



SHREE VASISHTHA VIDHYALAYA, CBSE

Summer Assignment 2026 - 27

Class-XII (Science)



Classes XI–XII

Dear Vashithians,

“The highest education is that which does not merely give us information but brings our lives in harmony with all existence.” — Rabindranath Tagore

As you step into the summer break, remember - this is not merely time away from school, but an opportunity to reconnect with yourself. It is a season to explore ideas, nurture curiosity, and grow beyond the boundaries of the classroom.

Learning does not pause; it simply transforms.

In moments of rest and play, in quiet reading and active exploration, and in reflection and creativity—true understanding unfolds. The holiday homework has been thoughtfully designed not as a checklist, but as a meaningful journey - a canvas where imagination meets logic and knowledge connects with real-life experiences.

Plan your time with intention. Set clear goals, prioritize wisely, and maintain a balanced routine. Equally important is the ability to pause, reflect, and rejuvenate - because a refreshed mind learns best. Stay organized, be consistent, and seek guidance whenever needed, for growth becomes richer when shared.

Let reading become your companion this summer. Choose any one novel from the following - Things Fall Apart, To Kill a Mockingbird, or Animal Farm and engage deeply with its ideas. Reflect, question, and articulate your understanding through a thoughtful review that captures both insight and perspective.

Stay connected with the world around you. Cultivate the habit of reading newspapers daily and create a scrapbook of articles, visuals, and ideas that inspire you. Express your thoughts as you reflect on issues shaping our society.

Aligned with the vision of the National Education Policy 2020, these experiences aim to nurture not only academic excellence but also creativity, critical thinking, and essential life skills. Education, after all, is not merely about acquiring knowledge - it is about understanding, questioning, and evolving.

To further enrich your learning journey, explore the SWAYAM platform - an initiative by the Ministry of Education, Government of India - offering a wide range of online courses by NCERT. Choose thoughtfully, learn independently, and broaden your horizons.

This summer, let curiosity guide you, discipline strengthen you, and creativity define you.

Read with depth.

Think with clarity.

Create with confidence.

Grow with purpose.

***Wishing you a meaningful
and magical summer!***

*Warm regards,
SVV Family*

“Summer brings the time to rest, But learning too can be at its Best!”

SUMMER ASSIGNMENT: 2026-27

CLASS: XII (SCIENCE STREAM)

General Instructions: -

1. All the subject assignments have to be done in separate files using project papers.
2. Submission date: - 15th June, 2026 (Monday)
3. The Summer Break is scheduled from 03rd May 2026 - 07th June, 2026. The students will resume the school from 5th June, 2026 (Friday).

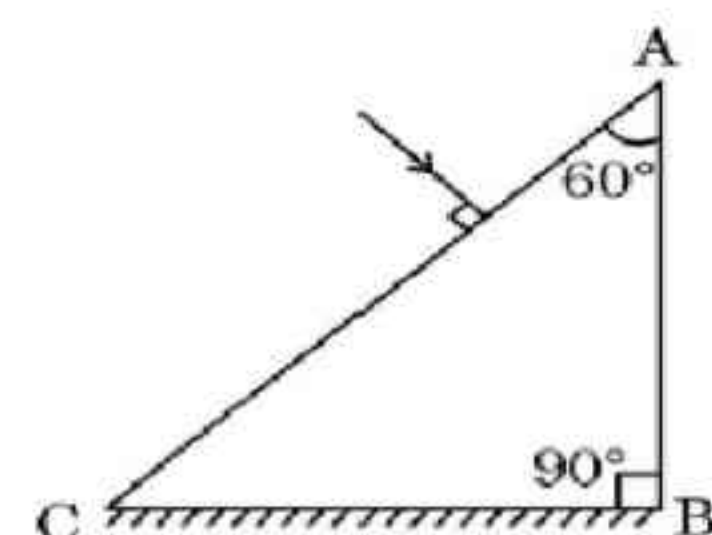
Note: - These assignments are a part of your internal assessment & will be marked accordingly out of 10.

