

DELHI PUBLIC SCHOOL GANDHINAGAR
HOLIDAY HOMEWORK
CLASS XII (SCIENCE)
ACADEMIC SESSION 2022-23

ENGLISH

1. Prepare a one minute speech on either of the topics

- * Social media is a necessary evil.
- * Paperbacks vs E-books
- * Fear of Missing Out (FOMO): Is it real or not?
- * My favourite fictional character
- * Beauty lies in the eyes of the beholder
- * Why humans should colonize Mars
- * The best lesson I have learned
- * Animal testing should be banned

2. Prepare a draft for the essay in Annual Project.

The topic of the essay should be inspired by any of the following:-

1. A Book -- a book review to be written in complete detail about the author, writing style, critical analysis, etc.
2. Inspiration from an interview/ newspaper/ article/ talk/ speech
3. Inspiration from the text (NCERT textbooks)

Some chapters and the topics which can be chosen:-

- Lost Spring - slum children, child labour
- Indigo - Ideologies of Mahatma Gandhi, struggle of Indian independence. condition of farmers
- Deep Water - All we have to fear is fear itself
- My Mother at Sixty-six - the condition of old parents, old age homes
- A Roadside Stand- the condition of slum children
- A Thing of Beauty - nature, India's natural beauty
- Aunt Jennifer's Tigers - patriarchy, female foeticide, patriarchy in India

PHYSICS

1. Journal Completion for Experiment Number-1 Ohm's Law.
2. Complete numericals notebook of chapter 1 and 2.

CHEMISTRY

1. Journal Completion for Experiment Number 1, 2 and 3.
2. Chemistry Investigatory Project File preparation and performing Investigation as per the topic assigned in the group.

BIOLOGY

1. Biology Investigatory Project to be performed and written.
2. Journal Completion for below mentioned experiments:
 - a. Exercise on controlled pollination
 - b. Study of adaptations of flowers for pollination

MATHEMATICS :

Choose the correct option (Q.1 to Q.10).

1. If $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & -2 \\ 7 & 3 \end{vmatrix}$, then x equals to
(a) 3 (b) ± 3 (c) ± 6 (d) 6
2. If A is a square matrix such that $A^2 = A$, then $(I + A)^3 - 7A$ is equal to
(a) A (b) $I - A$ (c) I (d) $3A$
3. If A is a matrix of order $m \times n$ and B is a matrix such that AB' and $B'A$ are both defined, then order of matrix B is
(a) $m \times m$ (b) $n \times n$ (c) $n \times m$ (d) $m \times n$
4. If $A = \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$, then for what value of α , A is an identity matrix?
(a) 0° (b) 90° (c) 45° (d) 30°
5. If a matrix has 18 elements, how many possible orders it can have?
(a) 4 (b) 6 (c) 8 (d) 9
6. If $\Delta = \begin{vmatrix} 5 & 3 & 8 \\ 2 & 0 & 1 \\ 1 & 2 & 3 \end{vmatrix}$, then the cofactor of the element a_{23} is
(a) -5 (b) 0 (c) -7 (d) 7
7. If A is a skew symmetric matrix of order 3×3 , then the value of $|A|$ is
(a) -1 (b) 0 (c) 1 (d) 2
8. If A and B are square matrices of the same order 3, such that $|A| = 2$ and $AB = 2I$, then $|B| =$
(a) 2 (b) 9 (c) 8 (d) 4
9. The number of possible matrices of order 2×2 with each entry 0, 1 or 2 is
(a) 9 (b) 27 (c) 81 (d) 16
10. If the points $(0, 0)$, $(\lambda, 1)$ and $(8, 1)$ are collinear, then $\lambda =$
(a) 2 (b) -8 (c) 8 (d) 0

Fill in the blanks (Q.11 to Q.15).

11. Let A be a matrix of order 3×3 and $k = 3$, then $|kA| =$ _____.
12. If A is a symmetric matrix, then A^3 is a _____ matrix.
13. If $\begin{bmatrix} 15 & x+y \\ 2 & y \end{bmatrix} = \begin{bmatrix} 15 & 8 \\ x-y & 3 \end{bmatrix}$, then the value of x is _____.
14. If $\begin{vmatrix} x & \sin \theta & \cos \theta \\ -\sin \theta & -x & 1 \\ \cos \theta & 1 & x \end{vmatrix} = 8$, then the value of x is _____.

15. If $A = \begin{bmatrix} 2 & 2 \\ -3 & 1 \\ 4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 2 \\ 1 & 3 \\ 0 & 4 \end{bmatrix}$, such that $A + B + C$ is a zero matrix, then $C = \underline{\hspace{2cm}}$.

Answer the following questions (Q.16 to Q.20).

