation of the line formed Richa and Raju?

Q. 5 Population Vs Year graph given below.



Based on the above information answer the following questions.

- i) What is the slope of the line AB?
- ii) Find the equation of line AB?
- iii) What is the equation of line perpendicular to AB and passing through (1995, 97)?

Solution: (i) $m = \frac{1}{2}$ (ii) Using two point form: $x - 2y = 1801$

(iii) $2x + y = 4087$

MULTIPLE CHOICE QUESTIONS

1. What can be said regarding a line if its slope is zero

- (a) θ is an acute angle
- (b) θ is an obtuse angle
- (c) Either the line is x-axis or it is parallel to the x-axis.
- (d) None of these

2. The equation of the line which cuts off equal and positive intercepts from the axes and passes through the point (α, β) is

- (a) $x + y = \alpha + \beta$
- (b) $x + y = \alpha$
- (c) $x + y = \beta$
- (d) None of these

3. The angle between the lines $2x - y + 3 = 0$ and $x + 2y + 3 = 0$ is

- a) 90° b) 60° c) 45° d) 30°

4. A line passes through the point (2, 2) and is perpendicular to the line $3x + y = 3$. Its y intercept is

- a) $\frac{1}{3}$ b) 5 c) $\frac{3}{4}$ d) $\frac{4}{3}$

5. The distance between the two parallel lines $2x + y - 5 = 0$ and $2x + y + 10 = 0$ is

- a) $\sqrt{5}$ b) $2\sqrt{5}$ c) $3\sqrt{5}$ d) $4\sqrt{5}$

ASSERTION - REASON BASED QUESTIONS

1. ASSERTION: Slope of a line passing through the two point (2,2) and (4,4) is 1

REASON: A line whose equation is $y=x$ has slope 1

2. Assertion: Slope of x axis is 0 and slope of y axis is not defined.

Reason: Inclination of x-axis is 0° and that of y-axis is 90° .

3. Assertion: Line $3x-4y = 6$ have slope $3/4$.

Reason: Line $3x-4y = 6$ have x intercept is 2 and y intercept is $-3/2$.

4. Assertion: The distance between line $4x+3y=15$ and $8x+6y=7$ is $23/10$.

Reason: the distance between line $ax+by = c$ and $ax+by = d$ is $\left| \frac{c-d}{\sqrt{a^2+b^2}} \right|$

5. Assertion: The slope of the line $3x + 4y = 7$ is $3/4$.

Reason: The slope of the line $ax + by + c = 0$ is $-a/b$

VERY SHORT ANSWER TYPE QUESTIONS

1. Find the equation of line intersecting the y-axis at a distance of 2 units above the origin and making an angle of 30° with positive direction of the x-axis.

2. Find angles between the lines $\sqrt{3}x + y = 1$ and $x + \sqrt{3}y =$

3. Find the distance between the lines $3x + 4y = 9$ and $6x + 8y = 15$.

4. Write the equation of the lines for which $\tan \theta = 1/2$ where θ is the inclination of the line and

i. y- intercept is $-3/2$

ii. x- intercept is 4

5. Find the equation of line when a point R (h, k) divides a line segment between the axes in the ratio 1: 2.

SHORT ANSWER TYPE QUESTIONS

1. Find equation of the line through the point $(0, 2)$ making an angle of $\frac{\pi}{3}$ with the positive x -axis. Also, find the equation of line parallel to it and crossing the y -axis at a distance of 2 units below the origin.
2. If the sum of perpendicular distances of a variable point $P(x,y)$ from the lines $x+y-5=0$ and $3x-2y+7=0$ is always 10, show that P must move on a line.
3. The hypotenuse of a right-angled triangle has its ends at the points $(1,3)$ and $(-4,1)$ find the equation of the legs (perpendicular sides of the triangles). (Ans: $x=1$ and $y=1$)
4. If the lines $2x+y-3=0$, $5x+ky-3=0$ and $3x-y-2=0$ are concurrent then find the value of k
5. If p is the length of perpendicular from the origin on the line $\frac{x}{a} + \frac{y}{b} = 1$ and a^2, p^2, b^2 are in AP, then prove that $a^4 + b^4 = 0$.

LONG ANSWER TYPE QUESTIONS

1. Find the image of the point $(3, 8)$ with respect to the line $x + 3y = 7$, assuming the line to be a plane mirror.
2. If the lines $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$, find the value of m .
3. A ray of light passing through the point $(1, 2)$ reflects on the x -axis at point A , and the reflected ray passes through the point $(5, 3)$. Find the coordinates of A .
4. A variable line passes through a fixed point P . The algebraic sum of the perpendiculars drawn from the points $(2, 0)$, $(0, 2)$ and $(1, 1)$ on the line is zero. Find the coordinates of the point P .
5. Find the equations of the lines through the point of intersection of the lines $x - y + 1 = 0$ and $2x - 3y + 5 = 0$ and whose distance from the point $(3, 2)$ is $7/5$.

CASE STUDY BASED QUESTIONS

1. A person standing at the junction of two straight paths represented by the equations

$2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ wants to reach the path whose equation is $6x - 7y + 8 = 0$ in the least time. Based on the above information answer the following questions:



- (i). Find the point where the two paths meet.
- (ii). Find the slope of that path in which the person should follow.

(iii). What is the equation of that path he follow to reach the path $6x - 7y + 8 = 0$ in the least time?

2. Three friends are sitting in a triangular park ABC. They marked the sides AB, BC and CA are represented by lines $y - x = 0$, $x + y = 0$ and $x - 4 = 0$ respectively One friend drawn the partition through A to M. The partition AM divides the triangle into two equal parts.

On the bases of the information answer the following.

(i) Find the coordinates of vertices A, B and C.

(ii) Find the area of triangular park. (iii) Find the equation of line AM.

3. Two friends Ammy and Inky were walking along the roads represented by the lines $3x + 4y - 7 = 0$ and $2x + 3y - 5 = 0$ respectively. After walking for a while they found that both the roads are meeting at a point that both the roads were intersection at a point as TEA POINT. One more road represented equation $2x + 10 = 7y$ is just opposite to the TEA POINT.



found means known by the

On the basis of the information answer the following:

- Find the distance between the road represented by the equation $2x + 10 = 7y$ and the TEA POINT.
- If the road represented by the equation $2x + 10 = 7y$ is considered as the plane mirror, find the co-ordinates of the image of the TEA POINT. Remember in a plane mirror image distance and object distance are equal.

