ARMY PUBLIC SCHOOL , BIRPUR DEHRADUN

SUMMER VACATION HOLIDAY HOMEWORK

CLASS XII

MATHS

1. Prepare a one-page summary of formulas related to all the chapters covered in class so far.
2. Solve 10 previous years' questions from each chapter covered in class so far.
3. Do any ten lab activities from the lab manual book. (Ensure you cover the lab manuals properly, as they will be required for your final board practical.)
4. Revise all the topics covered in class thoroughly, including all miscellaneous exercises with examples.

PHYSICS

A. Each student of class XII must prepare a slide show/PPT with audio and file on the same topic.

B. The topics can be chosen from the following list:
- Electrostatic Charge and Electrostatic Field

- Gauss's Theorem and Electrostatic Potential
- Current Electricity
- Magnetic Effect of
- Current
- Electromagnetic Induction
- Reflection of Light
- Refraction of Light
- Dual nature of radiation and matter
- Atoms and Molecules
- Semiconductor Devices

C. Each student of class XII must prepare a working model and project file on the same topic.

The topics can be chosen from the following list:

- Electrostatic Charge and Electrostatic Field

- Current Electricity

- Magnetic Effect of Current

- Electromagnetic Induction

- Reflection of Light

- Refraction of Light

- Semiconductor devices

Note: The contents of the project file are as follows:

(a) Page 1: Title of the project with your name and school name.
(b) Page 2: Acknowledgment.
(c) Page 3: Certificate.
(d) Page 4: List of components and their values.
(e) Page 5: Circuit diagram of the model.
(f) Page 6: Working of the model.
(g) Page 7: Bibliography.

Note: Pages 1 to 4, and pages 6 and 7, should be computerized printouts.

(b) Page 5: Draw a neat circuit diagram.

D. Do the following questions in your physics holiday homework notebook:

Q1. The electrostatic force on a small sphere of charge 0.4 μC due to another small sphere of charge -0.8 μC in air is 0.2 N.
(a) What is the distance between the two spheres?

(b) What is the force on the second sphere due to the first?

Q2. Four point charges q_A = 2 μC, q_B = -5 μC, q_C = 2 μC, and q_D = 5 μC are located at the corners of a square ABCD of side 10 cm. What is the force on a charge 1 μC placed at the centre of the square?

Q3. Two point charges, q_A = 3 μC and q_B = -3 μC, are located 20 cm apart in a vacuum. (a) Determine the electric field at the midpoint O of the line joining the two charges. (b) If a negative test charge of magnitude 1.5 x 10-9 C is placed at this point, calculate the force experienced by the test charge.

Q4. A system comprises two charges, q_A = 2.5 x 10-7 C and q_B = -2.5 x 10-7 C, located at points A: (0,0,-15 cm) and B: (0,0,+15 cm), respectively. Determine the total charge and electric dipole moment of the system.

Q5. Suppose spheres A and B have identical sizes and charges. A third sphere of the same size but uncharged is brought into contact with the first sphere, then brought into contact with the second sphere, and finally removed from both spheres. Calculate the new force of repulsion between spheres A and B.

Q6. Consider a uniform electric field $E = 3 \times 10^3 \, i$ N/C. (a) Determine the flux of this field through a square of 10 cm on a side, whose plane is parallel to the yz plane. (b) Determine the flux through the same square, if the normal to its plane makes a 600 angle with the x-axis.

Q7. Calculate the net flux of a uniform electric field $E = 3 \times 10^3 \, i$ N/C through a cube of side 20 cm oriented so that its faces are parallel to the coordinate planes.

Q8. A uniformly charged conducting sphere of 2.4 m diameter has a surface charge density of 80 μC/m2. (a) Determine the charge on the sphere. (b) Calculate the total electric flux leaving the surface of the sphere.

Q9. An infinite line charge produces a field of 9×10^4 N/C at a distance of 2 cm. Calculate the linear charge density.

Q10. Two charges, 5×10^{-8} C and -3×10^{-8} C, are located 16 cm apart. Determine the point(s) on the line joining the two charges where the electric potential is zero.

Q11. A regular hexagon of side 10 cm has a charge of 5 μC at each of its vertices. Calculate the potential at the center of th e hexagon.

Q12. Two charges, 2 μC and -2 μC, are placed at points A and B, 6 cm apart

. (a) Identify an equipotential surface of the system.

 (b) Determine the direction of the electric field at every point on this surface.

