

BISHOP SCOTT GIRLS' SCHOOL

Jaganpura, Brahmpur, Patna –27

(Affiliated to CBSE, New Delhi Up to 10+2)



SUMMER HOLIDAY HOMEWORK

Class – XII A (Science)

Session: 2026 – 27

Date of Submission: 18.06.2026

A Season of Purpose and Preparation

Dear Parents,

As the summer sun settles in, we reach a unique milestone in your child's educational journey. The onset of the summer break for **Grade XII** is more than just a hiatus from the classroom; it is the "quiet before the climb"—a vital period for students to calibrate their goals before the final stretch of their schooling.

The board year often brings a mix of excitement and intensity. This break offers a rare opportunity to manage that pressure effectively. As the saying goes:

"Success is the sum of small efforts, repeated day in and day out." — **Robert Collier**

To help our students make the most of this time, I invite you to partner with me in focusing on three key pillars:

1. The Power of "Micro-Consistency"

Rather than marathon study sessions that lead to burnout, encourage **2–3 hours of focused daily revision**.

- **Target the Basics:** Use this time to master complex concepts in core subjects.
- **Bridge the Gaps:** Identifying and fixing weak areas now prevents them from becoming hurdles during the winter revision cycle.

2. Exploring Horizons

This is a golden window for students to look beyond the syllabus. Whether it is researching university applications, practicing for competitive entrance exams, or honing a creative skill, this "free" time allows them to connect their academic work to their future aspirations.

"The future depends on what you do today." — **Mahatma Gandhi**

3. Deliberate Rest

A weary mind cannot retain information. Please ensure your ward uses this time to truly disconnect as well. Physical exercise, adequate sleep, and family time are not distractions—they are the fuel that will sustain them through the rigorous pre-board schedules ahead.

"Rest is not idleness, and to lie sometimes on the grass under trees on a summer's day, listening to the murmur of the water, or watching the clouds float across the sky, is by no means a waste of time." — **John Lubbock**

Looking Ahead

Our goal is for every student to return to school in June not just with completed assignments, but with **confidence and clarity**.

Your role as a source of steady encouragement is their greatest asset during this high-stakes year.

I look forward to seeing the students return recharged and ready to excel. I wish you and your family a safe and meaningful summer.

Regards,

BSGS

Patna

English CORE (Subject Code – 301)

1. The Last Lesson had made Franz very sad. On his way back home, he meets Wachter and stops to talk to him. What can they talk about? Prepare a brief dialogue between them.
2. Research: Franco Prussian War. Write the main reasons of the war and its outcome.
3. Imagine you found a 4th level instead of the 3rd level.
Describe:
 - a) Where it leads to
 - b) What time period it belongs to
 - c) Your experience there
4. Write a newspaper report about a mysterious discovery of a “hidden level” at Central Mall Patna.
5. Take a tour of your city. Locate areas where they are slums. Find out if their basic needs are taken care of. If possible talk to young children to know about their hopes, dreams and future plans
6. Mukesh grows up to be a motor mechanic as was his dream. He is sent to Delhi for some training. He meets Saheb, who now owns a tea stall. They sit over a cup of tea and talk about their lives.
What will they talk about? Prepare interesting dialogue between them.
7. Research: Bangle industry in Firozabad. Is there any improvement from what you read in ‘Lost Spring’?
8. Rewrite the ending of the Tiger King with a twist.
Guiding questions:
 - a) What if the prophecy was wrong?
 - b) Realised his mistake earlier?
 - c) How would the story change if told from the tiger’s point of view?
9. Research: Tiger population now in India
Steps taken to increase their population
Steps taken to stop poaching
On a Map of India point outline the different Tiger reserves.
10. Write a short paragraph on ‘A world without noise and rush’
11. Book review
Write a book review in not more than 500 words. Follow the format discussed in class. Choose any classic or motivational book.
12. Learn at least 2 new words every day. Write down in your notebook with their meaning and usage.
(From newspaper, story books)
13. Prepare a short PPT on ‘Child Labour’. Group activity.
14. Practice reading out loudly from any book or newspaper. Do this daily to improve your reading and pronunciation.