HIGHER ORDER THINKING SKILLS

Q.1. Find the equations of the line which cut off intercepts on the axes where sum and product are 1 and -6 respectively.

Q. 2. Find the distance of the line $4x + 7y + 5 = 0$ from the point (1, 2) along the line $2x - y = 0$.

Q.3. A line is such that its segment between the lines $5x - y + 4 = 0$ and $3x + 4y - 4 = 0$ is bisected at the point (1,5). Obtain the equation.

ANSWERS

ADDITIONAL QUESTIONS

- $(1 + n)x + 3(1 + n)y - n - 11 = 0$
- coordinates of fixed point is (1, 1)
- i) A will be (2,6) ii) $12x + y - 24 = 0$, iii) $12x - y - 18 = 0$

4. i) $x + 3y = 18$, ii) $x + y = 8$, iii) $-\frac{1}{2}$

MULTIPLE CHOICE QUESTIONS

1. c) Either the line is x-axis or it is parallel to the x-axis. 2. a) $x + y = \alpha + \beta$

3. a) 90° 4. d) $\frac{4}{3}$ 5. c) $3\sqrt{5}$

ASSERTION - REASON BASED QUESTIONS

1. b 2. a 3. b 4. a 5. A

VERY SHORT ANSWER TYPE QUESTIONS

1. $x - \sqrt{3}y + 2\sqrt{3} = 0$ 2. 30° or 150° 3. $3/10$ 4. i) $2y = x - 3$, ii) $2y = x - 4$ 5. $2kx + hy = 3hk$

SHORT ANSWER TYPE QUESTIONS

1. $\sqrt{3}x + y - 2 = 0$ and $\sqrt{3}x + y + 2 = 0$

2. Proof of locus of p is straight line.

3. $x = 1$ and $y = 1$

4. $k = -2$

LONG ANSWER TYPE QUESTIONS

1. The image of the given point with respect to the given line is $(-1, -4)$

2. $m = \frac{1 \pm 5\sqrt{2}}{7}$

3. The coordinates of point A are $(13/5, 0)$.

4. The coordinates of fixed point is $(1, 1)$. 5. The equation of required lines are $4x - 3y + 1 = 0$ and $3x - 4y + 6 = 0$

CASE BASED QUESTIONS

1. (i) the two paths meet at $(-1/17, 22/17)$.

(ii) Slope of the path he should follow = $-7/6$.

(iii) Equation of the path he should follow is: $119x + 102y = 125$.

2. (i) Coordinates are A(4, 4) Coordinates are B(0, 0) Coordinates are C(4, -4) (ii) Area of triangle = 16 sq units (iii) Equation of line AM is $3x - y = 8$ 3. i) $\frac{5}{\sqrt{53}}$ units ii) $(\frac{33}{53}, \frac{123}{53})$

COMPUTER SCIENCE

SECTION A: COMPUTER SYSTEMS AND FUNDAMENTALS

Activity 1: Computer Organisation

Answer the following questions.

1. Define a computer system and explain its major components.
2. Differentiate between hardware and software with five examples each.
3. Explain the functions of the CPU, ALU and Control Unit.
4. Differentiate between primary memory and secondary memory.
5. Explain the difference between RAM and ROM.
6. What are input and output devices? Give five examples of each.
7. Explain the role of an operating system.
8. Differentiate between system software and application software.

Activity 2: Number Systems and Data Representation

1. Convert the following decimal numbers into binary:
 - $(25)_{10}$
 - $(48)_{10}$
 - $(75)_{10}$
 - $(125)_{10}$
2. Convert the following binary numbers into decimal:
 - $(1010)_2$
 - $(11001)_2$
 - $(101101)_2$
 - $(111111)_2$
3. Convert the following decimal numbers into hexadecimal:
 - $(45)_{10}$
 - $(100)_{10}$
 - $(255)_{10}$
4. Explain the difference between a bit and a byte.

5. Define ASCII and Unicode.
6. Explain the units of memory: KB, MB, GB and TB.

SECTION B: PYTHON PROGRAMMING

Activity 3: Python Basics

Answer the following questions.

1. What is Python? Mention four features of Python.
2. Explain the difference between a compiler and an interpreter.
3. What are keywords and identifiers? Give examples.
4. Explain variables and constants with examples.
5. List the basic data types available in Python.
6. Differentiate between mutable and immutable data types.
7. Explain the use of the print() and input() functions.
8. What is type conversion? Explain implicit and explicit conversion.

Activity 4: Write Python Programs

Write, execute and record the output of the following programs.

Program 1: Display Student Details

Write a Python program to display your name, class, school name and favourite subject.

Program 2: Arithmetic Operations

Write a program to input two numbers and display their sum, difference, product and quotient.

Program 3: Area of a Rectangle

Write a program to input the length and breadth of a rectangle and calculate its area and perimeter.

Program 4: Simple Interest

Write a program to input the principal, rate of interest and time, then calculate simple interest.

Formula:

$$\text{Simple Interest} = (\text{Principal} \times \text{Rate} \times \text{Time}) / 100$$

Program 5: Temperature Conversion

Write a program to convert temperature from Celsius to Fahrenheit.

Formula:

$\text{Fahrenheit} = (\text{Celsius} \times 9/5) + 32$

Program 6: Swap Two Variables

Write a program to input two numbers and swap their values.

Program 7: Even or Odd

Write a program to input an integer and determine whether it is even or odd using an if-else statement.

Program 8: Largest of Three Numbers

Write a program to input three numbers and display the largest number.

Program 9: Positive, Negative or Zero

Write a program to check whether an entered number is positive, negative or zero.

Program 10: Multiplication Table

Write a program to input a number and display its multiplication table up to 10.

SECTION C: OPERATORS AND EXPRESSIONS

Activity 5: Python Operators

1. Explain arithmetic, relational, logical and assignment operators.
2. Differentiate between = and ==.
3. Explain the difference between /, // and %.
4. Evaluate the following expressions:
 - a. $15 // 4$
 - b. $15 \% 4$
 - c. $2 ** 5$
 - d. $10 + 5 * 2$
 - e. $(10 + 5) * 2$
5. Write a Python program to calculate the average of three numbers.
6. Write a program to calculate the area of a circle using the radius entered by the user.

