GURUKUL INTERNATIONAL SCHOOL, Haldwani

HOME WORK FOR SUMMER BREAK (2026-27)

Class- XII Science

ENGLISH

THINKING SKILLS

1 Write down the autobiografyof ' TIME MACHINE ' under the following headings
Its origin
Its experience with different people.

2 Plan out an itinerary of four days pilgrimage of Rameshwaram under the following headings
Day 1: Departure from home
Day 2: Start of Rameshwaram tour
Day 3: Sight-seeing and beach fun
Day 4; Arrival at home.

CRITICAL THINKING

3 Imagine, like Charley, one day you find yourself in place with different types of creature /people and machines. Later, you come to your real world.How will you explain your experience to your family?

4 Two of your best friends had a quarrel over an issue which they bring to your notice. How will you pacify them and resolve the issue?

WRITING SKILLS

5 Make a diary entry for one week on the following topics
1. About yourself
2. Letter to your most favourite person
3. Recipe of your favourite dish.
4. Biggest nightmare
5. Book I love the most
6. All about family
7. A place you want to visit

6 Write three notices on different topics to be placed in the notice board of your school.

CREATIVITY

7 Prepare a poster poster on 'Child Labour in India" .

8 Create a collage of postal stamps and paste it in your notebook

PHYSICS

Electrostatics & Current Electricity Target: CBSE Board & Holistic Progress Card (HPC) Guidelines
Part A: Theory & Conceptual Mastery (HPC: Critical Thinking)
Answer the following questions in your Physics Assignment Register.
Electrostatics:

1 Derive an expression for the electric field at a point on the (a) axial line and (b) equatorial line of an electric dipole.

2 Use Gauss's Law to derive the electric field due to an infinitely long straight wire and a uniformly charged thin spherical shell.

3 What is the work done in moving a test charge ‘q’ over an equipotential surface? Justify.

4 A capacitor is charged by a battery. The battery is then disconnected and a dielectric slab is inserted. Explain the change in (i) Capacitance, (ii) Potential Difference, and (iii) Energy Stored.
Current Electricity:

5 Derive the relation between current density (j) and drift velocity (v_d).

6 State Kirchhoff's Laws. Use them to derive the condition for a balanced Wheatstone Bridge.

7 Explain why a Potentiometer is preferred over a Voltmeter for measuring the EMF of a cell.

8 A wire of resistance ‘R’ is stretched to double its length. Calculate its new resistance and resistivity.
Part B: Art-Integrated Learning
(AIL) Projects

9 Complete both of the following projects. These are designed to merge core physics concepts with creative execution. Project 1: The "DIY Gold Leaf"
Electroscope
Objective: Construct a working model of an electroscope using household items to detect static charge. • Materials: A glass jar, a copper wire/ paperclip, aluminum foil (as a substitute for gold leaf), and an insulating cap (cork or plastic lid).
AIL Task: Create a "Process Journal" or a video demonstration showing:
The construction phases.
Testing the device with a charged comb or balloon.
A hand-drawn diagram illustrating the movement of charges (induction vs. conduction) during the test.

Project 2: Kirchhoff's Laws - "The City Grid" Visual Map
Objective: Visualize Kirchhoff's Current Law (KCL) and Voltage Law (KVL) through a creative analogy.
AIL Task: Design an artistic infographic or a 3D board map where:
Junction Rule (KCL): Is represented as a water pipe system or a traffic roundabout. Show how the "inflow" must equal the "outflow" using vibrant colors.
Loop Rule (KVL): Is represented as a mountain trail or a roller coaster. Show how the "gain in height" (EMF) must equal the "drops" (Potential drops across resistors) in a complete circuit. Mathematical Integration: Label your artistic map with a sample numerical circuit to prove the laws mathematically.
Part C: Numerical Challenge (HPC: Analytical Skills)

10 Three charges -q, +Q, -q are placed at equal distances on a straight line. If the total potential energy of the system is zero, find the ratio Q/q$

11 Two point charges +4eand +e are fixed a distance a apart. Where should a third point charge q be placed on the line joining them so that it is in equilibrium?

