SAINIK SCHOOL PUNGLWA, NAGALAND

SUMMER VACATION ASSIGNMENT: 2025-26

<u>CLASS XII</u>

Subject : English

Project Components:

1. Character Diary Entries:

- Franz in "The Last Lesson", expressing his feelings on losing his language and identity due to colonization.
- Diary entry should be **1–2 pages**, written in the **first person**.

2. Visual Collage or Poster:

- Create a visual collage (handmade or digital) titled "Preserving What We Lose", using symbols, drawings, or clippings that represent:
 - Language and cultural loss ("The Last Lesson")

3. Interview an Elder:

- Students will interview an elder (grandparent, teacher, neighbor) about:
 - A language or tradition that is fading away
 - Memories of school life or family values from their childhood
- Summarize the interview in **100–150 words** and draw parallels with the two lessons.

4. Creative Writing:

• Write a short **reflective paragraph** (100–150 words) on:

"Why it is important to preserve language and remember our elders."

Expected Outcome:

- A **project file** containing:
 - Diary entries (2)
 - Interview summary
 - Reflective paragraph
 - Visual collage/poster (can be pasted in the file or submitted separately)

Subject : Mathematics CHAPTER - MATRICES

1. If
$$\begin{bmatrix} x + y & 7 \\ 9 & x - y \end{bmatrix} = \begin{bmatrix} 2 & 7 \\ 9 & 4 \end{bmatrix}$$
, Find xy?
2. If $A = \begin{bmatrix} a_{ij} \end{bmatrix}$ is a skew-symmetric matrix of order n, then :
(a) $a_{ij} = \frac{1}{a_{ji}} \forall i, j$ (b) $a_{ij} \neq 0 \forall i, j$ (c) $a_{ij} = 0$, for $i = j$ (d) $a_{ij} \neq 0$, for $i \neq j$

3. If $\begin{bmatrix} 1 & -5 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$, then find value of y.

4. If
$$\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$$
 then $x = ?$
(a) 6 (b) ± 6 (c) -6 (d) 0

- 5. If $A = \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$ and A + A' = I then find the value of α
- 6. If A, B are symmetric matrices of same order then AB BA is a :

(a) Skew symmetric matrix (b) Symmetric matrix (c) Zero Matrix (d) Identity Matrix

ASSERTION – REASON BASED QUESTIONS :-

- 7. In the following questions, a statement of assertion (A) is following 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.

Assertion (A) Scalar matrix $A = [a_{ij}] = \begin{cases} k; & i=j \\ 0; & i \neq j \end{cases}$, Where k is a scalar, is an identity matrix when k = 1.

Reason (R) Every identity matrix is not a scalar matrix.

8. If A =
$$\begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$$
 show that $(A - 2I)(A - 3I) = 0$.

9. Express the given matrix A as the sum of a symmetric and skew symmetric matrix

where
$$A = \begin{bmatrix} 3 & 3 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2 \end{bmatrix}$$

10. If $A = \begin{bmatrix} 0 & -\tan\frac{\alpha}{2} \\ -\tan\frac{\alpha}{2} & 0 \end{bmatrix}$ and *I* be the identity matrix of order 2 show that $(I + A) = (I - A) \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}.$

11. Solve Exercise **3.1 to 3.3** all questions from **NCERT BOOK**.

12. Practice all Solved questions from CHAPTER- Statistics, Complex Numbers, Binomial Theorem, Logarithm, Quadratic Equations and Inequalities, Sequence & series, Trigonometry, Permutations & Combinations (From NDA MATHS CLASS NOTES & PATHFINDER BOOK).