15. Rewrite the last scene at airport from the mother's point of view from "My Mother at 66". (120 – 140 words)

MATHEMATICS (Subject Code – 041)

1. If $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}$ and $kA = \begin{bmatrix} 0 & 3a \\ 2b & 24 \end{bmatrix}$, then the value of k , a and b respectively, are :

- (a) $-6, -12, -18$ (b) $-6, -4, -9$
(c) $-6, 4, 9$ (d) $-6, 12, 18$

2. If $A = \begin{bmatrix} x & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 0 \\ -1 & 1 \end{bmatrix}$, then the value of x for which $A^2 = B$ is :

- (a) -2 (b) 2 (c) 2 or -2 (d) 4

3. The area of the triangle with vertices $(-1, 2)$, $(4, 0)$ and $(3, 9)$ is :

- (a) $43/\text{sq units}$ (b) $43/4 \text{ sq units}$ (c) 21 sq units (d) 42 sq units

4. **Assertion (A):** $A = \text{diag} [3 \ 5 \ 2]$ is a scalar matrix of order 3×3 .

Reason (R): If a diagonal matrix has all non-zero elements equal, it is known as a scalar matrix.

- (a) Both A and R are correct; R is the correct explanation of A.
(b) Both A and R are correct; R is not the correct explanation of A.
(c) A is correct; R is incorrect
(d) R is correct; A is incorrect

5. **Assertion (A):** If A is a non-singular matrix, then A^{-1} exists.

Reason (R): Determinant of a non-singular matrix is zero.

- (a) Both A and R are correct; R is the correct explanation of A.
(b) Both A and R are correct; R is not the correct explanation of A.
(c) A is correct; R is incorrect
(d) R is correct; A is incorrect

6. Find the matrix A such that : $A \begin{bmatrix} 1 & 2 & 4 \\ 4 & 5 & 6 \end{bmatrix} = \begin{bmatrix} -7 & -8 & -9 \\ 32 & 4 & 6 \end{bmatrix}$

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

8. Express the following matrix as a sum of a symmetric and a skew-symmetric matrix.

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

9. If $x = a \cos t$ and $y = b \sin t$, then find $\frac{d^2 y}{dx^2}$.

10. If $x = a \cos^3 \theta$ and $y = a \sin^3 \theta$, then find the value of $\frac{d^2 y}{dx^2}$ at $\theta = \frac{\pi}{6}$.

11. If $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 0 & -3 \\ 1 & 2 & 0 \end{bmatrix}$, then find A^{-1} and hence solve the following system of equations

$$x + 2y - 3z = 1, 2x - 3z = 2 \text{ and } x + 2y = 3.$$

12. Find the product of the matrices $\begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix} \begin{bmatrix} -6 & 17 & 13 \\ 14 & 5 & -8 \\ -15 & 9 & -1 \end{bmatrix}$ and hence solve the system of linear

$$\text{equations } x + 2y - 3z = -4, 2x + 3y + 2z = 2 \text{ and } 3x - 3y - 4z = 11.$$

13. A student in class XII is studying the concept of matrices. He comes across matrices A and B, defined as

$$A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix} \text{ later on, he uses the product of } AB \text{ in solving the system of}$$

$$\text{equations } x + 3z = 9, -x + 2y - 2z = 4 \text{ and } 2x - 3y + 4z = -3.$$

14. Differentiate $x^{\sin x} + (\sin x)^{\cos x}$ with respect to x .

15. If $(\cos x)^y = (\cos y)^x$, then find $\frac{dy}{dx}$.

PHYSICS (Subject Code – 042)

A. Activity-Based Questions

1. Rub a comb on dry hair and bring it near small paper pieces. Observe and explain charging by friction.
2. Use two balloons rubbed on hair and bring them close to observe repulsion. Explain the phenomenon.
3. Draw electric field lines around a positive point charge and a negative point charge.
4. Use a simple setup (charged scale/comb) to detect electrostatic force and describe your observation.
5. Observe how dust sticks to TV/computer screens and relate it to electrostatics.

