Srinath Public School

Summer Vacation Holiday Work
Session: 2025-26

Class: XII Science

Subject	Questions
English	**1st Project** Note: Project report is to be prepared by students during summer break. Following are the topics suggested for research. You can choose the topic of your choice from these or any other relevant topic of your choice. SUGGESTED TOPICS # Bangle Making in Firozabad # Phobias # Water Sports # Plight of Homeless People # Old Age Homes # Environmental Degradation # Time Travel: Fact or Fiction # Education # Marine Pollution # Global Warming The topic must have the scope of research. Your report must not be an article or an essay; it must be written like a report. You need to explore the idea, do research on the topic, collect data, interview people and come to a conclusion giving a positive solution. Therefore first think of the driving question. Your viva will be based on your report. It must have the scope of asking questions from your report. you can prepare a skit/nukkad natak, record a short film, etc. also to support your report. It must have ample scope of speaking that is supposed to be assessed.

	Note: Submit the draft of the project report after the summer break. GENERAL INSTRUCTIONS FOR PROJECTS - # A4 size ruled sheets (without any water marks or any design) will be used for making the report for the project. # The whole content will be put in a file. Sheets will be punched and stringed to file them neatly. # The whole file including the cover will be decently decorated as per the topic. # Following will be the order of content arrangement: - 01. Cover page- NAME OF SCHOOL HEADING- ALS PROJECT REPORT NAME OF STUDENT, CLASS, SECTION, CLASS ROLL NUMBER, BOARD ROLL NUMBER, SESSION. 02. TITLE OF PROJECT, MADE BY, SUBMITTED TO.....(NAME OF TEACHER) 03. OBJECTIVES OF PROJECT 04. CERTIFICATE OF COMPLETION UNDER THE GUIDANCE OF TEACHER 05. ACTION PLAN 06. MATERIAL EVIDENCES 07.ACKNOWLEDGEMENT 8. INDEX 09. CONTENT (REPORT IN ABOUT 1000 WORDS 10. SECOND LAST PAGE - STUDENT'S REFLECTION 11. PHOTOGRAPHS 12. BIBLIOGRAPHY NOTE : #The report must include relevant photographs and interviews. # Prepare for viva on the project. 2nd project WORK EXPERIENCE

	Type of activity - T shirt painting::: Literature based famous quotes/ anything related to literary terminology (to be marked for work experience in board exam)
Physics	**1. Why do the electrostatic field lines not form the closed loops?** **2. What is the electric flux through a cube of side 1cm which encloses an electric dipole?** **3. Two equal balls having equal positive charge q coulombs are suspended by two insulating strings of Equal length. What would be the effect on the force when a plastic sheet is inserted between the two?** **4. Why do the electric field lines never cross each other?** **5. Two charges of magnitudes -2Q and Q are located at points (a,0) and (4a,0) respectively. What is the electric flux due to these charges through a sphere of radius 3a with its centre at the origin?** **6. Distinguish between a dielectric and a conductor.** **7. A charge q is placed at the centre of a cube. What is the electric flux passing through a single face to the cube?** **8. An electric dipole of length 4cm, when placed with its axis making an angle of 60 ^ 6 with a uniform electric field, experiences a torque of 4sqrt(3) * N – m Calculate the potential energy of the dipole, if it has charge +8nC** **9. Given a uniform electric field E=5*10^ 3 tilde iN / C . find the flux of this field through a square of 10 cm on a side whose plane is parallel to the XZ-plane. What would be the flux through the same square, if the plane makes an angle of 30 ^ 0 with the X-axis?** **10. An electric dipole is held in a uniform electric field I)Show that the net force facing on it is zero.** **11. The dipole is aligned parallel to the field. Fin the work done in rotating it through the angle of 180.** **12. A hollow cylindrical box of length Im and area of cross-section 25c * m ^ 2 is placed in a three dimensional coordinate system as shown in the figure. The electric field in the region is given by E = 50i where E is N * C ^ - 1 and x is in metre. Find** **(a) Net flux through the cylinder** **(b) Charge enclosed by the cylinder** **13.(i) Define electric flux. Write its Sl unit. Gauss law in electrostatics is true for any closed surface, on matter what its shape of size is. Justify the statement with the help of a suitable example.** **(ii) Use Gauss law to prove that the electric field inside a uniformly charged spherical shell is zero.** **14.An electric dipole of dipole moment p consists of point charges +q and-q separated by a distance 2a apart. Deduce the expression for the electric field E due to the dipole at a distance x from the centre of the dipole on its axial line in terms of the dipole moment P. Hence, show that in the limit x >> α.E 2p/(4πε,χα)** **(ii) Given the electric field in the region E = 2i find the net electric flux through the cube and the charge enclosed by it.** **15.(1) Define electric flux. Write its Sl units.** **(ii) Using Gauss law, prove that the electric field at a point due to a uniformly charged infinite plane sheet is independent of the distance from it..** **(iii) How is the field directed if (a) the sheet is positively charged, (b) negatively charged?**