Subject : Physics (Class 12A)

- A convex lens is made of glass with a refractive index of 1.5. The radii of curvature of its two surfaces are R₁=+20 cm and R₂= −20 cm. Calculate the focal length of the lens.
- A plano-convex lens is made of a material with refractive index μ=1.6. One surface is plane and the other has a radius of curvature R=30 cm. Find the focal length of the lens.
- 3. A lens has a focal length of f=10 cm in air. The radii of curvature are R_1 =+15 cm and R_2 =-10 cm .Calculate the refractive index of the lens material.
- 4. A biconcave lens has radii of curvature R_1 =-25 cm and R_2 =+25 cm. If the focal length is found to be -50 cm, find the refractive index of the lens material.
- The focal length of a concave lens made of material with refractive index 1.55 is -20 cm. One surface is plane, and the other is spherical. Find the radius of curvature of the spherical surface.
- 6. In a Young's Double Slit Experiment, the wavelength of light used is 600 nm. The slits are 0.5 mm apart and the screen is placed 1.5 m away. Calculate the fringe width.
- 7. In an interference experiment, two slits are 0.2 mm apart and the screen is 1 m away. The third bright fringe is observed at a distance of 4.5 mm from the central fringe. Find the wavelength of the light used.

- Light of wavelength 500 nm is used in an YDSE setup. The fringe width is found to be
 2 mm. If the distance between the slits is 0.25 mm, find the distance between the screen and the slits.
- 9. In a YDSE, if the distance between the slits is increased from 0.3 mm to 0.6 mm and all other factors are kept constant, what will be the new fringe width if the initial fringe width was 3 mm?
- 10. In a Young's double slit experiment, the path difference between the waves from the two slits at a point on the screen is 1.2×10⁻⁶ m. If the wavelength of light used is 600 nm, find whether the interference at that point is constructive or destructive.
- 11. A monochromatic light of wavelength λ =600 nm passes through a single slit of width a=0.2 mm. Find the angular width of the central maximum in the diffraction pattern.
- 12. A laser beam of wavelength 500 nm is incident on a single slit of width 0.1 mm. The diffraction pattern is observed on a screen placed 2 m away. Calculate the distance of the first minimum from the central maximum on the screen.
- 13. In a single-slit diffraction experiment, the distance between the central maximum and the first minimum is found to be 3 mm on a screen 1.5 m away. If the slit width is 0.15 mm, calculate the wavelength of the light used.

Subject : Physics (Class 12B)

- 1. What is the refractive index of a medium in which the speed of light is half its value in vacuum?
- 2. Derive the lens maker's formula for a thin lens.
- 3. Explain the phenomenon of total internal reflection and mention two conditions necessary for its occurrence.
- 4. Derive the mirror formula for a concave mirror using the geometry of reflection.
- 5. Explain the construction and working of a compound microscope with the help of a ray diagram. Derive an expression for its magnifying power.
- 6. Describe the working of an astronomical telescope in normal adjustment position with a neat ray diagram. Derive the expression for its magnifying power.
- 7. An object is placed 30 cm in front of a concave mirror of focal length 15 cm. Find the position, nature, and magnification of the image formed.

- A convex lens forms a real and inverted image of an object placed 30 cm from it. The image is formed 60 cm on the other side of the lens. Calculate the focal length of the lens.
- A plano-convex lens has one flat surface and one convex surface with radius -40cm. The lens is made of material with refractive index µ=1.7. Find the focal length of the lens.
- 10. A lens has a focal length 10cm, and radii of curvature 15 cm and 20cm. Find the refractive index of the lens material.

Subject : Biology

Write all the textual question and answers from the chapter:

- 1. SEXUAL REPRODUCTION IN FLOWERING PLANTS
- 2. HUMAN REPRODUCTION

Subject : Chemistry

1. Prepare a concept map summarizing the following:

Types of solutions

- Concentration terms (molarity, molality, mole fraction, ppm)
- Solubility (solids/gases in liquids)
- Vapour pressure (Raoult's Law)
- Colligative properties (relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, osmotic pressure)
- 2. Prepare a handwritten formula sheet.

Subject : Computer Science

- Q1. Write all the built-in-functions of :
 - i. Strings
 - ii**. Lists**
 - iii. Tuples.

Q2. SQL Project on the Topics - Student Result Management

- i. Tables: Students, Marks
- ii. Fields Example:
 - a. Students (RollNo, Name, Class, Section)
 - b. Marks (RollNo, Subject, Marks)

iii. SQL Queries to include:

- a. Display student details.
- b. Find students scoring more than 80.
- c. List the name of the student as per their Roll Numbers.
- d. List the toppers in each subject displaying all the details of the students.
