NORTH-EX PUBLIC SCHOOL
(SENIOR SECONDARY, AFFILIATED TO CBSE)
SCHOOL BLOCK, JAIN NAGAR, SECTOR-38, ROHINI, DELHI-81
SUMMER HOLIDAY HOMEWORK
CLASS XII (SCIENCE)

ENGLISH

1. Draft a notice in not more than 50-words for your school notice board, informing the Students about the sale of old sports goods of your school. You are Rohini/Rohan the secretary of the sports club of Alka Public School, Indira Nagar Faridabad.
2. Secretary of the Activity Club of your school, draft a notice for the school noticeboard, informing students of the Inter-class Quiz contest being organised by the school. You are Nayasa/Pankaj.
   [Word limit: 50]
3. The increasing amount of time spent playing indoor games has been a major cause of decreasing the outdoor appearance of children. With this concern, write a speech to be delivered in the morning assembly in 150-200 words. You are Parag/Pragati.
4. You are Ankit/Ankita. You have to deliver a speech on the topic "Education Gives One Power". You have jotted down the following notes: Education trains mind—sharpens skill and abilities—Education: a source of power—improve self—be independent—earn money—ignorance to knowledge—removes Superstition—develops a free spirit—important for women: gives them freedom from social ills—independent—responsible. Write your speech in 150-200 words.
5. Solve any 2 unseen passages and paste it in the test register.
6. You are Shruti / Saurabh, Secretary, Literary Association of Queen Victoria School, Nagpur. Write a notice giving details of the inauguration of the literary Association activities.
7. Read all the chapters of P.T -1 syllabus and write the summary of each in your test register.
8. After reading 'The Last Lesson', can you compare any of your teachers with M Hamel? What values did he possess that every teacher should be endowed with? Are you a true patriot? Can you be one of those villagers? Explain.
9. Make a project file for the ASL.
10. Learn and revise PT-1 syllabus.

PHYSICS

1. Two particles A and B having charges q and 2q respectively are placed on a smooth table with a separation d. A third particle C is to be clamped on the table in such a way that the particles A and B remain at rest on the table under electrical forces. What should be the charge on C and where should it be clamped?
2. A particle of mass m and charge q is thrown at a speed u against a uniform electric field E. How much distance will it travel before coming to momentary rest?
3. A rod of length L has a total charge Q distributed uniformly along its length. It is bent in the shape of a semicircle. Find the magnitude of the electric field at the centre of curvature of the semicircle.
4. Consider a uniformly charged ring of radius R. Find the point on the axis where the electric field is maximum.
5. Consider a circular ring of radius r, uniformly charged with linear charge density λ. Find the electric potential at a point on the axis at a distance x from the centre of the ring. Using this expression for the potential, find the electric field at this point.
6. Two particles, carrying charges -q and +q and having equal masses m each, are fixed at the ends of a light rod of length a to form a dipole. The rod is clamped at an end and is placed in a uniform electric field E with the axis of the dipole along the electric field. The rod is slightly tilted and then released. Neglecting gravity find the time period of small oscillations.

7. A charge is distributed uniformly over a ring of radius 'a'. Obtain an expression for the electric intensity E at a point on the axis of the ring. Hence show that for points at large distances from the ring, it behaves like a point charge.

8. A cube of side b has a charge q at each of its vertices. Determine the potential and electric field due to this charge array at the centre of the cube.

9. In a parallel plate capacitor with air between the plates, each plate has an area of 5×10^{-3} m^2 and the separation between the plates is 2.5 mm.
   (i) Calculate the capacitance of the capacitor.
   (ii) If this capacitor is connected to 100 V supply, what would be the charge on each plate?
   (iii) How would charge on the plates be affected, if a 2.5 mm thick mica sheet of K = 8 is inserted between the plates while the voltage supply remains connected?

10. A 200 μF parallel plate capacitor having plate separation of 5 mm is charged by a 100 V dc source. It remains connected to the source. Using an insulated handle, the distance between the plates is doubled and a dielectric slab of thickness 5 mm and dielectric constant 10 is introduced between the plates. Explain with reason, how the (i) capacitance, (ii) electric field between the plates, (iii) energy density of the capacitor will change?