B. Concept-Based Questions

6. What is electric charge? State its types and properties.
7. Explain Coulomb's Law with formula.
8. What is electric field? Define electric field intensity.
9. Explain the concept of electric field lines and their properties.
10. State Gauss's Law and explain its significance.

C. Numerical / Critical Thinking Questions

11. Two charges of 2 C and 3 C are placed 1 m apart. Find the force between them (assume $k = 9 \times 10^9 \text{ Nm}^2/\text{C}^2$).
12. If distance between two charges is doubled, how does force change?
13. Why does electrostatic force act even without physical contact?
14. Why is electric field inside a conductor zero?
15. If a charge is placed in a uniform electric field, what motion will it perform?

Investigatory Project

As discussed, & directed in the class

CHEMISTRY (Subject Code – 043)

1. Although neo-pentyl bromide is a primary alkyl halide, it is exceptionally unreactive in S_N2 reactions. Explain this observation using the transition state theory.
2. When Ethyl chloride reacts with KCN, Ethyl cyanide is the major product, but with AgCN, Ethyl isocyanide predominates. Justify this difference based on the nature of the chemical bonds in the reagents.
3. An optically active compound C_4H_9Br reacts with aqueous KOH to give an optically inactive product. Identify the mechanism involved (S_N1 or S_N2) and explain the loss of optical activity.
4. Chlorobenzene is extremely less reactive towards nucleophilic substitution compared to Chloroethane. Provide three distinct structural reasons for this relative inertia.
5. Predict the major product when 2-Bromopentane is treated with:
(a) Alcoholic KOH
(b) Aqueous KOH
Explain the competition between elimination and substitution in this context.
6. Explain why the rate of nucleophilic substitution in p-Nitrochlorobenzene is higher than in Chlorobenzene, but there is no such effect observed for m-Nitrochlorobenzene.
7. Phenol is more acidic than Ethanol, yet p-Nitrophenol is more acidic than Phenol itself. Explain the electronic effects (Inductive and Resonance) that govern this trend.
8. In the industrial preparation of Phenol from Cumene, what is the importance of the side product formed? Write the chemical equations involved in this "Cumene Process."
9. Propose a step-by-step mechanism for the acid-catalyzed dehydration of Ethanol to Ethene at 443 K. Why does the product change to Ethoxyethane at 413 K?
10. Both Reimer-Tiemann & Kolbe's Reactions involve the treatment of Phenol with a base and a carbon-based electrophile. Compare the electrophiles in both reactions and explain why Salicylic acid is formed in one while Salicylaldehyde is formed in the other.
11. When Anisole (Methoxybenzene) reacts with HI, the products are Phenol and Methyl iodide, not Iodobenzene and Methanol. Explain why the O-CH₃ bond breaks while the O-C₆H₅ bond remains intact.
12. A student is given three unidentified liquids: n-butanol, sec-butanol, and tert-butanol. Explain how the Lucas reagent ($ZnCl_2 + HCl$) distinguishes between them based on the stability of the intermediate carbocation.
13. An organic compound (A) with molecular formula C_3H_8O on oxidation with Cu at **573 K** gives (B). (B) does not reduce Fehling's solution but gives a yellow precipitate with I_2 and NaOH. Identify (A) and (B) and write the reactions.
14. How would you carry out the following conversions in not more than two steps?
(a) Propene to Propan-2-ol
(b) Phenol to Benzyl alcohol (Hint: Think via Benzene)
(c) Chlorobenzene to 2-Hydroxyacetophenone

15. Explain why the C-O-C bond angle in ethers (e.g., Methoxymethane) is slightly greater than the tetrahedral angle (109.5°), whereas the C-O-H angle in alcohols is slightly less.