Q13. A spherical conductor of radius 12 cm has a charge of 1.6×10^{-7} C distributed uniformly on its surface. Calculate the electric field (a) inside the sphere, (b) just outside the sphere, and (c) at a point 18 cm from the center of the sphere.

Q14. A charge of 8 mC is located at the origin. Calculate the work done in taking a small charge of -2×10^{-9} C from a point P(0, 0, 3 cm) to a point Q(0, 4 cm, 0), via a point R(0, 6 cm, 9 cm).

Q15. A spherical conducting shell of inner radius r1 and outer radius r2 has a charge Q. (a) A charge q is placed at the center of the shell. What is the surface charge density of the inner and outer surfaces of the shell? (b) Is the electric field inside a cavity (with no charge) zero, even if the shell is not conducting?

Q16. Define the term drift velocity and obtain the expression for it.

Q17. At room temperature (270°C), the resistance of a heating element is 100 ohms. What is the temperature of the element if the resistance is found to be 117 ohms, given that the temperature coefficient of the material of the resistor is 1.7×10^{-4} per 0°C?

Q18. Show the variation of resistivity of copper as a function of temperature.

Q19. Why is constantan or manganin wire used for making standard resistance wires?

Q20. State the condition for maximum current to be drawn from a cell.

Q21. State the condition under which terminal potential difference is (a) greater than emf, (b) equal to emf.

Q22. Obtain the relation of resistivity with relaxation time.

Q23. Plot a graph showing the variation of emf with (a) internal resistance for a cell, and (b) current obtained through a cell.

Q24. Plot a graph showing the variation of V and I for Ga-As.

Q25. If the ammeter in the given circuit shown in the diagram reads 2 A, the resistance R is (a) 1 Ω, (b) 2 Ω, (c) 3 Ω, or (d) 4 Ω.

Q26. The heat produced by a 100 W heater in 2 minutes is equal to
A.   10.5kJ, 16.3Kj, 12.0kJ, 14.2kJ
B.

Q27. Kirchhoff's second law is based on the law of conservation of:

(a) Sum of mass and energy
(b) Momentum
(c) Energy
(d) Charge

Q28. Two wires A and B of equal masses and of the same metals are taken. The diameter of wire A is half the diameter of wire B. If the resistance of wire A is 24 Ω, then find the resistance of wire B?

(a) 0.5
(b) 1
(c) 1.5
(d) 3

Q29. Drift velocity vd varies with the intensity of the electric field as per the relation:

(a) vd = E
(b) vd = 1/E
(c) vd = constant
(d) vd = E²

Q30. Determine the magnitude of the magnetic field B at the centre of the circular coil of wire carrying a current of 0.4 A and having 100 turns with a radius of 8 cm for each turn.

Q31. Determine the direction and magnitude of B at a point that is 2.5 m away in the east direction of the long straight wire that is in a horizontal plane carrying a current of 50 A in the north to south direction.

Q32. A flat overhead electrical cable carries a current of 90 A in the east to west course. What is the direction and magnitude of the magnetic field due to the current 1.5 m below the line?

E. Make a question bank of 1 mark, 2 marks, and 3 marks, other than those given in the NCERT book (10 questions each from units of electrostatics and current).
Electricity covered in class, solve the questions.

CHEMISTRY

1. **Preparation of Project File**

- Students are advised to prepare a project file on any one topic of investigatory project from the following suggested list or if they have any other idea prepare a project file on it.
- Make sure that proper research is done on the chosen topic
- Collect photos, pictures, graphs related with the topic.
- The maximum pages for the project file should not be less than 20 pages.

Suggested List of Projects

1. Aldol condensation
2. Electrochemical cell
3. Paper chromatography
4. Sterilization of water using bleaching powder
5. Removal of alcohol from body by esterification
6. Neutralizing ability of antacid tablets
7. Common food adulterants in fat, butter, oil, turmeric powder, pepper, chili powder, sugar, etc.
8. Comparative study of the rate of fermentation of following materials: wheat flour, gram fluor, potato juice, carrot juice, etc.
9. Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.
10. Preparation of soyabean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.