	16. For any charge configuration, equipotential surface through a point is normal to the electric field. Justify your answer. **17. Two charges 2 μC and -2μC are placed at points A and B, 5cm apart. Depict an equipotential surface of the system.** **18. A capacitor has been charged by a DC source. What are the magnitude of conduction and displacement current, when it is fully charged?(Delhi-2013)** **19. What is the geometrical shape of equipotential surfaces due to a single isolated charge?** **20. Why is electrostatic potential constant throughout the volume of the conductor and has the same value as on its Surface?** **21. A parallel plate capacitor of capacitance C is charged to a potential V. It is then connected to another uncharged Capacitor having the same capacitance. Find out the ratio of the energy stored in the combined system to that stored Initially in the single capacitor.** **22 .An electric dipole of length 4cm, when placed with its axis making an angle of 60 degree with a uniform electric field, Experiences a torque of 4sqrt(3) N-m. Calculate the potential energy of the dipole, if it has charge ±8nC** **23. A capacitor made of two parallel plate each of the plate A and separation d, is being charged by an external sinusoidal time varying source. Show that the displacement current inside the capacitor is the same as the current charging the capacitor.**
Chemistry	**1.** Explain the terms ideal and non-ideal solutions in the light of forces of interactions operating between molecules in liquid solutions. **2.** Why is it not possible to obtain pure ethanol by fractional distillation? What general name is given to binary mixtures which show deviation from Raoult's law and whose components cannot be separated by fractional distillation. How many types of such mixtures are there? **3.** When kept in water, raisin swells in size. Name and explain the phenomenon involved with the help of a diagram. Give three applications of the phenomenon. **4.** Discuss biological and industrial importance of osmosis. **5.** How can you remove the hard calcium carbonate layer of the egg without damaging its semi permeable membrane? Can this egg be inserted into a bottle with a narrow neck without distorting its shape? Explain the process involved. **6.** Why is the mass determined by measuring a colligative property in case of some solutes abnormal? Discuss it with the help of Van't Hoff factor. **7.** Components of a binary mixture of two liquids A and B were being separated by distillation. After some time separation of components stopped and composition of vapour phase became same as that of liquid phase. Both the components started coming in the distillate. Explain why this happened. **8.** Explain why on addition of 1 mol of NaCl to 1 litre of water, the boiling point of water increases, while addition of 1 mol of methyl alcohol to one litre of water decreases its boiling point. **9.** Explain the solubility rule "like dissolves like" in terms of intermolecular forces that exist in solutions. **10.** Concentration terms such as mass percentage, ppm, mole fraction and molality are independent of temperature, however molarity is a function of temperature. Explain. **11.** What is the significance of Henry's Law constant K_4? **12.** Why are aquatic species more comfortable in cold water in comparison to warm water? **13.**

	(a) Explain the following phenomena with the help of Henry's law. (i) Painful condition known as bends. (ii) Feeling of weakness and discomfort in breathing at high altitude. (b) Why soda water bottle kept at room temperature fizzes on opening? **14.** Why is the vapour pressure of an aqueous solution of glucose lower than that of water? **15.** How does sprinkling of salt help in clearing the snow covered roads in hilly areas? Explain the phenomenon involved in the process. **16.** Give an example of a material used for making semipermeable membrane for carrying out reverse osmosis. **NUMERICALS** **1.** Calculate the molarity and molality of a solution prepared by mixing equal volumes of 30% by weight of H_2SO_4 density = 1.218 g/mL) and 70% by weight of H_2SO_4 of solution (density = 1.610 g/mL). **2.** Vapour pressure of pure water at 298 K is 23.8 mm Hg. 50 g of urea (NH_2CONH_2) is dissolved in 850 g of water. Calculate the vapour pressure of water for this solution and its relative lowering. **3.** Boiling point of water at 750 mm Hg is 99.63°C. How much sucrose is to be added to 500 g of water such that it boils at 100°C ? Molal elevation constant for water is 0.52 K kg mol **4.** Calculate the mass of ascorbic acid (vitamin C, $C_6H_8O_6$) to be dissolved in 75 g acetic acid to lower its melting point by 1.5°C, KF = 3.9 K kg mol^{-1} **5.** Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 185,000 in 450 mL of water at 37°C. **6.** When 15 gram of unknown molecular material is dissolved with 450 gram of water, the resulting solution phrases at -0.34 degree Celsius . what is the molar mass of the material, if KF of the water is 1.86 Kelvin kg per mole **7.** At 300 Kelvin , 36 gram of glucose present in a litre of its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of the solution is 1.5 bar at the same temperature what would be its concentration?
Physical Education	CH.1: Management of Sports Events. CH.2: Children and Women in Sports. Homework: Self notes Making Q.1: Discuss a method you would choose to spread health awareness and harmony in your area. Support your answer with reasons. Q.2: Explain the different types of menstrual dysfunction and there symptoms. How can these condition affect a woman's overall health and daily life.