ENGLISH CORE (301)

- Q1. “Lost opportunities teach the greatest lessons.” Reflect on this idea with reference to The Last Lesson and your own life experiences.
- Q2. “Poverty is not just economic but also a loss of dreams.” Analyze this statement with reference to Lost Spring.
- Q3. Explore how My Mother at Sixty-Six highlights the theme of aging and emotional separation in modern families.
- Q4. Develop a speech on “Power of Silence and Peace” inspired by Keeping Quiet.
- Q5. Study the issue of child labour in India and connect your findings with Lost Spring. Suggest realistic solutions.
- Q6. Your school is organizing a workshop on Cyber Safety for students. Draft a notice inviting students to attend the workshop.
- Q7. As the Secretary of the Music Club of your school, draft a notice inviting students to audition for the Annual Music Competition.
- Q8. Draft Mind Maps of the Lessons The Last Lesson & Lost Spring.
- Q9. Prepare comprehensive notes on all the poetic devices used in the poems My Mother at Sixty-Six by Kamala Das and Keeping Quiet by Pablo Neruda.
- Q10. Write a Detailed Summary of the Lesson The Third Level along with the Character sketch of Charley and Sam

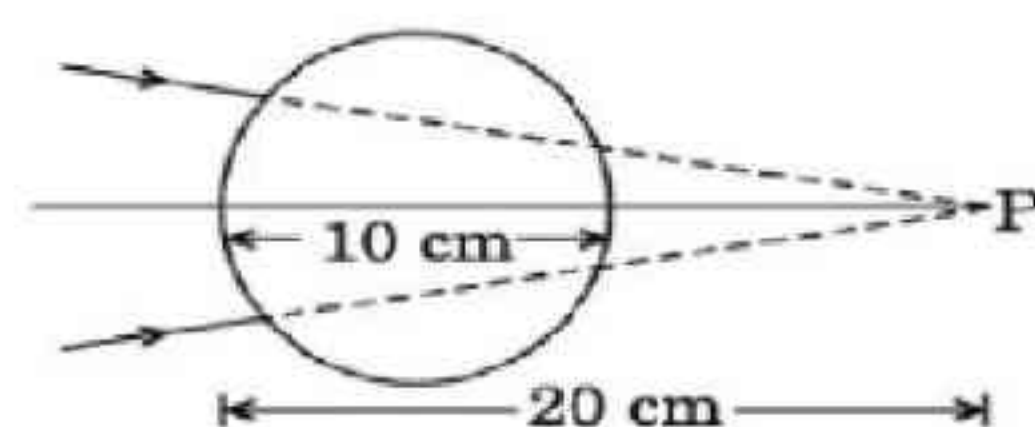
PHYSICS (042)

- Q1. Write any two advantages of a compound microscope over a simple microscope. Draw a ray diagram for the image formation at the near point by a compound microscope and explain it.
- Q2. In a compound microscope, an object is placed at a distance of 1.5 cm from the objective of focal length 1.25 cm. The eyepiece has a focal length of 5 cm. The final image is formed at infinity. Calculate the distance between the objective and the eyepiece
- Q3. Use mirror formula to deduce that a convex mirror always produces a virtual image of an object kept in front of it.
- Q4. Draw a ray diagram of a reflecting telescope (Cassegrain) and explain the formation of image. State two important advantages that a reflecting telescope has over a refracting telescope.
- Q5. In a refracting telescope, the focal length of the objective is 50 times the focal length of the eyepiece. When the final image is formed at infinity, the length of the tube is 102 cm. Find the focal lengths of the two lenses.
- Q6. A right-angled prism ABC (refractive index $\sqrt{2}$) is kept on a plane mirror as shown in the figure. A ray of light is incident normally on the face AC.
(a) Trace the path of the ray as it passes through the prism.
(b) Find the angle of deviation produced by the prism.
- Q7. A point object is placed in air at a distance $R/3$ in front of a convex surface of radius of curvature R , separating air from a medium of refractive index $n (< 4)$. Find the nature and position of the image formed.
- Q8. In Young’s double slit experiment, the screen is moved 30 cm towards the slits. As a consequence, the fringe width of the pattern changes by 0.09 mm. If the slits separation used is 2 mm, calculate the wavelength of light used in the experiment.