SECTION D: CONDITIONAL AND ITERATIVE STATEMENTS

Activity 6: Decision-Making

Write Python programs for the following:

1. Check whether a person is eligible to vote based on age.

2. Check whether a given year is a leap year.
3. Calculate grades based on marks entered by the user, using clearly defined grade ranges.
4. Check whether a number is divisible by both 5 and 11.
5. Calculate the electricity bill using sample rates and slabs of your choice, stating the assumptions.

Activity 7: Loops

1. Print the numbers from 1 to 50 using a for loop.
2. Print all even numbers between 1 and 100.
3. Calculate the sum of the first 20 natural numbers.
4. Calculate the factorial of a positive integer.
5. Display the multiplication table of a number using a while loop.
6. Count the number of digits in an integer.
7. Reverse the digits of an integer.
8. Check whether a number is prime.
9. Print the following pattern:

```
*  
**  
***  
****  
*****
```

10. Print the following number pattern:

```
1  
12  
123  
1234
```

Artificial Intelligence(AI)

Activity 1: AI Fundamentals

Answer the following questions.

1. Define Artificial Intelligence.
2. Explain the difference between Artificial Intelligence, Machine Learning and Deep Learning.
3. Write five applications of AI used in everyday life.
4. Differentiate between human intelligence and artificial intelligence.
5. Explain the benefits and limitations of AI.
6. What is Generative AI? Give three examples of tasks it can perform.
7. Explain the importance of data in developing AI systems.
8. Describe five career opportunities related to Artificial Intelligence.

Activity 2: AI Domains

Explain the following three domains of AI:

1. **Data Science:** Using data to discover patterns and support decisions.
2. **Computer Vision:** Enabling computers to analyse images and videos.
3. **Natural Language Processing (NLP):** Enabling computers to process and generate human language.

For each domain:

- Write a definition.
- Give three real-life applications.
- Identify one benefit and one limitation.
- Draw or paste a relevant illustration.

Prepare a colorful chart titled “**Three Major Domains of Artificial Intelligence.**”

SECTION B: AI PROJECT CYCLE

Activity 3: Understanding the AI Project Cycle

Explain the five stages of the AI Project Cycle:

1. Problem Scoping
2. Data Acquisition
3. Data Exploration
4. Modelling
5. Evaluation

Answer the following questions.

1. Why is problem identification important?
2. What is the role of data acquisition?
3. Why should data be cleaned and explored?
4. What is the difference between training data and testing data?
5. Why must an AI model be evaluated before use?

Activity 4: Mini AI Project

Topic: Reducing Food Waste in the School Canteen

Prepare a project using the AI Project Cycle.

Include:

- **Problem Scoping:** Describe the problem and identify the people affected.
- **Data Acquisition:** Suggest what information could be collected, such as the amount of food prepared and leftover food each day.
- **Data Exploration:** Explain how tables and graphs could reveal patterns.
- **Modelling:** Suggest how historical data might help estimate the quantity of food required.
- **Evaluation:** Explain how you would check whether the estimates reduce food waste.

Write a conclusion explaining how AI could help and what human supervision would still be needed.

PHYSICS

1. Derivation of equation using dimensional method. (3m)
2. Derivation of $s = ut + \frac{1}{2}at^2$ & $v^2 - u^2 = 2as$ by graphical method. (2m)
3. Distance-time, velocity-time, acceleration-time graphs. (1m)
4. x-t, v-t, a-t, graphs for free falling body. (3m)
5. Parallelogram law- statement & proof (special cases also). (3m)
6. Projectile motion, time of flight, range , maximum height – proof. (3m, 5m)
7. Relation between $v = r\omega$ – proof (2m)
8. Centripetal acceleration- definition & proof . (2m)
9. Newtons law of motion (all 3 laws). (3m/2m/1m)
10. Definition of momentum , impulse , inertia with DF. (1m/2m)
11. Apparent weight of a body in a lift -all cases(only for numerical). (2m)
12. Law of conservation of linear momentum –statement & proof . (2m/3m)
13. Definiton of static friction/limiting friction/kinetic friction. (1m)
14. Angle of friction & angle of repose –definition & prove angle of friction = angle of repose . (3m)
15. Laws of limiting friction & kinetic friction (at least 2). (2m)

16. It is easy to pull a lawn roller than push it – proof .(2m)
17. Banking of a curved road- angle of banking road- proof.(2m)
18. Motion of verticle circle – proof .(3m)
19. Proof & definition of $KE = \frac{1}{2} mv^2$. (2m)
20. Statement of work energy theorem & its proof.(2m)
21. PE of spring – proof of $U = \frac{1}{2} kx^2$.(2m)
22. PE of spring by graphical method – proof. (2m)
23. Proof of conservation of mechanical energy for a freely falling body. (3m)
24. Elastic collision , inelastic collision , perfectly inelastic collision – definition & characteristics . (2m)
25. Elastic collision in one dimensional – proof . (5m)
26. Loss in KE in inelastic collision – proof. (3m)
27. Definition of torque (or) moment of force, angular momentum=-DF etc. (2m/1m)
28. Relation between torque & angular momentum $T = dl/dt$.
(2m)
29. Moment of inertia – definition, unit, DF, factors on which it depends.(2m)
30. Radius of gyration- definition, & factors on which it depends.(2m)
31. newton's universal law of gravitation – statement,
mathematical expression, unit for G, DF for G, value for G.(2m)
32. kepler's laws of planetary motion(all 3 laws). (3m)
33. Gravitational PE – definition & proof. (3m)
34. Escape velocity – defintion & proof. (3m)
35. Orbital velocity – definiton & proof. (3m)

CLASS XII

COMPUTER SCIENCE

1. Complete all pending Python and SQL practical exercises.
2. Revise important Python functions and programming concepts.
3. Practice file handling and database connectivity exercises taught in class.
4. Prepare a glossary of 25 important Computer Science terms.
5. Solve one sample paper based on the current CBSE syllabus.
6. Review all practical programs and prepare for viva-voce questions.