Maths

ONE MARK QUESTIONS

1. If $[1\ x\ 1]\begin{bmatrix}1 & 3 & 2\\ 0 & 5 & 1\\ 0 & 3 & 2\end{bmatrix}\begin{bmatrix}x\\ 1\\ -2\end{bmatrix} = 0$, then What is the value of x?

2. For what value of λ, the matrix A is a singular matrix where

$$A = \begin{bmatrix}1 & 3 & \lambda+2\\ 2 & 4 & 8\\ 3 & 5 & 10\end{bmatrix}$$

3. Find the value of A^2, if

$$A = \begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\\ a & b & -1\end{bmatrix}$$

4. If $A = \begin{bmatrix}a & b\\ b & a\end{bmatrix}$ and $A^2 = \begin{bmatrix}\alpha & \beta\\ \beta & \alpha\end{bmatrix}$, then find the value of $\propto and\ \beta$.

5. If A is a square matrix such that $A^2 = I$, then write the value of $(A - I)^3 + (A + I)^3 - 7$ A in simplest form.

6. Write the value of Δ, if

$$\Delta = \begin{vmatrix}x+y & y+z & z+x\\ z & x & y\\ -3 & -3 & -3\end{vmatrix}$$

7. If $\begin{bmatrix}x-y & z\\ 2x-y & w\end{bmatrix} = \begin{bmatrix}-1 & 4\\ 0 & 5\end{bmatrix}$, find the value of x+y.

8. If A is a 3 × 3 matrix, $|A| \neq 0$ and $|3A| = K|A|$, then write the value of K.

9. If $A = \begin{bmatrix}4 & x+2\\ 2x-3 & x+1\end{bmatrix}$ is a symmetric matrix, then write the value of x.

10. Matrix $A = \begin{bmatrix}0 & 2a & -2\\ 3 & 1 & 3\\ 3b & 3 & -1\end{bmatrix}$ is given to be symmetric, find the value of a and b.

11. For any 2 × 2 matrix A, if A (adjoint A) = $\begin{bmatrix}10 & 0\\ 0 & 10\end{bmatrix}$, then find $|A|$.

12. Find X, if A + X = I, where

$$A = \begin{bmatrix}1 & 4 & -1\\ 3 & 4 & 7\\ 5 & 1 & 6\end{bmatrix}$$

13. If $U = [2\quad -3\quad 4], V = \begin{bmatrix}3\\ 2\\ 1\end{bmatrix}$, X= $[0\quad 2\quad 3]$ and $Y = \begin{bmatrix}2\\ 2\\ 4\end{bmatrix}$, then find UV+XY.

14. If $\begin{bmatrix}2 & -3\\ 6 & 5\end{bmatrix}\begin{bmatrix}1 & 0\\ 2 & 3\end{bmatrix} = \begin{bmatrix}-4 & -9\\ 16 & 15\end{bmatrix}$

write the equation after applying elementary column transformation $C_2 \to C_2 + 2C_1$

15. If $A = \begin{bmatrix}2 & 0 & 0\\ 0 & 2 & 0\\ 0 & 0 & 2\end{bmatrix}$, then find the value of A^3.

16. Find the value of $a_{23} + a_{32}$ in the matrix

18. For what value of x, is the matrix

$A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & x & -3 \\ 2 & 3 & 0 \end{bmatrix}$ a skew-symmetric matrix

19. If $A = \begin{bmatrix} \sin 15^\circ & \cos 15^\circ \\ -\sin 75^\circ & \cos 75^\circ \end{bmatrix}$, then evaluate $|A|$.