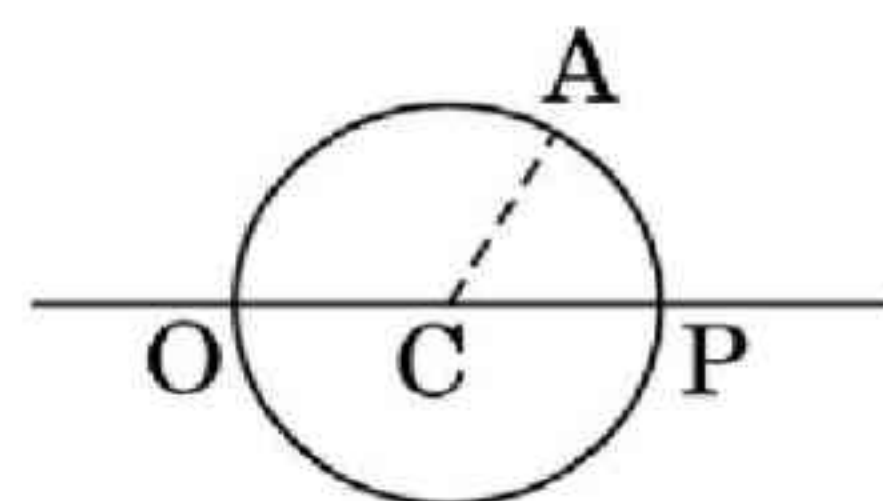


- Q9.** Write the conditions under which two light waves originating from two coherent sources can interfere each other (i) constructively, and (ii) destructively, in terms of wavelength. Can these be applied for two lights originating from two sodium lamps? Give reason.
- Q10.** An object is placed 30 cm from a thin convex lens of focal length 10 cm. The lens forms a sharp image on a screen. If a thin concave lens is placed in contact with the convex lens, the sharp image on the screen is formed when the screen is moved by 45 cm from its initial position. Calculate the focal length of the concave lens.
- Q11.** A physics teacher wants to demonstrate interference with the help of double slit experiment using a laser beam of 633 nm wavelength. Since the hall is large enough, interference pattern is formed on the wall 5.0 m from the slits. For clear and comfortable view by all the students they want the fringe width 5 mm.
- (I) Find the slit separation for obtaining the desired interference pattern.
 (II) How far will the first minimum be from the central maximum?

- Q12.** A converging beam of light travelling in air converges at a point P as shown in the figure. When a glass sphere of refractive index 1.5 is introduced in between the path of the beam, calculate the new position of the image. Also draw the ray diagram for the image formed.

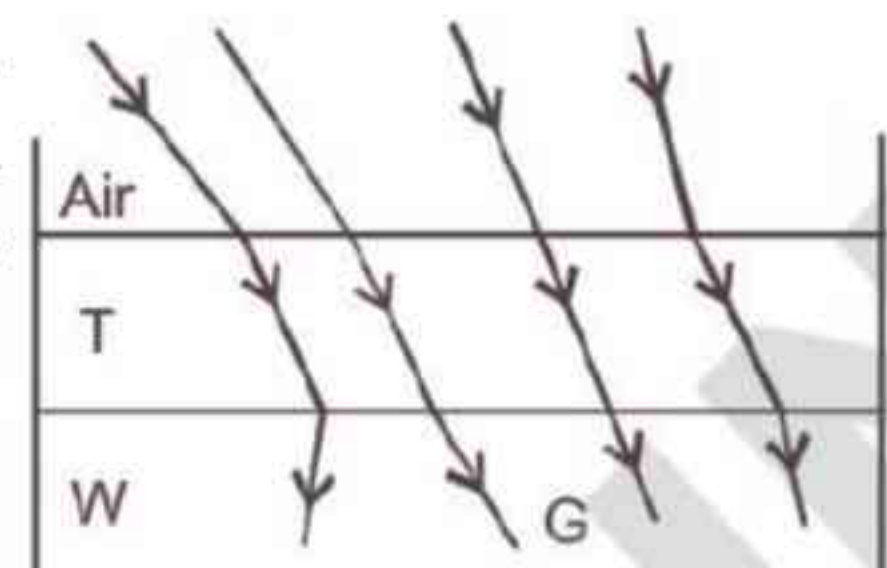


- Q13.** A point 'O' marked on the surface of a glass sphere of diameter 20 cm is viewed through glass from the position directly opposite to the point O. If the refractive index of the glass is 1.5, find the position of the image formed. Also, draw the ray diagram for the formation of the image.