12 In a meter bridge, the balance point is found at 39.5 cm}from end A, when the resistor Y is of 12.5 ohm Determine the resistance of X Why are the connections between resistors in a Wheatstone or meter bridge made of thick copper strips?
Part D: HPC Competency & Self-Assessment

13 Reflect on your learning during this break and answer these in 2-3 lines:
Real-world Connection: Identify one place in your home where "Electrostatic Shielding" is used.
Safety Awareness: Why should you never touch electrical switches with wet hands? (Explain using the concept of resistance and current).
Learning Goal: Which topic in these two units did you find most challenging, and what strategy did you use to understand it?

CHEMISTRY

1 A binary liquid solution of A and B shows **positive deviation** from Raoult's law.Sketch the total vapour pressure vs mole fraction curve.Explain intermolecular interactions in A–A, B–B, and A–B.Predict whether ΔH_mix and ΔV_mix are positive or negative with justification.Identify whether this system can form an azeotrope. If yes, what type?

2 An aqueous solution of K_2SO_4 shows a van't Hoff factor less than expected.Explain the reason in terms of interionic interactions.How does concentration affect i? What happens to conductivity in this case?

3 A current of 2 A is passed through a solution of $CuSO_4$ for 30 minutes. Calculate mass of copper deposited. If current efficiency is 80%, calculate actual mass deposited.Explain factors affecting current efficiency.

4 0.1 m NaCl solution shows 80% dissociation; calculate van't Hoff factor and freezing point depression.(Kf = 1.86 K kg mol^{-1})

5 During electrolysis of an aqueous solution containing multiple ions, it is observed that the product formed at the electrode is not the one predicted solely based on standard electrode potentials; explain this observation in terms of overpotential, concentration effects, and nature of electrodes, and discuss how these factors influence product selectivity.

6 **CASE BASED QUESTION**
A galvanic cell is constructed using Zn and Cu electrodes where the reaction taking place is $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$ with a standard EMF of 1.10 V; as the cell operates, the concentration of Zn^{2+} ions increases while that of Cu^{2+} ions decreases, and it is observed that the EMF of the cell gradually falls during operation.
a) Explain why the EMF decreases as the reaction proceeds.
b) Write the expression for reaction quotient Q for this cell.
c) State the condition when EMF becomes zero.
d) Relate this condition to equilibrium constant.

MATHEMATICS

1 Plot the graphs of inverse trigonometric functions, such as $\sin^{-1}(x)$, $\cos^{-1}(x)$, and $\tan^{-1}(x)$, and analyze their properties.

2 Research and present real-life applications of inverse trigonometry, such as navigation, physics, or engineering.

3 Create a set of matrices and perform operations such as addition, subtraction, multiplication, and inverse.

4 Create a diagram to illustrate the concept of relations and functions, and identify the domain and range.

5 **Find the principal values of the following**
i) $\sin^{-1}(1/2)$ ii) $\cos^{-1}(-1/2)$ iii) $\tan^{-1}(1)$

6 **Prove the following identities**
i) $\sin^{-1}(x) + \cos^{-1}(x) = \pi/2$ ii) $\tan^{-1}(x) + \tan^{-1}(1/x) = \pi/2$

7 **Find the inverse of the following matrices**
i) A = [[2, 1], [4, 3]] ii) B = [[1, 2], [3, 4]]

8 **Solve the following system of linear equations using matrices**
i) $2x + 3y = 7$ ii) $x - 2y = -3$

9 **Determine whether the following relations are reflexive, symmetric, and transitive**

i) $R = \{(a, b) : a = b\}$ ii) $R = \{(a, b) : a < b\}$

BIOLOGY

1 Read the following case study and answer the given case based questions in your Biology notebook.

Case Study : Failure of Fruit Formation

A farmer noticed that despite healthy flowering in his mango orchard, very few fruits developed. On investigation, it was found that insect pollinators had drastically reduced in the area due to excessive pesticide use. Some flowers also showed immature pollen grains.