20. If A is a square matrix, expressed as A= X + Y where X is symmetric and Y is skew-symmetric, then write the values of X and Y.

21. Write a matrix of order 3 × 3 which is both symmetric and skew-symmetric matrix.

22. What positive value of x makes the following pair of determinants equal?

$$\begin{vmatrix} 2x & 3 \\ 5 & x \end{vmatrix}, \quad \begin{vmatrix} 16 & 3 \\ 5 & 2 \end{vmatrix}$$

23. $\Delta = \begin{vmatrix} 5 & 3 & 8 \\ 2 & 0 & 1 \\ 1 & 2 & 3 \end{vmatrix}$, find the value of $5A_{31} + 3A_{32} + 8A_{33}$.

24. If $A = \begin{bmatrix} 2 & 1 \\ 7 & 5 \end{bmatrix}$, find $|A\ (adjA)|$

25. Find the minimum value of. $2\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+sin\theta & 1 \\ 1 & 1 & 1+cos\theta \end{vmatrix}$

26. If A and B are square matrices of order 3 and $|A| = 5$ and $|B| = 3$, then find the value of $|3AB|$.

27. Evaluate $\begin{vmatrix} 3+2i & -6i \\ 2i & 3-2i \end{vmatrix}$, $i = \sqrt{-1}$

30. If A be any square matrix of order 3 × 3 and $|A| = 5$, then find the value of $|adj\ (adjA)|$

31. What is the number of all possible matrices of order 2 × 3 with each entry 0,1 or 2.

32. Given a square matrix A of order 3 × 3 such that $|A|$=12, find the value of $|A\ adj\ A|$

33. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ find $|(A^{-1})^{-1}|$

34. If $A = [-1 \quad 2 \quad 3]$ and $B = \begin{bmatrix} 3 \\ -4 \\ 0 \end{bmatrix}$ find $|AB|$

35. Find $|A\ (adjoint\ A)|$ and $|adjoint\ A|$, if $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$

TWO MARK QUESTIONS

1. Construct a matrix of order 2 × 3, whose elements are given by

(a) aij = $\frac{(i-2j)^2}{2}$ (b) aij = $\frac{|-2i+j|}{3}$

4. If $2\begin{bmatrix} x & 5 \\ 7 & y-3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}$

Find the valve of x – y

5. If A and B are skew symmetric matrices of the same order prove that AB + BA is symmetric matrix.

6. Without expending prove that $\begin{bmatrix} o & p-q & p-r \\ q-p & o & q-r \\ r-p & r-q & o \end{bmatrix} = 0$

7. Let A= $\begin{bmatrix} 2 & 5 \\ 4 & 6 \end{bmatrix}$ Prove that A+A′ is symmetric matrix.

8. If A= $\begin{bmatrix} 2 \\ 3 \\ 5 \end{bmatrix}$ and B=[1 2 3], Verify (AB)′ = B′A′

9. If A= $\begin{bmatrix} 1 & 0 & -2 \\ 3 & -1 & 0 \\ -2 & 1 & 1 \end{bmatrix}$, B= $\begin{bmatrix} 0 & 5 & -4 \\ -2 & 1 & 3 \\ -1 & 0 & 2 \end{bmatrix}$ and C= $\begin{bmatrix} 1 & 5 & 2 \\ -1 & 1 & 0 \\ 0 & -1 & 1 \end{bmatrix}$

Find AB-AC.

10. If A= $\begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$ Find the determinant of A^2-2A

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13. If $A = \begin{bmatrix} 1 & -2 & 3 \\ 0 & -1 & 4 \\ -2 & 2 & 1 \end{bmatrix}$, find $(A')^{-1}$

14. The monthly incomes of Mohan and Sohan are in the ratio 3:4 and their monthly expenditures are in the ratio 5:7. If each saves ₹ 15000/- per month, find their monthly incomes and expenditures using matrices.