- Q14.** In the diffraction due to a single slit experiment, the aperture of the slit is 3 mm. If monochromatic light of wavelength 620 nm is incident normally on the slit, calculate the separation between the first order minima and the 3rd order maxima on one side of the screen. The distance between the slit and the screen is 1.5 m.
- Q15.** Give reasons for each of the following: (a) The intensity of light at some points on the screen in Young's double slit experiment is zero. (b) In the single slit diffraction experiment, some coloured fringes around the central white maximum are observed on the screen when one uses a source of white light.
- Q16.** In a single slit diffraction experiment, the width of the slit is decreased. How will the (i) size (ii) intensity of the central bright band be affected? Justify your answer.
- Q17.** (a) Two thin lenses are placed coaxially in contact. Obtain the expression for the focal length of this combination in terms of the focal lengths of the two lenses.
 (b) A converging lens of refractive index 1.5 has a power of 10 D. When it is completely immersed in a liquid, it behaves as a diverging lens of focal length 50 cm. Find the refractive index of the liquid.
- Q18.** In a Young's double-slit experiment the fringe width is 0.2 mm. If the wavelength of light used is increased by 10% and the separation between the slits is also increased by 10%, then the fringe width will be
 (a) 0.20 mm (b) 0.401 mm (c) 0.242 mm (d) 0.165 mm

- Q19.** The optical density of turpentine is Higher than that of water while its mass density is lower. Figure shows a layer of turpentine floating over water in a container. For which one of the four rays incident on turpentine in fig, the path shown is correct?



- Q20.** According to Huygen's construction which of the following wavefront does not exist?
 (a) Forward wavefront (b) Backward wavefront
 (c) Cylindrical wavefront (d) Cannot be predicted

Write all 8 experiments and 6 activities from Physics Lab Manual. (Keep space for writing readings in observation table and calculations)

CHEMISTRY (043)

- Q1.** The experimental molecular weight of an electrolyte will always be less than its calculated value of Van't Hoff factor, 'I' is:
 (a) Greater than 1 (b) Less than 1 (c) One (d) Zero