16. Evaluate: $\begin{vmatrix} \cos 15^\circ & \sin 15^\circ \\ \sin 75^\circ & \cos 75^\circ \end{vmatrix}$
17. Find the value of x , if $\begin{bmatrix} 3x + y & -y \\ 2y - x & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ -5 & 3 \end{bmatrix}$
18. Write the value of the determinant: $\begin{vmatrix} a - b & b - c & c - a \\ b - c & c - a & a - b \\ c - a & a - b & b - c \end{vmatrix}$
19. If $\begin{bmatrix} a + b & 2 \\ 5 & b \end{bmatrix} = \begin{bmatrix} 6 & 5 \\ 2 & 2 \end{bmatrix}'$, then find a .
20. Find the minor of the element of second row and the second column in the following determinant.
- $$\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$$
21. Write A^{-1} for $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$.
22. For what value of x , the matrix $\begin{bmatrix} 5 - x & x + 1 \\ 2 & 4 \end{bmatrix}$ is singular?
23. Find the product matrix: $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} [2 \ 3 \ 4]$.
24. For a 2×2 matrix $A = [a_{ij}]$, whose elements are given by $a_{ij} = \frac{(i+2j)^2}{4}$, write the value of a_{21}
25. If $3A - B = \begin{bmatrix} 5 & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$, then find the matrix A .
26. If $\begin{vmatrix} x + 1 & x - 1 \\ x - 3 & x + 2 \end{vmatrix} = \begin{vmatrix} 4 & -1 \\ 1 & 3 \end{vmatrix}$, then write the value of x .
27. For what value of x , is the matrix $A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ x & -3 & 0 \end{bmatrix}$ a skew-symmetric matrix?
28. If $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$, then for any natural number n , find the value of $\text{Det}(A^n)$.
29. If matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and $A^2 = kA$, then find the value of k .
30. Write the value of the determinant $\begin{vmatrix} p & p + 1 \\ p - 1 & p \end{vmatrix}$

31. Use elementary column operation $C_2 \rightarrow C_2 - 2C_1$ in the matrix equation

$$\begin{bmatrix} 4 & 2 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$$

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

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

33. If area of triangle is 35 sq. units with vertices $(2, -6)$, $(5, 4)$ and $(k, 4)$, then find k .

34. Find the equation of a line joining the points $(-1, 2)$ and $(-3, 6)$, using determinants.

35. Show that the null matrix is both symmetric as well as skew symmetric.

36. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, then find the value of $A^2 - 3A + 2I$.

37. For the matrices A and B, verify that $(AB)' = B'A'$, if $A = \begin{bmatrix} 1 \\ -4 \\ 3 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 & 1 \end{bmatrix}$.

38. Find the inverse of the following matrix using elementary row operations:

$$A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$$

39. Using elementary column transformations, find the inverse of the matrix $\begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -1 \\ 2 & 1 & 0 \end{bmatrix}$.

40. A total amount of ₹7,000 is deposited in three different savings bank accounts with annual interest rates of 5%, 8% and $8\frac{1}{2}\%$ respectively. The total annual interest from these three accounts is ₹550. Equal amounts have been deposited in the 5% and 8% savings accounts. Find the amount deposited in each of the three accounts, with the help of matrices.

42. Express the matrix $X = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ as the sum of a symmetric and a skew symmetric matrix.

43. Show that all the diagonal elements of a skew symmetric matrix are zero.

44. Using properties of determinants, prove that $\begin{vmatrix} -a^2 & ab & ac \\ ba & -b^2 & bc \\ ca & cb & -c^2 \end{vmatrix} = 4a^2b^2c^2$

45. Using the properties of determinants, prove that:

$$\begin{vmatrix} (a+1)(a+2) & a+2 & 1 \\ (a+2)(a+3) & a+3 & 1 \\ (a+3)(a+4) & a+4 & 1 \end{vmatrix} = -2$$

46. Using properties of determinants, prove the following:

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ bc & ca & ab \end{vmatrix} = (a-b)(b-c)(c-a)$$

47. Using properties of determinants, prove the following:

$$\begin{vmatrix} a+x & y & z \\ x & a+y & z \\ x & y & a+z \end{vmatrix} = a^2(a+x+y+z)$$

48. Using properties of determinants, prove the following:

$$\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ a & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3$$

49. Using properties of determinants, solve the following for x :

$$\begin{vmatrix} x-2 & 2x-3 & 3x-4 \\ x-4 & 2x-9 & 3x-16 \\ x-8 & 2x-27 & 3x-64 \end{vmatrix} = 0$$

50. Using properties of determinants, prove the following:

$$\begin{vmatrix} a & b-c & c+b \\ a+c & b & c-a \\ a-b & b+a & c \end{vmatrix} = (a+b+c)(a^2+b^2+c^2)$$

COMPUTER SCIENCE

1. Completion of Practical File programs of lesson 1, 2 and 3.
2. Completion of Note book work of ch-1,2 and 3.

PHYSICAL EDUCATION

Write in Practical Book

** Procedure for Asanas, Benefits & Contraindication for **any two** Asanas for each lifestyle disease. [with your own photographs]

Obesity: Procedure, Benefits & Contraindications for Tadasana, Katichakrasana, Pavanmuktasana, Matsayasana, Halasana, Pachimottansana, Ardha – Matsyendrasana, Dhanurasana, Ushtrasana, Suryabedhan pranayama.

Diabetes: Procedure, Benefits & Contraindications for Katichakrasana, Pavanmuktasana, Bhujangasana, Shalabhasana, Dhanurasana, Supta-vajarasana, Paschimottanasana, Ardha-Mastendrasana, Mandukasana, Gomukasana, Yogmudra, Ushtrasana, Kapalabhati.

Asthma: Procedure, Benefits & Contraindications for Tadasana, Urdhwahastottansana, UttanMandukasana, Bhujangasana, Dhanurasana, Ushtrasana, Vakrasana, Kapalabhati, Gomukhasana Matsyaasana, Anuloma-Viloma.

Hypertension: Procedure, Benefits & Contraindications for Tadasana, Katichakransan, Uttanpadasana, Ardha Halasana, Sarala Matyasana, Gomukhasana, UttanMandukasana, Vakrasana, Bhujangasana, Makarasana, Shavasana, Nadishodhanapranayam, Sitlipranayam.

PSYCHOLOGY

1. Practical File-Psychometric Tests: Report writing for test 1 & 2
2. Conduct and write the entire case study.
3. Complete unit end exercise of chapter 2