15. If $A = \begin{bmatrix} 0 & -1 & 2 \\ 4 & 3 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 0 \\ 1 & 3 \\ 2 & 6 \end{bmatrix}$, then verify that (AB)′ = B′A′

16. If $A = \begin{bmatrix} 0 & -x \\ x & 0 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ and $x^2 = -1$

Then show that $(A + B)^2 = A^2 + B^2$

17. Prove that $aI + bA + cA^2 = A^3$, if $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ a & b & c \end{bmatrix}$

18. If $A = \begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$, then find A^3.

19. If $A = \begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2 + 2AB$, find *a* and *b*.

20. If $A = \begin{bmatrix} 0 & 2b & c \\ a & b & -c \\ a & -b & c \end{bmatrix}$, then find the value of a, b and c. Such that $A^T A = I$

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15. Determine the product $\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}\begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$

and use it to solve the system of equations:

$x - y + z = 4,\ x - 2y - 2z = 9,\ 2x + y + 3z = 1$

16. If $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$, find A^{-1} and use it to solve the system of linear equations:$x + 2y + z = 4,\ -x + y + z = ,\ x - 3y + z = 2$

17. Solve given system of equations by matrix method:

$\frac{2}{a} + \frac{3}{b} + \frac{4}{c} = -3,\ \frac{5}{a} + \frac{4}{b} - \frac{6}{c} = 4,\ \frac{3}{a} - \frac{2}{b} - \frac{2}{c} = 6$

18. To raise money for an orphanage, students of three schools A, B and C organized an exhibition in their locality, where they sold paper bags, scrap books and pastel sheets made by them using recycled paper, at the rate of ₹ 20, ₹ 15 and ₹ 5 per unit respectively. School A sold 25 paper bags, 12 scrap books and 34 pastel sheets. School B sold 22 paper bags, 15 scrap books and 28 pastel sheets. While school C sold 26 paper bags, 18 scrap books and 36 pastel sheets. Using matrices, find the total amount raised by each school.

19. Two cricket teams honored their players for three values, excellent batting, to the point bowling and unparalleled fielding by giving ₹ x, ₹ y and ₹ z per player respectively. The first team paid respectively 2, 2 and 1 players for the above values with a total prize money of 11 lakhs, while the second team paid respectively 1,2 and 2 players for these values with a total prize money of ₹ 9 lakhs. If the total award money for one person each for these values amount to ₹ 6 lakhs, then express the above situation as a matrix equation and find award money per person for each value.

20. It $A=\begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$ find A^{-1} using elementary transformation

Hence solve the system of linear equations.

$x-2y=10$

$2x-y-z=8$

$-2y+z=7$

ANSWERS

TWO MARK QUESTIONS

1. Find the value of the following

(i) $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) + \cos^{-1}\left(-\frac{1}{2}\right) + \tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

(ii) $\sin^{-1}\left(Sin\frac{2\pi}{3}\right)+\cos^{-1}\left(\cos\frac{4\pi}{3}\right)$

(iii) $\sin\left\{\frac{\pi}{3}-\sin^{-1}\left(-\frac{1}{2}\right)\right\}$

(iv) $\tan^{-1}\left(\tan\frac{7\pi}{6}\right)$; $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$

2. Simplify

(i) $\tan^{-1}\left(\frac{\sin x}{1+\cos x}\right)$

(ii) $\cot^{-1}\left(\frac{1}{\sqrt{x^2-1}}\right)$, $x < -1$

(iii) $\cos\left\{\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)+\frac{\pi}{6}\right\}$

(iv) $\tan\left[\frac{1}{2}\cos^{-1}\left(\frac{3}{\sqrt{11}}\right)\right]$

3. Simplify : $\sin^{-1}\left\{\frac{\sin x+\cos x}{\sqrt{2}}\right\}, -\frac{\pi}{4} < x < \frac{\pi}{4}$

4. Prove that : $\tan^{-1}\frac{2}{11}+\tan^{-1}\frac{7}{24}=\tan^{-1}\frac{1}{2}$.

5. Prove that : $\tan^{-1}\frac{m}{n}-\tan^{-1}\left(\frac{m-n}{m+n}\right)=\frac{\pi}{4}.\ m,n>o$

6. Prove that : $\tan^{-1}\left\{\frac{a\cos x-b\sin x}{b\cos x+a\sin x}\right\}=\tan^{1}\left(\frac{a}{b}\right)-x$

7. Evaluate : $\tan^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$

8. Prove that $\tan\left(\frac{1}{2}\sin^{-1}\frac{3}{4}\right)=\frac{4-\sqrt{7}}{3}$

9. Prove that $4(\cot^{-1}3+\operatorname{cosec}^{-1}\sqrt{5})=\pi$

10. Prove that $\sin\{\cot^{-1}(\cos(\tan^{-1}x)\}=\sqrt{\frac{x^2+1}{x^2+2}}$

11. Prove that $\tan^{-1}\frac{2}{3}=\frac{1}{2}\tan^{-1}\frac{12}{5}$

4 MARK QUESTIONS

1. Show that : $\tan^{-1}\left[\frac{\sqrt{1+\cos x}+\sqrt{1-\cos x}}{\sqrt{1+\cos}-\sqrt{1-\cos x}}\right]=\frac{\pi}{4}+\frac{x}{2};\ x\in[0,\pi]$