11. Study of quantity of casein present in different samples of milk.

12. Measuring solubility of saturated solutions

13. Measure the amount of acetic acid in vinegar

14. Determination of contents in cold drinks

15. Study of diffusion of solids in liquids

16. Analysis of fertilizer

17. Chemistry in black and white photography

18. Presence of oxalate ions in guava fruit and different stages of ripening

19. Compare the rate of evaporation of water

20. Check the ions present in toothpaste

21. Preparation of Toilet Soaps

22. Study of Constituents of an Alloy

23. Study of Diffusion of Solids in Liquids

24. To Analyse a Sample of Brass Qualitatively

25. To Prepare a Smoke Bomb

26. Acidity In Tea

27. Analysis Of Honey

28. Water concentration and texture

29. Study the effects of metal coupling on the rate of corrosion

30. Effects of voltage and concentration

2. Do the given exercise in your chemistry notebook

1. A solution of glucose in water is labelled as 10% w/w, what would be the molality and mole fraction of each component in the solution? If the density of solution is 1.2 g mL^{-1}, then what will be the molarity of the solution?

2. How many mL of 0.1 M HCl are required to react completely with 1 g mixture of Na_2CO_3 and $NaHCO_3$ containing equimolar amounts of both?

3. An antifreeze solution is prepared from 222.6 g of ethylene glycol ($C_2H_6O_2$) and 200 g of water. Calculate the molality of the solution. If the density of the solution is 1.072 g mL^{-1}, then what shall be the molarity of the solution?

4. Heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components are 105.2 kPa and 46.8 kPa respectively. What will be

the vapour pressure of a mixture of 26.0 g of heptane and 35 g of octane?

5. Two elements A and B form compounds having formula AB_2 and AB_4. When dissolved in 20 g of benzene (C_6H_6), 1 g of AB_2 lowers the freezing point by 2.3 K whereas 1.0 g of AB_4 lowers it by 1.3 K. The molar depression constant for benzene is 5.1 K kg mol^{-1}. Calculate atomic masses of A and B.

6. Write the correct increasing order for the depression in freezing point of water observed for the same amount of acetic acid, trichloroacetic acid and trifluoroacetic acid. Explain briefly.

7. Henry's law constant for the molality of methane in benzene at 298 K is 4.27 × 10^5. Calculate the solubility of methane in benzene at 298 K under 760 mm Hg.

8. 100 g of liquid A (molar mass 140 g mol^{-1}) was dissolved in 1000 g of liquid B (molar mass 180 g mol^{-1}). The vapour pressure of pure liquid B was found to be 500 torr. Calculate the vapour pressure of pure liquid A and its vapour pressure in the solution if the total vapour pressure of the solution is 475 Torr.

9. Determine the amount of $CaCl_2$ ($i = 2.47$) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27°C.

10. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 liters of water at 25°C, assuming that it is completely dissociated.

11. The molar conductivity of 0.025 mol L^{-1} methanoic acid is 46.1 S cm^2 mol^{-1}. Calculate its degree of dissociation and dissociation constant. Given $\Lambda^o H^+$ = 349.6 S cm^2 $mole^{-1}$ and Λ^o ($HCOO^-$) = 54.6 S cm^2 mol^{-1}.

12. If a current of 0.5 ampere flows through a metallic wire for 2 hours, then how many electrons would flow through the wire?

13. The resistance of a conductivity cell containing 0.001 M KCl solution at 298 K is 1500 W. What is the cell constant if conductivity of 0.001 M KCl solution at 298 K is 0.146 ´ 10^{-3} S /cm.

14. How much charge is required for the following reductions:
   a. 1 mol of Al^{3+} to Al
   b. 1 mol of Cu^{2+} to Cu

15. A solution of $Ni(NO_3)_2$ is electrolysed between platinum electrodes using a current of 5 amperes for 20 minutes. What mass of Ni is deposited at the cathode?

16. Three electrolytic cells A, B, C containing solutions of $ZnSO_4$, $AgNO_3$ and $CuSO_4$ respectively are connected in series. A steady current of 1.5 amperes was passed through them until 1.45 g of silver deposited at the cathode of cell B. How long did the current flow? What mass of copper and zinc were

deposited?

17. Predict the products of electrolysis in each of the following: A dilute solution of H_2SO_4 with platinum electrodes.

18. Write only reactions taking place on anode and cathode in

   (a) Dry cell   (b) Lead Storage Battery   (c) Fuel cell

19. Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10.

20. Calculate the emf of the cell in which the following reaction takes place:

   $Ni(s) + 2Ag^+ (0.002 \text{ M}) \longrightarrow Ni^{2+} (0.160 \text{ M}) + 2Ag(s)$ Given that $E^°_{cell} = 1.05$ V
   .

21. Time required to decompose SO_2Cl_2 to half of the initial amount is 60 minutes. If the decomposition is a first order reaction, calculate the rate constant of the reaction.