Artificial Intelligence(AI)

AI Model Evaluation

Consider the following hypothetical results from a binary classification model:

- True Positives (TP): 40
- True Negatives (TN): 50

- False Positives (FP): 5
- False Negatives (FN): 5

Calculate:

1. Total number of predictions
2. Accuracy
3. Precision
4. Recall
5. F1-score

Use the following formulas:

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

$$\text{Precision} = \frac{TP}{TP + FP}$$

$$\text{Recall} = \frac{TP}{TP + FN}$$

$$F1 = 2 \times \frac{\text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$$

Write a short explanation of why accuracy alone may not be sufficient to evaluate every AI model.

Careers in Artificial Intelligence

Research any three of the following careers:

- Data Scientist
- Machine Learning Engineer
- AI Research Scientist
- Computer Vision Engineer
- NLP Engineer
- Robotics Engineer
- AI Ethics Specialist

For each career, write about:

1. Job responsibilities

2. Required technical and soft skills
3. Relevant educational pathways
4. Applications in industry
5. Ethical responsibilities
6. Future opportunities

MINI-PROJECT

AI-Based Waste Classification Proposal

Prepare a proposal for an AI system that helps classify waste into categories such as paper, plastic, metal and organic waste.

Your project file should include:

1. Project title
2. Problem statement
3. Objectives
4. Stakeholders
5. Data collection plan
6. Proposed AI approach
7. System flowchart
8. Evaluation criteria
9. Benefits and limitations
10. Ethical and environmental considerations
11. Conclusion

MATHEMATICS

CHAPTER 11: THREE – DIMENSIONAL GEOMETRY

POINTS TO REMEMBER:

1. Direction cosines of a line are the cosines of the angles made by the line with the positive directions of the coordinate axes.
2. If l, m, n are the direction cosines of a line, then $l^2 + m^2 + n^2 = 1$.
3. Direction cosines of a line joining two points $P(x_1, y_1, z_1)$ and $Q(x_2, y_2, z_2)$ are $\frac{x_2 - x_1}{PQ}, \frac{y_2 - y_1}{PQ}, \frac{z_2 - z_1}{PQ}$ Where $PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$
4. Direction ratios of a line are the numbers which are proportional to the direction cosines of a line

STRAIGHT LINE:

5. Line passing through point A whose position vector is $\vec{a}$ and parallel to $\vec{m}$ in vector form is $\vec{r} = \vec{a} + \lambda \vec{m}$.

Cartesian form: $A(x_1, y_1, z_1)$ & a, b, c be Direction Ratios of vector parallel to line $\frac{x - x_1}{a} = \frac{y - y_1}{b} = \frac{z - z_1}{c}$

6. A general point on the line is $P(a\lambda + x_1, b\lambda + y_1, c\lambda + z_1)$
7. Line passing through two points A and B, whose position vectors are $\vec{a}$ & $\vec{b}$, is $\vec{r} = \vec{a} + \lambda(\vec{b} - \vec{a})$

Cartesian form: For points A (x_1, y_1, z_1) and B (x_2, y_2, z_2) is, $\frac{x - x_1}{x_2 - x_1} = \frac{y - y_1}{y_2 - y_1} = \frac{z - z_1}{z_2 - z_1}$

8. For lines having angle θ between them $\vec{r}_1 = \vec{a}_1 + \lambda \vec{m}_1, \vec{r}_2 = \vec{a}_2 + \mu \vec{m}_2$

or $\frac{x - x_1}{a} = \frac{y - y_1}{b} = \frac{z - z_1}{c}$ & $\frac{x - x_2}{a} = \frac{y - y_2}{b} = \frac{z - z_2}{c}$

$$\cos \theta = \frac{a_1 a_2 + b_1 b_2 + c_1 c_2}{\sqrt{a_1^2 + b_1^2 + c_1^2} \sqrt{a_2^2 + b_2^2 + c_2^2}} = \frac{\vec{m}_1 \cdot \vec{m}_2}{|\vec{m}_1| |\vec{m}_2|}$$

For perpendicular lines: $\vec{m}_1 \cdot \vec{m}_2 = a_1 a_2 + b_1 b_2 + c_1 c_2 = 0$

For parallel lines: $\vec{m}_1 = \mu \vec{m}_2$ i.e. $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

9. Skew lines in space are lines which are neither parallel nor intersecting.

10. Shortest distance between two skew lines:

For two lines $\vec{r}_1 = \vec{a}_1 + \lambda \vec{m}_1$, $\vec{r}_2 = \vec{a}_2 + \mu \vec{m}_2$

$$S.D = \frac{(\vec{a}_2 - \vec{a}_1) \cdot (\vec{m}_1 \times \vec{m}_2)}{|\vec{m}_1 \times \vec{m}_2|}$$

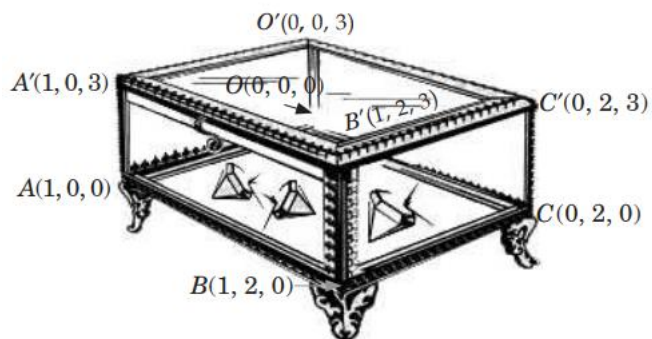
Condition for two lines to intersect: $[(\vec{a}_2 - \vec{a}_1) \cdot (\vec{m}_1 \times \vec{m}_2)] = 0$

For parallel lines: $\vec{r}_1 = \vec{a}_1 + \lambda \vec{m}$ and $\vec{r}_2 = \vec{a}_2 + \mu \vec{m}$ **S.D.** = $\frac{|(\vec{a}_2 - \vec{a}_1) \times \vec{m}|}{|\vec{m}|}$