- Q2.** If α is the degree of dissociation of K_2SO_4 , the van't Hoff factor (i) used for calculating the molecular mass is
 (a) $1-2\alpha$ (b) $1+2\alpha$ (c) $1-\alpha$ (d) $1+\alpha$
- Q3.** The porous membrane used in reverse osmosis plant is made up by
 (a) Cellulose acetate (b) Potassium nitrate
 (c) Mercuric iodide (d) Starch
- Q4.** The number of moles of NaCl in 3 litres of 3 M solution is
 (a) 1 (b) 3 (c) 9 (d) 27
- Q5.** If molality of the dilute solution is doubled, the value of the molal depression constant will be
 (a) doubled (b) halved (c) tripled (d) unchanged
- Q6.** In a lead storage battery, the electrolyte H_2SO_4 solution is
 (a) 38% (b) 62% (c) 80% (d) 48%
- Q7.** The emf produced by a voltage cell is
 (a) Electrode potential (b) Reduction potential
 (c) Cell potential (d) Oxidation potential
- Q8.** The cell constant of a conductivity cell
 (a) Changes with change in concentration of electrolyte
 (b) Changes with the nature of electrolyte
 (c) Changes with change in temperature of electrolyte
 (d) Remains constant for a cell.
- Q9.** When initial concentration of reactant is double in a reaction, the half-life period is not affected. The order of reaction is
 (a) Second (b) Zero
 (c) First (d) More than zero but less than first
- Q10.** The first order rate constant for the decomposition of N_2O_5 is $6.2 \times 10^{-3} \text{ sec}^{-1}$. The $t_{1/2}$ of the decomposition
 (a) 117.7 sec (b) 111.7 sec (c) 228.4 sec (d) 168.9 sec
- Q11.** Gases tend to be less soluble in liquids as the temperature is raised. Why?
- Q12.** What is reverse osmosis? Give one large scale use of it.
- Q13.** What is a semi permeable membrane?
- Q14.** Under what condition is Van't Hoff factor less than one?
- Q15.** Why is glycol and water mixture used in car radiators in cold countries?
- Q16.** Given reason for the following: -
 (a) Aquatic species are more comfortable in cold waters than in warm waters.
 (b) To avoid bends scuba divers use air diluted with helium.
 (c) Cold drinks bottles are sealed under high pressure of CO_2 .
- Q17.** For a dilute solution containing 2.5 g of a non-volatile non-electrolyte solute in 100 g of water, the elevation in boiling point at 1 atm pressure is $2^\circ C$. Assuming concentration of solute is much lower than the concentration of solvent, determine the vapour pressure (mm of Hg) of the solution.
- Q18.** Osmotic pressure of a 0.0103 molar solution of an electrolyte was found to be 0.75 atm at $27^\circ C$. Calculate Van't Hoff factor.
- Q19.** What is meant by cell constant?
- Q20.** Define the term molar conductivity.
- Q21.** Which type of cell is lead storage battery? Write its electrode reaction.
- Q22.** Which type of cell is mercury cell? Write its electrode reaction.
- Q23.** Calculate the equilibrium constant for the reaction
 $Cu(s) + 2Ag^+(aq) \rightleftharpoons Cu^{2+} + 2Ag(s)$ $E^\circ_{\text{cell}} = 0.46 \text{ V}$.
- Q24.** The standard electrode potential for Daniell cell is 1.1 V. Calculate the standard Gibbs energy for the reaction:
 $Zn(s) + Cu^{2+}(aq) \rightleftharpoons Zn^{2+}(aq) + Cu(s)$
- Q25.** What do you understand by rate of a reaction?
- Q26.** Distinguish between order and molecularity of a reaction.
- Q27.** Rate of a reaction is given by the equation: $Rate = [A]^2[B]$.
 What are the units for the rate and rate constant for this reaction?

- Q28.** Name the factors on which the rate of a particular reaction depends.
- Q29.** The rate constant for a first order reaction is 60 s^{-1} . How much time will it take to reduce the initial concentration of the reactant to its $1/16^{\text{th}}$ value?
- Q30.** During nuclear explosion, one of the products is ${}^{90}\text{Sr}$ with half-life of 28.1 years. If $1 \mu\text{g}$ of ${}^{90}\text{Sr}$ was absorbed in the bones of a newly born baby instead of calcium, how much of it will remain after 10 years and 60 years if it is not lost metabolically.

INVESTIGATORY PROJECT (Any One)

- Q1.** Study of the presence of oxalate ions in guava fruit at different stages of ripening.
- Q2.** Study of quantity of casein present in different samples of milk.
- Q3.** Preparation of soybean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.
- Q4.** Study of the effect of Potassium Bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)
- Q5.** Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
- Q6.** Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, etc.
- Q7.** Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).
- Q8.** Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.

MATHEMATICS (041)