22. A first order reaction has rate constant 1.15×10^{-3} s^{-1}. How long will 5 g of this reactant take to reduce to 3 g ?

23. A reaction is first order in A and second order in B.

   a. Write the differential rate equation.

   b. How is the rate affected on increasing the concentration of B three times?

   c. How is the rate affected when the concentrations of both A and B are doubled?

24. For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

25. For the decomposition of azoisopropane to hexane and nitrogen at 543 K, the following data are obtained.

t (sec)	P (mm of Hg)
0	35.0
360	54.0
720	63.0

   Calculate the rate constant.

26. The rate constant for the first order decomposition of H_2O_2 is given by the following equation: $\log k = 14.34 - 1.25 \times 10^4$ K/T [Where unit of k is s^{-1}]

   Calculate E_a for this reaction and at what temperature will its half-period be 256 minutes?

27. For the reaction R—>P, the concentration of reactant changes from 0.03 M to 0.02 M in 25 minutes. Calculate the average rate of reaction using units of time both in minutes and seconds.

28. The activation energy for the reaction, 2 HI(g) —-> $H_2 + I_2$ (g) is 209.5 k J mol⁻¹ at 581 K. Calculate the fraction of molecules of reactants having energy equal to or greater than activation energy?

29. The following results have been obtained during the kinetic studies of the reaction.

2A+B ——–> C + D

Exper-iment	[A] mol L^{-1}	[B] mol L^{-1}	Initial rate of formation of D mol L^{-1} min^{-1}
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Determine the rate law and the rate constant for the reaction.

30. The half-life for radioactive decay of 14C is 5730 years. An archaeological artifact containing wood had only 80% of the 14C found in a living tree. Estimate the age of the sample.

3. **Do the given exercise in your chemistry notebook**

31. A solution of glucose in water is labelled as 10% w/w, what would be the molality and mole fraction of each component in the solution? If the density of solution is 1.2 g mL^{-1}, then what will be the molarity of the solution?

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49. Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10.

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BIOLOGY

Preparation of Project File

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- Make sure that proper research is done on the chosen topic
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ENGLISH

1. Choose any current topic that is age related i.e. related to teenage or school life that you feel needs to be discussed
Research on the topic and also collect pictures.

2. Write 2 Notices and 2 formal and 2 informal invitations along with their replies in fair notebook.
3. Complete all questions and answers given in notebooks as well as all language work.
4. Revise thoroughly all chapters covered.

HINDI

1- विद्यालय पत्रिका हेतु अपनी रुचि के किसी विषय पर लेख/कविता/तथ्य/हास्य मौलिक लेख word या docs पर लिखिए और अध्यापिका को मेल कीजिए!

2 -अपने प्रिय कवि/लेखक किसी रचना को पढ़िए और उस पर पुस्तक समीक्षा लिखिए। चित्र भी चिपकाइए।(यह कार्य project paper के 4 पृष्ठों पर करें)

3- ऑपरेशन सिंदूर एवं कृत्रिम बुद्धिमत्ता पर अभिव्यक्ति एवं माध्यम कॉपी में 1-1 निबंध लिखिए।

PHYSICAL EDUCATION
1. Solve all the objective-type questions given in the exercises of chapters 1 to 4.
2. Design a fun and engaging physical activity program for children, including games, exercises, and sports.

Note:
- Work should be done in handwritten form and in a fair notebook.
- Homework is to be submitted on July 5, 2025.

ENJOY YOUR HOLIDAYS UTMOST! TRY TO LEARN SOME NEW LIFE SKILLS.

PAINTING:

- Make 12 paintings on the sheets shown in the class (Ivory A2).

- Create two landscapes, two posters, three picture compositions (festival, mela, market, circus, playing games, farmers working, vegetable/balloon sellers, etc.), two still lifes, one folk art (any state, Aipan art, Kolam design, Madhubani art, etc.), and one monochromatic painting (one colour painting).

- Choose one painting from the syllabus painting book.

- Prepare one large canvas (20 x 30 cm or 50 cm x 75 cm) as well, as it will be used for your final Board practical exam.

YOGA:

- Maintain a daily practice journal to record your yoga practice, breathing techniques, and meditation practices.

- Engage in reflective journaling by writing about your experiences, challenges, and insights gained from yoga practice.

- Focus on specific breathing techniques, such as Kapalabhati or Bhastrika, during your daily pranayama practice.