2. Prove that :

$$\tan^{-1}\left(\frac{\cos x}{1-\sin}\right)-\cot^{-1}\left(\sqrt{\frac{1+\cos}{1-\cos}}\right)=\frac{\pi}{4}\quad x\in(0,\pi/2).$$

3. Prove that $\tan^{-1}\left(\frac{x}{\sqrt{a^2-x^2}}\right)=\sin^{-1}\frac{x}{a}=\cos^{-1}\left(\frac{\sqrt{a^2-x^2}}{a}\right)$.

4. prove that:

$$\cot^{-1}\left[2\tan\left(\cos^{-1}\frac{8}{17}\right)\right]+\tan^{-1}\left[2\tan\left(\sin^{-1}\frac{8}{17}\right)\right]=\tan^{-1}\left(\frac{300}{161}\right)$$

5. Prove that:

$$\tan^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)=\frac{\pi}{4}+\frac{1}{2}\cos^{-1}x^2$$

6. Solve:

$$\cot^{-1}2x+\cot^{-1}3x=\frac{\pi}{4}$$

Biology

1. Discuss the process of microsporogenesis and megasporogenesis in an angiosperm.
2. Draw the structure of female reproductive system of human female.
3. Discuss the different types of pollination.

Compute r Science

1. Define dictionary. Can list and tuples be used as keys to dictionaries? Justify your answer with the help of example.
2. Predict the output with the help of dry run;

```
J=12
C=9
while(J>0):
        if (j>5):
                C=C+J-2
```

```
                J=J-1
            else:
                break
        print(J, C)
    print(C)
```

3. Write a program to generate the following pattern:

```
# # # #
#     #
#     #
# # # #
```

4. Write a program to create a function EOReplace() in python, which accept a list of numbers. Thereafter, it increments all even numbers by 1 and decrements all odd numbers by 1. Display the Old and New list.
5. Differentiate between break and continue statement with the help of an example.
6. Explain the difference between "in" and "not in" operator with the help of an example.
7. Write a program to accept a sentence from user and create a new sentence after removing all the vowels with "#" and display both the string value.
8. Differentiate between actual parameter(s) and formal parameter(s) with a suitable example for each.
9. Write a program to store nth terms of Fibonacci series in a list and display it.
10. What do you understand by mutable and immutable? Explain with the help of example of each.

11. Suggest appropriate functions for the following tasks:
    (i) To check whether the string contains digits
    (ii) To capitalize all the letters of the string
    (iii) To remove all white spaces from the beginning of a string.
    (iv) To check whether all letters of the string are in capital letters
12. Write the output of following:

```
list = ['I','N','D','I','A']
print(list[0:3])
print(list[3:]
print(list[:])
print(list[1:-2])
```

13. WAP to find minimum element from a list of elements along with its index in the list.
14. Write a program that accept a string and count the number of vowels and consonants present in the string.
15. Write a program to calculate x^y without using exponent operator.
16. What is the different in file opening mode "a" and "w"?

Write a function in python to count the number of lines in "POEM.txt" begins from Upper case character.

For e.g if the
content of file
is :

As you set out on life's road
unsure of the path you'll go,
the most important thing you can do
is to always be true to "you"

	Always remember who you are
	in moments of struggle or fear.
	Never forget or give up on
	the hopes and dreams you hold dear
	There will be setbacks and rejection
	and moments of failure too,
	but you must overcome any frustration
	to achieve the potential of you.
	Output should be: Lines starting from Capital letters: 4
	17. Write a program to count the number of words in a text file.
	18. Predict the output:
	def Funstr(S):
	T= “”
	for i in S:
	if i.isdigit():
	T=T+i
	return T
	X= “COMPUTER 2025”
	Y=Funstr(X)
	print(X,Y,sep= “*”)

Hindi	1.वितान ---गद्य भाग 1.भक्तिन 2.बाजार दर्शन पद्य भाग 1.आत्मपरिचय 2.पतंग निम्नलिखित पाठों के अभ्यास प्रश्न -उत्तर नोट बुक में लिखें। परियोजना कार्य - कथा सम्राट प्रेमचंद का जीवन परिचय