

SUGHAR SINGH ACADEMY (SWARN JAYANTI VIHAR) SUMMER VACATION HOLIDAY HOMEWORK (2025-26) CLASS-XII (Science)

English	Project on Lost Spring
	Points to be covered
	Character sketch of :
	Saheb-e-Alam, Mukesh, Child Labour in India, Poverty & it's Impact, Loss of Childhood Innocence,
	The Role of Government & Society, The Author's Perspective
Hindi	1-परियोजना कार्य (प्रोजेक्ट फाइल) तैयार करें।
	*हिंदी कविता में शरद ऋतु का हमारे जीवन में महत्व(पतंग कविता के आधार पर)
	*आतंकवाद
	*छायावाद भक्तिकाल या आधुनिक काल के किसी एक कवि या लेखक का समग्र परिचय ।
	2- कक्षा में कराए गए सभी पाठों का अभ्यास करें।
Chemistry	Do the given project work
Biology	Prepare the allotted project. (Submit the project in a printed format in spiral file)
	Project :
	1. Immunity, 2. Human health and disease, 3. In vitro fertilisation, 4. DNA fingerprinting,
	5. Biodiversity and it's conservation, 6. Genetic disorder, 7. Organism and population,
	8. Microbes in human welfare, 9. Principles of inheritance, 10. Pre fertilisation events in a
	flower, 11. Reproductive health, 12. Biotechnology and it's application, 13. Ecosystem, 14.
	Sewage treatment
Physics	Do the given project work
Maths	Do the given worksheet.
Computer	Do the given worksheet.
Physical	1. Prepare a labelled chart of anyone game
Education	a) Badminton, b) Cricket, c) Football, d) Kabaddi, e) Basketball
	2. Prepare a labelled chart of any five asanas and send the video
	3. Perform 1 hour physical activity daily outdoor and indoor
	4. Learn lesson 1,2 and 3

SUGHAR SINGH ACADEMY

HOLIDAY-HOMEWORK

Class-XII

- 1. If R is a relation 'is a divisor of' from the set $A = \{1, 2, 3\}$ to $B = \{4, 10, 5\}$. Then write down the set of ordered pairs corresponding to R.
- 2. Let $R = \{(a, a^3) : a \text{ is a prime number less than 5}\}$ be a relation. Find the range of R.
- 3. Show that the relation *R* in the set \mathbb{R} of real numbers defined as $R = \{(a, b) \mid a, b \in \mathbb{R} \text{ and } a \leq b^3\}$ is neither reflexive nor symmetric nor transitive.
- 4. Show that the relation $R = \{(a, b) \mid a, b \in \mathbb{N} \text{ and } a \text{ is a multiple of } b\}$ is reflexive and transitive but not symmetric.
- 5. Show that the relation *R* defined by $(a, b)R(c, d) \Rightarrow a + d = b + c$ on $\mathbb{N} \times \mathbb{N}$ is an equivalence relation.
- 6. Show that the relation 'is similar to' on the set of all triangles in a plane is an equivalence relation.
- 7. Check the injectivity of the function $f : Z \to Z$ defined by $f(x) = x^2 + 5$.
- 8. Let $f : R \to R$ be defined by $f(x) = x^2 + 1$. Then find the pre-image of 17 and -3.
- 9. Show that the function $f : R \to R$, defined by $f(x) = \frac{x}{x^2+1}$, $\forall x \in R$ is neither one-one nor onto.
- 10. Find the domain and range of the following functions.
 - (a) $f(x) = \sqrt{4 x^2}$ (b) $f(x) = \sqrt{x^2 - 4}$ (c) $f(x) = \sqrt{x}$ (d) $f(x) = x^2 - 5$ (e) $f(x) = x^2 + 2$ (f) $f(x) = x^3$ (g) f(x) = |x + 2|(h) $f(x) = \frac{|x - 1|}{x - 1}, x \neq 1$ (i) $f(x) = \frac{4x - 3}{2x + 5}$ (j) $f(x) = \frac{x^2}{1 + x^2}$ (k) $f(x) = \frac{1}{x^2 + 1}$
- 11. Show that the function $f : R \to (-1, 1)$ defined by $f(x) = \frac{x}{1+|x|}, x \in R$ is one-one and onto.
- 12. Show that $f : R \to R$ given by $f(x) = 4x^3 + 7$ is bijective.
- 13. Show that the function $f : N \to N$, given by $f(n) = n (-1)^n$, $\forall n \in N$ is a bijection.
- 14. Make a table and write down the principal branches(Domain and Codomain) of all inverse trigonometric functions. Also sketch their graphs.
- 15. Find the values of the following-

(a)
$$\cos^{-1}(\frac{1}{2}) + 2\sin^{-1}(-\frac{1}{2})$$

(b) $\tan^{-1}(-\frac{1}{\sqrt{3}}) + \cot^{-1}(\frac{1}{\sqrt{3}}) + \tan^{-1}\left[\sin(-\frac{\pi}{2})\right]$

(c) $\tan^{-1} \left[2 \sin \left(2 \cos^{-1} \frac{\sqrt{3}}{2} \right) \right]$ (d) $\tan^{-1} \left[\tan \left(\frac{15\pi}{4} \right) \right]$ (e) $\cos^{-1} [\cos(680^\circ)]$ (f) $\tan \left(2 \tan^{-1} \frac{1}{5} \right)$ (g) $\tan^{-1} \left(\tan \frac{3\pi}{4} \right)$

16. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$, then find the value of

$$x^{100} + y^{100} + z^{100} - \frac{9}{x^{101} + y^{101} + z^{101}}$$

17. Find *x* in each of the following cases-

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- (a) $\tan^{-1}(\sqrt{3}) + \cot^{-1} x = \frac{\pi}{2}$ (b) $\cos(\tan^{-1} x) = \sin(\cot^{-1} \frac{3}{4})$ (c) $\tan^{-1} x + 2\cot^{-1} x = \frac{2\pi}{3}$
- 18. Find the domain of the following functions-