- Commit to a regular meditation practice, focusing on breath, mantra, or visualisation.

- Explore yoga philosophy texts, such as the Yoga Sutras or Bhagavad Gita, to deepen your understanding of yoga.

- Create a yoga-themed art piece, poem, or short story as a creative project.

HINDUSTANI VOCAL

1. Create a file , Write life sketch and contribution of musicians:

   - Bade Ghulam Ali Khan

   - Ustad Faiyaz Khan

   - Krishna Rao Shankar Pandit

   - Abdul Karim Khan

2. Write about contemporary Hindustani classical musicians (from your book list):

   - Choose musicians you like

   - Analyze their styles and contributions

3. Write a Chhota khyal in Raga Bageshri:

   - Include introduction, bandish, alap, and tan

 4. Write the introduction of Taal roopak , Dhamar , Tilwada along with that , dugun , tigun , chaugun .

PSYCOLOGY

List down all the theorists, psychologists and researchers names along with the contributions they have done, in your notebook from all the chapters of psychology book class 12th.

Prepare one ppt on CBT and RET therapy. Use 14 slides.

Write the discussed content of case study in assignment sheet.

S

Informatics Practices

Holiday Homework – Summer Break 2025
Submission Date: First class after holidays
Instructions:

- Attempt all questions neatly in your classwork copy.
- Use proper indentation and comments for programs.
- Attach printouts of Python code (if done on computer).
- Research questions should be written in your own words.

✅ Part A: Theory (Short Answer Questions)
Answer the following questions briefly (2–3 lines each):

1. What are **tokens** in Python? Write examples.

2. Differentiate between the following:
a) Keywords and Identifiers
b) Unary and Binary Operators
c) Interpreted vs Compiled Language
d) SQL and Python
e) Mutable vs Immutable Data Types
f) `break` vs `continue`
g) `for` loop vs `while` loop
h) List vs Dictionary
i) Series vs DataFrame
j) `head()` vs `tail()` functions

✅ Part B: Python Programming Practice
Write and test the following Python programs:

1. Write a program to print the **Fibonacci series** up to `n`terms using `for` loop.
2. Write a program to count **vowels and consonants** in agiven string.
3. Create a **dictionary** of student names and marks. Addone more student to it and update marks for one.

4. Write a program using **pandas** to:
○ Create a DataFrame of 4 students with columns: `Name`,`Subject`, `Marks`
○ Display the first two and last two records using`head()` and `tail()`
5. Write a program to find the **maximum, minimum, andaverage** from a list of marks.

✅ Part C: SQL Practice
Assume the following table:

sql
Copy code
```sql
STUDENT (RollNo, Name, Class, Marks)
```

Write SQL queries for:

1. Display all records of the STUDENT table.
2. Show names of students who scored more than 80 marks.
3. Count the number of students in Class 12.
4. Find the average marks of all students.
5. Add a new column `Grade` to the STUDENT table.

✅ Part D: Research & Presentation Work

1. Prepare a handwritten chart or A4 sheet explanation of:

○ Python Data Types (with classification: Mutable andImmutable)

○ Real-life examples of where SQL and Python are usedin industries

2. Make a flowchart or diagram of how a Python programruns step by step (from code to output).

Bonus Task (Optional):
Use `matplotlib` in Python to plot a simple bar graph of 5students' marks. Paste the code/output in your copy.

✅ Part D: Research & Presentation Work

3. Prepare a handwritten chart or A4 sheet explanation of:

○ Python Data Types (with classification: Mutable andImmutable)

○ Real-life examples of where SQL and Python are usedin industries

4. Make a flowchart or diagram of how a Python programruns step by step (from code to output).

Bonus Task (Optional):
Use `matplotlib` in Python to plot a simple bar graph of 5students' marks. Paste the code/output in your copy.

ECONOMICS

1. Preparation of project files.
      Key instructions:

• Choose the topic wisely (Only one topic)
• Collect photos, pictures, graphs, schedule, etc related with the topic.
• Make sure that proper research is done on the given topic.
• The maximum pages for the project file should not be less than 30 pages.

Suggestive list of Projects:

➢ National Income
➢ Aggregate demand and Aggregate Supply
➢ Government Budget
➢ Money and Banking
➢ Human capital Formation
➢ Rural Development
➢ Foreign exchange rate
➢ Balance of Payment
➢ New Economic Policy-1991
➢ Sustainable development
➢ Employment and Unemployment
➢ Short run equilibrium