Case based Questions:

a) Analyze the role of pollinators in the process of fertilization in flowering plants.
b) Explain why healthy flowers alone are not sufficient for fruit formation.
c) Differentiate between self-pollination and cross-pollination on the basis of genetic variation and dependency on external agents.
d) Predict the consequences of reduced pollinator populations on agricultural productivity and biodiversity.
e) Explain the sequence of events from pollen deposition on stigma to seed formation.

2 **Investigatory project :**

Make a well illuminating Investigatory project file on any one of thefollowing topics:

- Biotechnology
- Chromosomal disorders
- Application of Biotechnology
- Devices for preventing self pollination
- Adaptive Radiation

Focus on all the key points of the given topic with the help of flowcharts , pictures and diagrams.File should include :

- Cover page
- Index
- Acknowledgement
- Certificate
- Introduction
- Details about the topic
- Bibliography

3 **Genetics Family Tree**

Task : Create your family pedigree chart showing inheritance of following phenotypes in a scrapbook:

- Blood groups
- Color blindness
- Dimples
- Widow's peak
- Rolling tongue

4 **Disease Investigation:**

Task: Choose a human disease (infectious or genetic) and research it in detail.

Activities:

a) Investigate the causative agent (pathogen or genetic mutation).
b) Study the mode of transmission or inheritance.
c) Learn about the symptoms, diagnosis, treatment, and prevention strategies.
d) Explore the social and economic impact of the disease.
e) Present your findings in a comprehensive report in A4 sheets

PHYSICAL EDUCATION

1 Select any one sport of your choice. Identify the 5 major fitness components required for that sport and explain how you would design a 4-week training plan to improve at least 2 of them.

2 Write three yogasanas that help in managing stress and lifestyle diseases. Describe their procedure, benefits, and contraindications with diagrams or pictures.

3 Investigate the most common injuries in any one game/sport. Explain their causes, preventive measures, and first aid treatment as per recent guidelines.

4 Research the role of a sports captain. Write about the qualities required, and interview any local coach or player to find out how leadership affects team performance. Summarize your findings.

Case-Based Study Question

5 Case Study:

Ravi is a Class 12 student and a district-level football player. During practice, he suddenly complains of severe pain in his ankle after a fall. His ankle is swollen and he cannot put weight on it.

Based on this case, answer:

a) What type of injury do you suspect and why?
b) What immediate first aid should be given using the R.I.C.E. method?
c) Suggest 3 long-term rehabilitation exercises once recovery begins.

6 Any one IOA recognised sports/Games of choice. Labelled diagram of field and equipment. Also mention it's Rules, Terminologies and skills.

HINDI

1 रचनात्मक लेखन

क) रिपोर्ट लेखन– 'उत्तराखण्ड में मोटे अनाज का महत्व' पर एक विस्तृत रिपोर्ट तैयार करें।

ख) पत्रकारिता– अपने पसंदीदा न्यूज चैनल या पत्रकार की कार्यशैली और समाज पर उसके प्रभाव पर एक लेख लिखिए।

2 सचित्र परियोजना कार्य

क) समकालीन मुद्दे– 'बाजार दर्शन' निबंध के संदर्भ में 'आधुनिक युग में उपभोग्तावाद का प्रभाव' पर सचित्र प्रोजेक्ट तैयार कीजिए।

ख) 'हिन्दी कविता की विकास यात्राः एक विहंगम दृष्टि' (प्रमुख कवियों के चित्रों के साथ) लिखिए।

3 व्याकरण एवं भाषा–

क) पाठ्यक्रम में दिए गए कवियों/लेखकों का जीवन परिचय और उनकी प्रमुख रचनाओं का चार्ट तैयार करें।

नोट– सभी कार्यो को एक फाइल या नोटबुक में व्यवस्थित करें।

COMPUTER

Advanced Python Programming

1 Write a function to find the square of a number.
2 Write a function to check whether a number is even or odd.
3 Create a function to calculate the area of a rectangle.
4 Write a function to display the multiplication table of a number.
5 Explain local variables and global variables with examples.
6 What is the difference between actual and formal parameters? Explain with examples.