(a)
$$f(x) = \sin^{-1}(x^2 - 1)$$

(b) $f(x) = \sin^{-1}\sqrt{x-1}$
(c) $f(x) = \cos^{-1}(x^2 - 5)$
19. If $F(x) = \begin{bmatrix} \cos x & -\sin x & 0\\ \sin x & \cos x & 0\\ 0 & 0 & 1 \end{bmatrix}$, then show that $F(x + y) = F(x).F(y)$.
20. If $A = \begin{bmatrix} 1 & -1\\ 2 & -1 \end{bmatrix}$, $B = \begin{bmatrix} a & 1\\ b & -1 \end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$, then find the values of *a* and *b*.
21. If $A = \begin{bmatrix} 1 & 3 & 2\\ 2 & 0 & -1\\ 1 & 2 & 3 \end{bmatrix}$, then show that $A^3 - 4A^2 - 3A + 11I = O$.
22. If $A = \begin{bmatrix} 1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 0 & 3 \end{bmatrix}$ and $A^3 - 6A^2 + 7A + kI_3 = O$, then find *k*.
23. If $A = \begin{bmatrix} 1 & -1 & 2\\ 2 & 0 & 3\\ 1 & 3 & -2 \end{bmatrix}$, then write *A* as the sum of symmetric and skew-symmetric matrices.
24. Show that the diagonal elements of a skew-symmetric matrix are all zero.

25. If
$$A = \begin{bmatrix} 0 & 2b & -2 \\ 3 & 1 & 3 \\ 3a & 3 & -1 \end{bmatrix}$$
 is a symmetric matrix, then find the values of *a* and *b*.

- 26. If *A* is a skew-symmetric matrix then show that A^2 is a symmetric matrix.
- 27. Write a 2×2 matrix which is both symmetric and skew-symmetric.

- 28. If $A = [a_{ij}]$ is a square matrix such that $a_{ij} = i^2 j^2$, then check whether A is a symmetric or skew-symmetric matrix.
- 29. construct a matrix $A = [a_{ij}]_{3\times 3}$ such that $a_{ij} = \begin{cases} 2i+3j, \ i < j \\ 5, \ i = j \\ 3i-2j, \ i > j \end{cases}$.
- 30. Find the value of x if $\begin{bmatrix} x & -5 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} \begin{bmatrix} x & 4 & 1 \end{bmatrix} = O.$
- 31. Do all the exercises of Chapter-3(Matrices) of NCERT.
- 32. Find the area of a triangle, whose vertices are (3,8), (-4,2) and (5,1).
- 33. If the points (2,-3), (λ ,-1) and (0,4) are collinear, then find the value of λ .
- 34. Find the equation of a line joining (2,3) and (-1,2) using determinants.
- 35. Find the value of k, if the points (k + 1,1), (2k + 1,3) and (2k + 2, 2k) are collinear.

36. If
$$A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & -1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$
, then show that $A^{-1} = A^2$.
37. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then find A^{-1} .

38. For the matrix $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$, find the numbers *a* and *b* such that $A^2 + aA + bI = O$. Hence, find A^{-1} .

39. If for any 2 × 2 square matrix *A*, $A(adjA) = \begin{bmatrix} 8 & 0 \\ 0 & 8 \end{bmatrix}$, then find the value of |A|.

40. Solve the system of linear equations by using the matrix method-

$$x - y + 2z = 7$$
$$3x + 4y - 5z = -5$$
$$2x - y + 3z = 12$$

41. Solve the linear equations by matrix method-

$$5x + 2y = 4$$
$$7x + 3y = 5$$

42. If $A = \begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$, then find A^{-1} . Using A^{-1} solve the system of linear equations-

$$2x - 3y + 5z = 11$$
$$3x + 2y - 4z = -5$$
$$x + y - 2z = -3$$

43. Do Activity 1 to Activity 6 from Arihant Lab Manual.



SUGHAR SINGH ACADEMY (SWARN JAYANTI VIHAR) SUMMER HOLIDAY HOMEWORK (2025-26) SUBJECT- COMPUTER SCIENCE CLASS-XII

Section: A

- **1.** What are text files?
- 2. What are binary files?
- **3.** What are CSV files?
- 4. What is the role of file mode in file open ()?
- 5. A program having multiple functions is considered better designed than a program without any functions, why?
- 6. What is the significance of file object?
- 7. How is file open () function is different from file close () function?
- 8. What is the role of delimiter character in a CSV file?
- 9. What is the role of the newline argument in the csv open ()?
- 10. What do you understand by local and global variables?

Section: B

- 11. What is the difference between read () and read (n) functions?
- **12.** What is the difference between the dump () and load ()?
- 13. What is the difference between read () and redlines () function?
- 14. Differentiate between fruitful functions and non-fruitful functions.
- 15. Differentiate between default arguments and keywords arguments?
- 16. Can a function return multiple values? How?
- 17. What is a python module? What is its significance?
- **18.** What is a module, a package and a library?
- **19.** When is exception handling required?
- **20.** What are the advantages of exception handling?

<u>Section: C</u>

- 21. Read a text file line by line and display each word separated by a #.
- 22. Read a text file and display the number of vowels/consonants/uppercase/lowercase characters in the file.
- 23. Remove all the lines that contain the character 'a' in a file and write it to another file.
- 24. Create a binary file with name and roll number. Search for a given roll number and display the name, if not found display appropriate message.
- 25. Create a binary file with roll number, name and marks. Input a roll number and update the marks.