- Q1.** Find the value of n for which $\tan^{-1} n/\pi > \pi/4$ $n \in N$
- Q2.** Find the domain of 1) $\sin^{-1}(2x-3)$ 2) $\sin^{-1}x^2$
- Q3.** Find the value of the expression: $\sin[\cot^{-1}(\cos(\tan^{-1}1))]$
- Q4.** Prove that $\tan^2(\sec^{-1}2) + \cot^2(\text{cosec}^{-1}3) = 11$
- Q5.** Solve: $\cos(\tan^{-1} x) = \sin(\cot^{-1} \frac{3}{4})$
- Q6.** Sketch the graph of $\sin^{-1} x$, $\cos^{-1} x$ and $\tan^{-1} x$.
- Q7.** Write the value of $\tan^{-1}(\sqrt{3}) - \cot^{-1}(-\sqrt{3})$.
- Q8.** The cost of 4 kg onion, 3 kg wheat and 2 kg rice is Rs.60. The cost of 2 kg onion, 4 kg wheat and 6 kg rice is Rs.90. The cost of 6 kg onion 2 kg wheat and 3 kg rice is Rs.70. Find the cost of each item per kg by matrix method.
- Q9.** Show that the points $A(a, b+c)$, $B(b, c+a)$, $C(c, a+b)$ are collinear.
- Q10.** Find the inverse of each of the matrices if it exists. $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$ by using matrix method
- Q11.** Find the equation of the line joining $A(1, 3)$ and $B(0, 0)$ using determinants and find k if $D(k, 0)$ is a point such that area of triangle ABD is 3 sq units
- Q12.** If A is an invertible matrix of order 2, then $\det(A^{-1})$ is equal to:
 (i) $\det(A)$ (ii) $1/\det(A)$ (iii) 1 (iv) 0
- Q13.** Show that the relation R on R , defined as $R = \{(a,b): a \leq b\}$ is reflexive and transitive but not symmetric.
- Q14.** Show that $f: R \rightarrow R$ defined by $f(x) = \frac{x}{x+1}$, for all $x \in R$ is neither one-one nor onto
- Q15.** Find x, y, z if $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ satisfies $A^T = A^{-1}$.
- Q16.** Find the inverse of the matrix $\begin{bmatrix} 1 & 2 \\ 4 & 6 \end{bmatrix}$
- Q17.** Find the value of x for which the matrix $A = \begin{bmatrix} 2 & 0 & 9 \\ 0 & x+7 & -3 \\ 0 & 4 & x \end{bmatrix}$ is invertible.
- Q18.** If A is 3×3 invertible matrix, then show that for any scalar k (non-zero), kA is invertible and $(kA)^{-1} = (1/k)A^{-1}$.

BIOLOGY (044)

Q1. Students will prepare a detailed project based on real-life application.

 **Guidelines:**

- The project must be **handwritten**
- Use proper format and neat presentation
- Include relevant data, graphs, or examples

 **Project Format:**

1. Cover Page
2. Certificate
3. Acknowledgement
4. Index
5. Introduction
6. Objectives
7. Methodology YY
8. Data Collection (Survey / Research)
9. Analysis & Interpretation
10. Conclusion
11. Bibliography

Instructions:

- Maintain **originality** (no copy-paste)
- Q2.**
- Complete all **spotting work** in your Biology practical journal.
 - Draw **neat and properly labeled diagrams** of all specimens/slides.
 - Write 4-5 **identifying features** and **name/function** of each item.
 - Keep the journal **updated and well-maintained**.

INFORMATICS PRACTICES (065)

Q1. Python – Series Based Questions

During your upcoming summer vacation, you plan to visit several cities across India.

You notice that petrol prices fluctuate significantly from one state to another.

To analyze this economic variation, perform the following tasks using the Python Pandas library.

Task 1: Data Categorization and Storage Create a Pandas Series named Energy_Crisis.

Store the petrol prices of at least 10 cities you plan to visit. The City Names should serve as the index, and the Petrol Prices should be the data values.

Task 2: Data Manipulation and Analysis Write the Python statements to perform the following operations on the Energy_Crisis series:

1. Append Data: Add a new city and its petrol price to the existing series.
2. Update Data: Modify the price of an existing city in the series.
3. Data Cleaning: Delete any one record from the series using its index.
4. Data Inspection: * Display the first 5 records of the series.
 - Display the last 5 records of the series.
5. Metadata Management: Change the internal name of the series to "Summer_Analysis".
6. Structural Analysis: * Display the Shape and Size of the series.
 - Find the total number of non-NaN values present.
 - Check and display whether the series is currently empty.

Task 3: Precise Data Retrieval (Advanced Indexing)

Using the Energy_Crisis series created in Task 1, write the commands to perform the following specific data retrieval operations:

1. Label-Based Access: Use the .loc attribute to retrieve the petrol price for "Mumbai".
2. Position-Based Access: Use the .iloc attribute to retrieve the petrol price of the 4th city in the series.
3. Single Value Retrieval (Label): Use the .at attribute to quickly extract the price for "Bangalore".
4. Single Value Retrieval (Position): Use the .iat attribute to retrieve the very first price in the series.