Instruction for Students:

- To be done in Homework Notebook.
- Investigatory Project to be shared as word file by 28.05.26 through what's app in person

BIOLOGY (Subject Code – 044)

1. You observe a longitudinal section of an anther under a microscope. Identify the different layers and explain the role of any one layer.
2. During a lab activity, you are given a slide showing pollen grains. Identify the structures visible and explain how pollen is adapted for fertilization.
3. A student observes different stages of embryo sac development. Draw a labeled diagram of a mature embryo sac and identify its cells.
4. While studying human reproduction, you are given a model of the female reproductive system. Label any three parts and state their functions.
5. During a health awareness program, a chart shows stages of the menstrual cycle. Identify any two phases and explain the changes occurring in each.
6. Explain the process of microsporogenesis in flowering plants.
7. Describe double fertilization and mention its significance in angiosperms.
8. Explain the structure of a mature embryo sac with diagram.
9. Describe the hormonal regulation of the menstrual cycle.
10. Explain the process of spermatogenesis in humans.
11. Some plants produce large amounts of pollen grains. Analyze why this is necessary and relate it to their mode of pollination.
12. Failure of pollen tube growth prevents fertilization. Explain the consequences of this on seed and fruit formation.
13. In humans, improper hormone secretion can disturb the menstrual cycle. Analyze the possible effects on reproduction.
14. Why double fertilization is considered an evolutionary advantage in flowering plants? Justify with reasoning.
15. A couple is unable to conceive due to low sperm count. Explain how this condition affects fertilization and suggest one possible solution.

Investigatory project – as discussed in the class.

PHYSICAL EDUCATION (Subject Code - 048)

1. Draw a fixture for 18 teams on knockout basis participating in football tournament. And mention the following. Mention following -
 - a) Total no. of matches
 - b) Total no. of byes to given
 - c) Total no. of Rounds
2. Draw a flow chart of the committee organizing the tournament.
3. Draw a league fixture for 9 teams using following methods -
 - a) Stair case
 - b) Tabular method
 - c) cyclic methods
4. Write postural deformities and their cause and preventive measures (2 yogic asanas)
 - a) Khyphosis
 - b) Lordosis
 - c) Round shoulder
5. Calculate the B.M.I of your family 5 members and identify the category
6. Mention life style diseases cause and cure.(2 yogic asanas)
 - a) Diabetes
 - b) Asthma
 - c) Obesity
7. Read the news paper and collect the information about ongoing national or international tournament
 - a) Types of matches (knockout or league)
 - b) Semifinals and finals details
 - c) Total no of players or team participating
8. Design a 'First Aid Kit' and create cards showing different types of sports injuries.
9. Explain anorexia nervosa & Bulimia nervosa.
10. Make a personnel fitness log weekly (Exercise, Physical Activity)
11. Differentiate between league tournament and knockout tournament and one advantage & disadvantage in each.
12. Differentiate between Intramural & extramural with two examples for each.
13. What are the three components of female Athlete triad? Explain how they affect a female athlete's health?
14. Define Menarche and menstrual dysfunction. How do these impact a women's participation in sports?
15. Based on WHO guidelines, suggest physical activity recommendations for children.(5-17 years)

Project Work -

Prepare a Record files for board exams

- a) Practical.1: fitness tests administration. (SAI Khelo India Test)
- b) Practical 2 : Procedures for Asanas , benefits & contraindication for any two Asanas for each life style diseases
- c) Practical 3: Any one IOA recognize sports/ games of your choice with labelled diagram of fields & equipment, Rules, Terminology & skills.