MULTIPLE CHOICE QUESTIONS	
Q1	If a line makes an angle ϕ_1, ϕ_2, ϕ_3 with the axes respectively, then the value of $\cos 2\phi_1 + \cos 2\phi_2 + \cos 2\phi_3$ is (a) 1 (b) -1 (c) 4 (d) 3
Q2	Distance of the point (a, b, c) from y-axis is (a) b (b) b (c) b + c (d) $\sqrt{a^2+b^2}$
Q3	If the direction cosines of a line are k, k, k, then (A) $k > 0$ (B) $0 < k < 1$ (C) $k = 1$ (D) $k = 1/\sqrt{3}$ or $-1/\sqrt{3}$
Q4	The reflection of the point (a, b, c) in the xy-plane is (A) (a, b, 0) (B) (0, 0, c) (C) (-a, -b, c) (D) (a, b, -c)
Q 5	The area of the quadrilateral ABCD, where A(0, 4, 1), B(2, 3, -1), C(4, 5, 0) and D(2, 6, 2), is equal to (A) 9 sq. units (B) 18 sq. units (C) 27 sq. units (D) 81 sq. units
Q 6	The direction cosines of the line passing through two points (2, 1, 0) and (1, -2, 3) are (a) $(1/\sqrt{19}, 3/\sqrt{19}, 3/\sqrt{19})$ (b) $(-1/\sqrt{19}, 3/\sqrt{19}, -3/\sqrt{19})$ (c) $(-1/\sqrt{19}, -3/\sqrt{19}, 3/\sqrt{19})$ (d) $(1/\sqrt{19}, 3/\sqrt{19}, -3/\sqrt{19})$

Q 7	Find the direction cosines of the line that makes equal angles with the three axes in space. (a) $\pm 1/\sqrt{2}$ (b) ± 1 (c) $\pm 1/\sqrt{3}$ (d) $\sqrt{3}$
Q 8	Find the direction cosines of the line joining A(0,7,10) and B(-1,6, 6). (A) $(1/\sqrt{2}, 1/\sqrt{2}, 4/\sqrt{2})$ (B) $(1/\sqrt{2}, 4/\sqrt{2}, 1/\sqrt{2})$ (C) $(1/\sqrt{2}, 1/\sqrt{2}, 1/\sqrt{2})$ (D) $(4/\sqrt{2}, 1/\sqrt{2}, 4/\sqrt{2})$
Q 9	If $(1/2, 1/3, n)$ are the direction cosines of a line, then the value of n is (a) $\sqrt{23}/6$ (b) $23/6$ (c) $2/3$ (d) $3/2$
Q10	The equation of y-axis in space is (a) $x = y = 0$ (b) $x = z = 0$ (c) $y = z = 0$ (d) $y = 0$
Q11	The shortest distance between the two lines are zero if the lines are (a) Intersecting (b) parallel (c). Skew (d). none of these
Q12	The d.r's of the line which is perpendicular to the lines $\frac{x-7}{2} = \frac{y+17}{-3} = \frac{z-6}{1}$ and $\frac{x+5}{1} = \frac{y}{2} = \frac{z-4}{-2}$ (a) (4, 5, 7) (b) (4, -5, 7) (c) (4, -5, -7) (d) (-4, 5, 7)
Q13	If d.r's of a line be 1, -2, 2, then its d.c's are (a) $1/3, -1/3, 2/3$ (b) $1/3, -1/3, -2/3$ (c) $1/3, -2/3, 2/3$ (d) $-1/3, -2/3, 2/3$
Q14	The length of perpendicular from origin to the line $r = (4\hat{i} + 2\hat{j} + 4\hat{k}) + \lambda(3\hat{i} + 4\hat{j} - 5\hat{k})$ is (a) 2 (b) $2\sqrt{3}$ (c) 6 (d) 7
Q15	The shortest distance between the lines $r = (5\hat{i} + 7\hat{j} + 3\hat{k}) + \lambda(3\hat{i} - 16\hat{j} + 7\hat{k})$ and $r = (9\hat{i} + 13\hat{j} + 15\hat{k}) + \lambda(3\hat{i} + 8\hat{j} - 5\hat{k})$ is (a) 10 units (b) 12 units (c) 14 units (d) 15 units

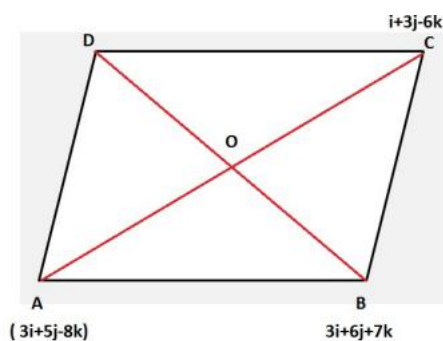
Q16	The d.c's of a line parallel to the line $\frac{3-x}{3} = \frac{y+2}{-2} = \frac{z+2}{6}$ (a) $-3/7, -2/7, 6/7$ (b) $3/7, -2/7, 6/7$ (c) $3/7, 2/7, 6/7$ (d) $3/7, -2/7, -6/7$
Q17	If d.r's of a line be 1, -2, 2, then its d.c's are (a) $1/3, -1/3, 2/3$ (b) $1/3, -1/3, -2/3$ (c) $1/3, -2/3, 2/3$ (d) $-1/3, -2/3, 2/3$
Q18	If l, m, n be the d.c's of a line then $l^2 + m^2 + n^2$ is equal to (a) 1 (b) 2 (c) 3 (d) 2
Q19	The shortest distance between the lines $r = (5\hat{i} + 7\hat{j} + 3\hat{k}) + \lambda(3\hat{i} - 16\hat{j} + 7\hat{k})$ and $r = (9\hat{i} + 13\hat{j} + 15\hat{k}) + \lambda(3\hat{i} + 8\hat{j} - 5\hat{k})$ is (a) 10 units (b) 12 units (c) 14 units (d) 15 units
Q20	If lines $\frac{x-1}{-3} = \frac{y-2}{2k} = \frac{z-3}{2}$ and $\frac{x-1}{3k} = \frac{y-5}{1} = \frac{z-6}{-5}$ are mutually perpendicular, then k is equal to (a) $-10/7$ (b) $-7/10$ (c) -10 (d) -7
	CASE BASED Case-I : Read the following passage and answer the questions In a diamond exhibition, a diamond is covered in cubical glass box having coordinates O(0, 0, 0), A(1, 0, 0), B(1, 2, 0), C(0, 2, 0), O'(0, 0, 3), A'(1, 0, 3), B'(1, 2, 3) and C'(0, 2, 3)