Q2.

SID	SName	Gender	DOB	Marks	Stream
1	Amit	Male	2005-01-15	78	Science
2	Neha	Female	2004-07-20	85	Commerce
3	Rahul	Male	2005-03-10	67	Arts

4	Sneha	Female	2004-11-25	92	Science
5	Karan	Male	2005-06-18	55	Commerce
6	Pooja	Female	2004-09-12	74	Arts
7	Arjun	Male	2005-02-08	88	Science
8	Riya	Female	2004-12-30	81	Commerce
9	Vikas	Male	2005-04-22	60	Arts
10	Anjali	Female	2004-08-05	95	Science

- (i) Create the student table with appropriate data type.
- (ii) Insert a records
- (iii) Display all records from the Student table.
- (iv) Show only the names and marks of all students.
- (v) Display details of students who scored more than 80 marks.
- (vi) List all female students.
- (vii) Show students who belong to the Science stream.
- (viii) Display students who scored less than 70 marks.
- (ix) Find students born after 1st January, 2005.
- (x) Display students from Science stream AND having marks greater than 85.
- (xi) Show students from Arts OR Commerce stream.
- (xii) Display students whose stream is either Science or Arts using IN operator.
- (xiii) Find students whose names start with letter 'A'.
- (xiv) Display students whose names end with 'a'.
- (xv) Display all students sorted by marks in ascending order.
- (xvi) Display all students sorted by marks in descending order.
- (xvii) Update marks of student Amit to 90 and display the updated record.

PHYSICAL EDUCATION (048)

Q1. Design a mini sports event plan for your school:

- Name of event
- Activities included
- Equipment required
- Safety measures
- Expected outcomes

ARTIFICIAL INTELLIGENCE (843)

Q1. For a Class 12 AI student, "Data Modelling" refers to the bridge between Data Science Methodology and actual Machine Learning. It is the stage where you transform clean data into a predictive engine.

TOPIC-AI Data Modelling & Methodology

Project Title: "Predictive Analytics for Urban Resources"

Part A: Theoretical Framework (Data Science Methodology)

Objective: Demonstrate an understanding of how a business problem becomes a data model.

1. Workflow Mapping: Create a flowchart representing the 10 stages of the Data Science Methodology.
2. Case Study Analysis: Suppose you are building a model to predict electricity consumption in your neighborhood.
 - Explain the Business Understanding for this project.
 - Identify the Data Requirements (List at least 5 features, e.g., temperature, time of day).
 - Describe the Analytic Approach: Would you use *Classification* or *Regression*? Justify your choice.

Part B: The Modeling Logic (Critical Thinking)

Objective: Understand the difference between training and evaluating a model.

1. Training vs. Testing: Explain why we split data into a Training Set and a Testing Set. What happens if we evaluate the model using the same data we used for training?
2. Evaluation Metrics: * If your model predicts whether a machine will fail (Yes/No)

Name the metric you would use (e.g., Accuracy).

- If your model predicts the exact price of a stock, would "Accuracy" still be the right metric? Explain.

PSYCHOLOGY (037)

Q1. Students have to prepare a detailed file of RPM Intelligence test.

Guidelines:

- The project must be **handwritten**
- Use proper format and neat presentation
- Include all required materials related to the test
- Do not use colour project paper. (Only white single line one side paper)
- Partitions are compulsory.
- Black file is mandatory.

Project Format:

1. Front Page
2. Index
3. Partition
4. Brief introduction of psychometric testing
5. Standardization
 - Reliability
 - Validity
 - Norms
6. Uses
7. Limitations

Partition

1. Definition of intelligence
2. Theory of intelligence
3. Brief introduction of John c. Raven
4. Raven's theory

Partition

1. Name of the test
2. Objectives
3. Materials required
4. Instructions
5. Procedure
6. Demographic details
7. Test and Scoring sheet
8. Introspective report
9. Conclusion
10. References

Instructions:

- Maintain **originality** (no copy-paste)