ECONOMICS (Subject Code - 030)

1. " Final goods include only those goods which are consumed by the households". Defend or refute the given statement with valid reasons. (1)
2. Differentiate between final goods and intermediate goods. (1)
3. Giving reason, classify the following into intermediate products and final products.
 - (a) Computers installed in an office.
 - (b) Mobile sets purchased by a mobile dealer. (1)
4. Which among the following are final goods and which are intermediate goods? Give reasons. (3)
 - (a) Milk purchased by a tea stall.
 - (b) Bus purchased by a school.
 - (c) Juice purchased by a student from the school canteen.
5. "Circular flow of income in a two –sector economy is based on the axiom that one's expenditure is other's income".(4)
6. Why did India opt for Planning? (3)
7. Why did P.C. Mahalanobis known as the architect of Indian planning? (1)
8. Limitations of Green Revolution. (6)
9. How do Small Scale Industries promote rural development? (4)
10. Explain Import Substitution. (3)
11. What role does the Industrial sector play in the India Economy? (4)
12. Why do Small Scale Industries promote rural development? (3)
13. Highlight the salient features of India's Pre- Independence occupational structure.(6)
14. Why were land reforms not implemented successfully? (4)
15. What are Miracle Seeds? (1)

Project Work –

Students will prepare a project file based on the relevant topic chosen by them as per CBSE Curriculum.

INFORMATICS PRACTICES (Subject Code - 065)

Instructions: -

- All programs must be written in Python language.
- Use proper indentation in your code.
- Take input from user using input () function.
- Display output using print () function.

- Use simple if-else conditions wherever required.
 - Write each program clearly with proper spacing.
 - Add comments in your code to explain logic.
 - Avoid syntax errors and write clean code.
1. A shopkeeper wants to store daily sales of 5 days. Write a program to create a Pandas Series using these values. Display the complete Series.
 2. A teacher recorded marks of 5 students in a test. Create a Series to store these marks. Find and display the highest and lowest marks.
 3. A mobile shop has prices of 5 phones. Create a Series for these prices. Display only those prices which are greater than ₹15,000.
 4. A student tracks his daily study hours for 5 days. Create a Series using these hours. Increase each value by 1 hour and display the updated Series.
 5. A company stores employee IDs as a, b, c, d. Create a Series with salaries using these labels as index. Display the salary of employee 'c'.
 6. A shopkeeper records earnings of 5 days. Create a Series to store earnings. Find the total earning using the Series.
 7. A player scores runs in 5 matches. Create a Series for these scores. Display the square of each score.
 8. A school wants to store names and marks of students. Create a DataFrame with Name and Marks columns. Display the complete DataFrame.
 9. A hospital records patient name and age. Create a DataFrame using this data. Display only the Age column.
 10. A teacher wants to identify students scoring above 60. Create a DataFrame of 5 students with marks. Display only those students who scored more than 60.
 11. A company stores employee Name, Salary, and Department. Create a DataFrame with this data. Display the first 3 records.
 12. A shop has 5 products with their prices. Create a DataFrame to store product name and price. Find and display the average price.
 13. A school wants to assign pass/fail result to students. Create a DataFrame with Name and Marks. Add a new column "Result" based on marks (>40 Pass).
 14. A college stores data of students in a table. Create a DataFrame with at least 5 rows. Display the number of rows and columns in the DataFrame.
 15. A company keeps record of employee salaries. Create a DataFrame with employee names and salaries. Display the highest salary from the DataFrame.

Project:-

Title: Airline Passenger Data Analysis System

An USA based airline company wants to maintain and analyze passenger booking details using Python. Create a project using Pandas Series, Data Frame, and Data Visualization.

Your project should include the following tasks:

A. Create Pandas Series for:

Passenger Names, Destinations and Ticket Prices

B. Create a DataFrame containing minimum 10 passenger records with the following fields:

Passenger Name, Flight Number, Destination, Seat Class, Ticket Price, Travel Date

C. Perform the following operations (Data Analysis)

Display first 5 records

Display last 3 records

Find average ticket price

Find highest ticket

Find lowest ticket price

Display passengers traveling to Delhi

Count total Economy class passengers

Count total Business class passengers

Find the most common destination

Display records where ticket price is greater than 8000

D. Data Visualization

Create the following charts:

Bar Chart – Passenger Name vs Ticket Price

Pie Chart – Seat Class Distribution

Line Chart – Passenger Name vs Ticket Price