Q21 Direction ratios of OA are
 (a) (0, 1, 0) (b) (1, 0, 0) (c) (0, 0, 1) (d) none of these

Q22 Equation of diagonal OB' is
 (a) $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ (b) $\frac{x}{0} = \frac{y}{1} = \frac{z}{2}$ (c) $\frac{x}{1} = \frac{y}{0} = \frac{z}{2}$ (d) none of these

Once the maths teacher was taking class test on three dimensional geometry. He select topic of straight line in 3 dimension. He draw a parallelogram ABCD on the black board



- i. Further he called Dinesh to write the position vector of A as $3i+5j-8k$
- ii. Next he called Reena to write the position vector of B as $3i+6j+7k$
- iii. Now he called Harish to write the position vector of C as $i+3j-6k$

The Position vectors of D are unknown

Now answer the following questions?

Q23 What is the position vector of D?

- a) $2i+2j+8k$ b) $i+2j-2k$ c) $2i+5j-8k$ d) $3i+5j-14k$

Q24 What is the cartesian form of equation of BD?

a) $\frac{x-3}{1} = \frac{y-6}{2} = \frac{z-7}{14}$

b) $\frac{x-4}{1} = \frac{y-5}{2} = \frac{z-10}{21}$

c) $\frac{x-3}{1} = \frac{y-7}{8} = \frac{z-7}{21}$

d) $\frac{x-4}{8} = \frac{y-5}{7} = \frac{z-10}{11}$

Q25 What is the position vector of point O?

- a) $2i+2j-8k$ b) $i+2j-7k$ c) $2i+4j+8k$ d) $2i+4j-7k$

Q26 Which of the following is the vector equation of the side AB?

a) $r = (3i+5j-8k) + \lambda(2i+j+15k)$

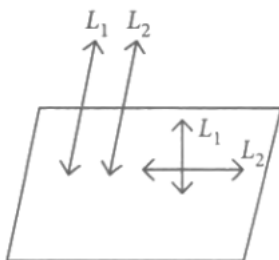
b) $r = (3i+5j-8k) - \lambda(j+15k)$

c) $r = (3i+5j-8k) + \lambda(j+15k)$

d) $r = (3i-5j-8k) - \lambda(j-15k)$

If a_1, b_1, c_1 and a_2, b_2, c_2 are direction ratios of two lines say L_1 and L_2 respectively. Then $L_1 \parallel L_2$ iff $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

and L_1 perpendicular to L_2 iff $a_1a_2 + b_1b_2 + c_1c_2 = 0$.



Based on the above information, answer the following questions

Q27	l_1, m_1, n_1 and l_2, m_2, n_2 are the direction cosines of L_1 and L_2 respectively, then L_1 will be perpendicular to L_2, iff a. $l_1l_2 + m_1m_2 + n_1n_2 = 0$ b. $l_1m_2 + m_1l_2 + n_1n_2 = 0$ c. $\frac{l_1}{l_2} = \frac{m_1}{m_2} = \frac{n_1}{n_2}$ d. None of these
Q28	If l_1, m_1, n_1 and l_2, m_2, n_2 are the direction cosines of L_1 and L_2 respectively, then L_1 will be parallel to L_2, iff a. $l_1l_2 + m_1m_2 + n_1n_2 = 0$ b. $l_1m_2 + m_1l_2 + n_1n_2 = 0$ c. $\frac{l_1}{l_2} = \frac{m_1}{m_2} = \frac{n_1}{n_2}$ d. None of these
Q29	The coordinates of the foot of the perpendicular drawn from the point $A(1, 2, 1)$ to the line joining $B(1, 4, 6)$ and $C(5, 4, 4)$, are a. $(1, 2, 1)$ b. $(2, 4, 5)$ c. $(3, 4, 5)$ d. $(4, 3, 5)$
Q30	The lines $\frac{x-2}{3} = \frac{y+1}{-2} = \frac{z-2}{0}$ and $\frac{x-1}{1} = \frac{y+3/2}{-3/2} = \frac{z+5}{2}$ are a. parallel b. perpendicular c. skew lines d. non-intersecting
Q31	The direction ratios of the line which is perpendicular to the lines with direction ratios proportional to $(4, -3, 5)$ and $(3, 4, 5)$ are a) $(-35, -5, 25)$ b) $(35, 5, -25)$ c) $(-35, -5, -25)$ d) $(-35, 5, 25)$
	The equation of motion of a rocket are : $x = 2t, y = -4t, z = 4t$, where the time 't' is given in seconds, and the distance measured is in kilometres



Based on the above information, answer the following questions

Q32 What is the path of the rocket?

- a. Straight line
- b. Circle
- c. Parabola
- d. none of these

Q33 Which of the following points lie on the path of the rocket?

- a. (0, 1, 2)
- b. (1, -2, 2)
- c. (2, -2, 2)
- d. none of these

Q34 At what distance will the rocket be from the starting point (0, 0, 0) in 5 seconds?

- (a) $\sqrt{550}$ km
- (b) $\sqrt{450}$ km
- (c) $\sqrt{650}$ km

	(d) $\sqrt{750}$ km
Q35	If the position of rocket at certain instant of time is (3, -8, 10), then what will be the height of the rocket from the ground, which is along the xy-plane? (a) 10 km (b) 20 km (c) 12 km (d) 11 km
	OBJECTIVE TYPE
Q36	Find the direction cosines of the line $\frac{(4-x)}{2} = \frac{y}{6} = \frac{1-z}{3}$
Q37	Find the vector equation of a line which passes through the points (3, 4, -7) and (1, -1, 6).
Q38	The equation of a line are $5x - 3 = 15y + 7 = 3 - 10z$. Write the direction cosines of the line
Q39	Write the vector equation of a line passing through the point (1, -1, 2) and parallel to the line whose equation is $\frac{(x-3)}{1} = \frac{y-1}{2} = \frac{z+1}{-2}$
Q40	The x-coordinate of a point on the line joining the points P(2, 2, 1) and Q(5, 1, -2) is 4. Find its z-coordinate
Q41	Find the value of k so that the lines $x = -y = kz$ and $x - 2 = 2y + 1 = -z + 1$ are perpendicular to each other
Q42	Find the vector equation of the line passing through the point A (1, 2, -1) and parallel to the line $5x - 25 = 14 - 7y = 35z$.
Q43	Find the coordinates of the point where the line through (-1, 1, -8) and (5, -2, 10) crosses the ZX-plane
Q44	If a line makes angles 90° , 60° , 30° with the x,y and z axes respectively, find its direction cosines