Cyber Ethics & Emerging Trends

7 Write short notes on Cloud Computing and Data Science.
8 Design awareness poster on Online Frauds.

Problem Solving Activity

9 Choose any one real-life problem and explain how Computer Science can help solve it.

Examples:
Online education
Traffic management
Cyber security
Digital payments
Healthcare systems
Waste management

Include:
The problem
Technology used
Expected solution
Benefits to society

Mini Project
Develop a Student Report card.

Output-Based Questions

```
x = 10
def test():
   x = 5
  print(x)
test()
print(x)
def func(a=5, b=10):
print(a+b)
func()
func(2,3)
```

PSYCHOLOGY

1 **Long Case Study (10 Marks)**

Read the case carefully and answer the questions that follow:

Seventeen-year-old Ananya is a student of Class 12 preparing for her board examinations as well as entrance exams. She was always considered a hardworking and intelligent student. However, during the last few months, her behaviour has changed noticeably.

Ananya wakes up early and studies late into the night, often sleeping for only 4–5 hours. She spends most of her

time studying or using her mobile phone to watch educational videos and compare her preparation with others on social media. Whenever she sees students posting about their achievements or study schedules online, she starts feeling anxious and believes she is not doing enough.

At school, Ananya has become quieter than before. She avoids participating in class discussions and has stopped spending time with her friends during breaks. Her teachers have noticed that although she studies continuously, she often appears distracted and forgets things easily. Recently, she scored lower marks in a test despite studying hard, which made her feel disappointed and frustrated.

At home, Ananya's parents constantly remind her about the importance of securing high marks and getting admission into a reputed college. Though her parents want the best for her, their repeated expectations make her feel emotionally pressured. Whenever her mother asks about her preparation, Ananya becomes irritated and sometimes starts crying without clearly expressing her feelings.

To manage stress, Ananya has started drinking excessive coffee and spending more time alone in her room. She has also stopped doing activities she once enjoyed, such as painting and evening walks. Deep inside, she feels exhausted, unmotivated, and fearful about failing in life.

One day, her school counsellor spoke to her and suggested maintaining a balanced routine, taking short breaks, practising relaxation techniques, and sharing her feelings with trusted people. The counsellor also explained that mental health is equally important as academic success and encouraged her to focus on self-care and realistic goal-setting.

a) Identify any four symptoms of stress or anxiety visible in Ananya's behaviour.
b) Explain any two factors responsible for Ananya's stress.
c) How is social media affecting Ananya's self-esteem and mental health?
d) Suggest any four healthy coping strategies that can help Ananya manage stress effectively.
e) "Mental health is as important as physical health." Explain this statement with reference to the case study.

2 **Application-Based Activity**

Self-Reflection Task:

Write a short reflective paragraph (150–200 words) on the topic:

"How Do I Handle Stress in My Daily Life?"

Include: Situations that make you stressed Your emotional reactions Ways you usually manage stress Healthy changes you would like to make in your routine

3 **Research & Analysis Task**

Topic: "Study Habits and Mental Well-Being Among Teenagers"

Conduct a survey of any 8–10 students and collect information about: Hours of study per day Sleep duration Screen time Stress level during exams Present: A table/chart/graph of the collected data Three observations from the survey One conclusion about students' mental health and academic pressure

Instructions

Write answers neatly in your own words. Use psychological concepts wherever possible. Add creativity and proper presentation. Attach charts/graphs separately if needed.