Q45	Find the distance of the point (3, -5, 12) from x-axis.
Q46	Find the distance of the point (2, 3, 4) from y-axis.
Q47	If a line has direction ratios proportional to 2, -1, -2, then what are its direction cosines?
Q48	Write the distances of the point (7, -2, 3) from XY, YZ and XZ-planes
Q49	Find the vector equation of the line passing through the points (-1, 0, 2) and (3, 4, 6)
Q50	The vector equation of a line is $r = -2\hat{i} + 3\hat{j} - 3\hat{k} + (2\hat{i} + \hat{j} + 2\hat{k})$. Find the Cartesian equation of the line.
	SHORT QUESTIONS
Q51	Find the vector and Cartesian equations of the line through the point (5, 2, -4) and which is parallel to the vector $3\hat{i} + 2\hat{j} - 8\hat{k}$.
Q52	Find the points on the line $\frac{(x+2)}{3} = \frac{y+1}{2} = \frac{z-3}{2}$ at a distance of 5 units from the point P(1, 3, 3)
Q53	Find the foot of the perpendicular from the point P(0, 2, 3) on the line $\frac{x+3}{5} = \frac{y-1}{2} = \frac{z+4}{3}$. Also find the length of the perpendicular.
Q54	Find the shortest distance between the lines $r = (4\hat{i} - \hat{j}) + \lambda(\hat{i} + 2\hat{j} - 3\hat{k})$ and $(\hat{i} - \hat{j} + 2\hat{k}) + \mu(2\hat{i} + 4\hat{j} - 5\hat{k})$
Q55	Find the shortest distance between the lines whose vector equations are $r = (\hat{i} + 2\hat{j} + 3\hat{k}) + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k})$ and $r = (2\hat{i} + 4\hat{j} + 5\hat{k}) + \mu(4\hat{i} + 6\hat{j} + 8\hat{k})$
Q56	If the equations of a line AB are $\frac{3-x}{1} = \frac{y+2}{-2} = \frac{z-5}{4}$ Write the direction ratios of a line parallel to AB.
Q57	Write the vector equation of a line given by $\frac{x-5}{3} = \frac{y+4}{7} = \frac{z-6}{2}$

Q58	Find the distance between the parallel lines : $\vec{r} \cdot (2\hat{i} - \hat{j} + 3\hat{k}) = 4$ and $\vec{r} \cdot (6\hat{i} - 3\hat{j} + 9\hat{k}) + 13 = 0$
Q59	If a line makes angle α, β, γ with positive directions of x- axis, y-axis and z-axis respectively, then find the value of $\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma$.
Q60	If the equation of a line is $x = ay + b, z = cy + d$, then find the passing point and direction ratios of the line .
Q61	Find the angle between the pair of lines given by $\vec{r} = (3\hat{i} + 2\hat{j} - 4\hat{k}) + \lambda(\hat{i} + 2\hat{j} + 2\hat{k})$ and $\vec{r} = (\hat{i} - 2\hat{j}) + \mu(3\hat{i} + 2\hat{j} + 6\hat{k})$
Q62	Find the angle between the pair of lines $\frac{x-3}{3} = \frac{y-1}{5} = \frac{z+3}{4}$ and $\frac{x+1}{1} = \frac{y-4}{1} = \frac{z-5}{2}$
Q63	Find the distance between the lines l_1 and l_2 given by $\vec{r} = (\hat{i} + 2\hat{j} - 4\hat{k}) + \lambda(2\hat{i} + 3\hat{j} + 6\hat{k})$ and $\vec{r} = (3\hat{i} + 3\hat{j} - 5\hat{k}) + \mu(2\hat{i} + 3\hat{j} + 6\hat{k})$
Q64	Find the angle between the following pair of lines: $\frac{x-2}{2} = \frac{y-1}{5} = \frac{z+3}{-3}$ and $\frac{x+2}{-1} = \frac{y-4}{8} = \frac{z-5}{4}$
Q65	Find the values of p so that the lines $\frac{1-x}{3} = \frac{7y-14}{2p} = \frac{z-3}{2}$ and $\frac{7-7x}{3p} = \frac{y-5}{1} = \frac{6-z}{5}$ are at right angles.
Q66	Show that the lines $\frac{x-5}{7} = \frac{y+2}{-5} = \frac{z}{1}$ and $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ are perpendicular
Q67	Find the vector and Cartesian equation of the lines that passes through the origin and (5,-2,3)
Q68	Are the lines whose direction ratios are a, b, c and $b - c, c - a, a - b$ perpendicular.
Q69	Show that the line through the points (4, 7, 8) and (2, 3, 4) is parallel to the line through the points (-1, -2, 1) and (1, 2, 5).
Q70	Show that the points (2, 3, 4), (-1, 1, 2) and (5, 5, 6) are collinear.
	LONG QUESTIONS

Q71	Prove that the lines: $\frac{x-4}{1} = \frac{y+3}{-4} = \frac{z+1}{7}$ and $\frac{x-1}{2} = \frac{y+1}{-3} = \frac{z+10}{8}$ intersect each other and find the point of intersection.
Q72	Find the equation of a line passing through the point (2,1,3) and perpendicular to the line: $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-3}{3}$ and : $\frac{x}{-3} = \frac{y}{2} = \frac{z}{5}$
Q73	Find the image of the point (1, 6, 3) on the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$
Q74	Let the point p (5, 9, 3) lies on the top of Qutub Minar, Delhi. Find the image of the point on the line $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ Do you think that the conservation of monuments is important and why?
Q75	Two bikers are running at the Speed more than allowed speed on the road along the Lines $\vec{r} \cdot (\hat{i} + \hat{j} - \hat{k}) + \lambda (3\hat{i} - \hat{j})$ and $\vec{r} \cdot (4\hat{i} - \hat{k}) + \lambda (2\hat{i} + 3\hat{k})$ Using Shortest distance formula check whether they meet to an accident or not? While driving should driver maintain the speed limit as allowed. Justify?
Q76	Prove that the line through A(0, -1, -1) and B(4, 5,1) intersects the line through C(3, 9, 4) and D(-4, 4, 4).
Q77	Show that the lines $r=3i+2j-4k + \lambda(i+2j+2k)$ and $r=5i-2j+v(3i+2j+6k)$ are intersecting. Hence find their point of intersection.
Q78	Show that the lines $\frac{x+1}{3} = \frac{y+3}{5} = \frac{z+5}{7}$ and $\frac{(x-2)}{1} = \frac{y-3}{3} = \frac{z+6}{5}$ intersect. Also find their point of intersection
Q79	Find the perpendicular distance of the point (1, 0, 0) from the line $\frac{x-1}{2} = \frac{y+1}{-3} = \frac{z+10}{8}$. Also find the coordinates of the foot of the perpendicular and the equation of the perpendicular.
Q80	Find the equation of the line passing through the point (-1, 3, -2) and perpendicular to the lines $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and $\frac{(x+2)}{-3} = \frac{y-1}{2} = \frac{z+1}{5}$

ASSERTION – REASON QUESTIONS

In these questions, a statement of Assertion is followed by a statement of Reason is given. Choose the correct answer out of the following choices :

- (a) Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion.
- (b) Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion.
- (c) Assertion is correct statement but Reason is wrong statement.
- (d) Assertion is wrong statement but Reason is correct statement.

Q81 Assertion : The points (1, 2, 3), (-2, 3, 4) and (7, 0, 1) are collinear.

Reason : If a line makes angles α , β , and γ with X, Y, and Z-axes respectively, then its direction cosines are $\cos \alpha$, $\cos \beta$, and $\cos \gamma$

Q82 Assertion : If the cartesian equation of a line is $\frac{x-5}{3} = \frac{y+4}{7} = \frac{z-6}{2}$ then its vector form is $\mathbf{r} = 5\mathbf{i} - 4\mathbf{j} + 6\mathbf{k} + \lambda(3\mathbf{i} + 7\mathbf{j} + 2\mathbf{k})$.

Reason : The cartesian equation of the line which passes through the point (-2, 4, -5) and parallel to the line given by $\frac{x+3}{3} = \frac{y-4}{5} = \frac{z+8}{6}$ is $\frac{x+3}{3} = \frac{y-4}{5} = \frac{z+8}{6}$

Q83 Assertion : The pair of lines given by $\mathbf{r} = \mathbf{i} - \mathbf{j} + \lambda(2\mathbf{i} + \mathbf{k})$ and $\mathbf{r} = 2\mathbf{i} - \mathbf{k} + \mu(\mathbf{i} + \mathbf{j} - \mathbf{k})$ intersect

Reason : Two lines intersect each other, if they are not parallel and shortest distance = 0.

Q84 Assertion : There exists only one plane that is perpendicular to the given vector.

Reason : Through a given point perpendicular to the given vector only one plane exists.

Q85	Assertion : If a variable line in two adjacent positions has direction cosines l, m, n and $l + \delta l, m + \delta m, n + \delta n$, then the small angle $\delta \theta$ between the two positions is given by $\delta \theta^2 = \delta l^2 + \delta m^2 + \delta n^2$ Reason : If O is the origin and A is (a, b, c), then the equation of plane through A at right angle to OA is given by $ax + by + cz = a^2 + b^2 + c^2$.
Q86	Consider the lines $L_1 \frac{(x+1)}{3} = \frac{y+2}{1} = \frac{z+1}{2}, L_2 \frac{(x-2)}{1} = \frac{y+2}{2} = \frac{z-3}{3}$ Assertion : The distance of point $(1, 1, 1)$ from the plane passing through the point $(-1, -2, -1)$ and whose normal is perpendicular to both the lines L1 and L2 is $13/5\sqrt{3}$ Reason : The unit vector perpendicular to both the lines L1 and L2 is $(-i - 7j + 5k)/5\sqrt{3}$
Q87	Assertion : The three lines with direction cosines $\frac{12}{13}, \frac{-3}{13}, \frac{-4}{13}$ and $\frac{4}{13}, \frac{12}{13}, \frac{3}{13}$ and $\frac{3}{13}, \frac{-4}{13}, \frac{12}{13}$ are mutually perpendicular. Reason : The line through the points $(1, -1, 2)$ and $(3, 4, -2)$ is perpendicular to the line through the points $(0, 3, 2)$ and $(3, 5, 6)$.
Q88	Assertion (A) : if a line passes through a point whose position vector is $\vec{a} = i - 4j - 2k$ and is parallel to $\vec{b} = 2i + 2j + 3k$ then, its equation is $\vec{r} = i - 4j - 2k + \mu(2i + 2j + 3k)$ Reason (R) : if a line passes through a point whose position vector is $\vec{a}$ and is parallel to the vector $\vec{b}$ then, its equation is $\vec{r} = \vec{a} + \mu \vec{b}$

PHYSICS

List of most probable Derivations

1- Electric field due to dipole

* 2- Gauss law applications (Thin shell)

3- Potential energy of a dipole in electric field

- * 4- Insertion of dielectric
- 5- Energy stored in capacitor
- * 6- Drift velocity and its relation with current
- * 7- Parallel grouping of cells
- * 8- Balanced Wheatstone bridge
- 9- Biot Savart law
- 10- Ampere circuital law - applications
- * 11- Force per unit length between 2 parallel current carrying wires
- 12- Moving coil Galvanometer
- * 13- Self and Mutual inductance of solenoid
- 14- Energy stored in inductor
- * 15- Series LCR phasor
- * 16- Transformer
- * 17- AC generator
- 18- Relation between Critical angle and refractive index
- * 19- Refraction through spherical surface
- 20- Lens makers Formula
- 21- Thin lenses in contact
- * 22- Compound Microscope and Astronomical telescope (final image at LDDV)
- * 23- Laws of reflection and refraction using Huygens principle
- 24- de Broglie wavelength of an electron
- 25- Distance of closest approach
- * 26- Nuclear density independent of mass no.

(* Means Most Important Topics for CBSE Board Examination)