11. Two capacitors of unknown capacitances C_1 and C_2 are connected first in series and then in parallel across a battery of 100 V. If the energy stored in the two combinations is 0.045 J and 0.25 J respectively, determine the value of C_1 and C_2. Also calculate the charge on each capacitor in parallel combination.

12. Two capacitors of capacitance 10 μF and 20 μF are connected in series with a 6 V battery. After the capacitors are fully charged, a slab of dielectric constant (K) is inserted between the plates of the two capacitors. How will the following be affected after the slab is introduced:
   (a) The electric field energy stored in the capacitors?
   (b) The charges on the two capacitors?
   (c) The potential difference between the plates of the capacitors? Justify your answer.

13. Complete your practical and activity file.

14. Prepare a model on the following

S.No	Roll Numbers	Suggested Topics
1	1-5	RECTIFIER
2	6-10	PHOTOELECTRIC EFFECTS
3	11-15	LIGHT DEPENDENT RESISTANCE
4	16-21	LOGIC GATES

15. Prepare an investigatory project
   (Suggested Investigatory Projects)
   1. To study various factors on which the internal resistance/EMF of a cell depends.
   2. To study the variations in current flowing in a circuit containing an LDR because of a variation in (a) the power of the incandescent lamp, used to 'illuminate' the LDR (keeping all the lamps at a fixed distance). (b) the distance of a incandescent lamp (of fixed power) used to 'illuminate' the LDR.
   3. To find the refractive indices of (a) water (b) oil (transparent) using a plane mirror, an equiconvex lens (made from a glass of known refractive index) and an adjustable object needle.
   4. To investigate the relation between the ratio of (i) output and input voltage and (ii) number of turns in the secondary coil and primary coil of a self-designed transformer.
   5. To investigate the dependence of the angle of deviation on the angle of incidence using a hollow prism filled one by one, with different transparent fluids.
   6. To estimate the charge induced on each one of the two identical Styrofoam (or pith) balls suspended in a vertical plane by making use of Coulomb's law.
   7. To study the factor on which the self-inductance of a coil depends by observing the effect of this coil, when put in series with a resistor/(bulb) in a circuit fed up by an A.C. source of adjustable frequency.

8. To study the earth's magnetic field using a compass needle -bar magnet by plotting magnetic field lines and tangent galvanometer.

CHEMISTRY

1. The vapour pressure of CS_2 at $500^0 C$ is 854 mm Hg .A solution of 2.0g sulphur in 100g of CS_2 has a vapour pressure of 848.9 mm Hg .Calculate the formula of sulphur molecule.

2. Calculate the mass percentage of benzene (C_6H_6) and carbon tetrachloride (CCl_4) if 22 g of benzene is dissolved in 122 g of carbon tetrachloride.

3. Calculate the mole fraction of benzene in solution containing 30% by mass in carbon tetrachloride.

4. Calculate the molarity of each of the following solutions: (a) 30 g of . in 4.3 L of solution (b) 30 mL of 0.5 M diluted to 500 mL.

5. Calculate (a)molality (b)molarity and (c)mole fraction of KI if the density of 20% (mass/mass) aqueous KI is $1.202 \, g \, ml^{-1}$.

6. H_2S, a toxic gas with rotten egg like smell, is used for the qualitative analysis. If the solubility of H_2S in water at STP is 0.195 m, calculate Henry's law constant.

7.Henry's law constant for CO_2 in water is 1.67 x 108 Pa at 298 K. Calculate the quantity of CO_2 in 500 mL of soda water when packed under 2.5 atm CO_2 pressure at 298 K.

8.The vapour pressure of pure liquids A and B are 450 and 700 mm Hg respectively, at 350 K. Find out the composition of the liquid mixture if total vapour pressure is 600 mm Hg. Also find the composition of the vapour phase.

9.Vapour pressure of pure water at 298 K is 23.8 mm Hg. 50 g of urea (NH_2CONH_2) is dissolved in 850 g of water. Calculate the vapour pressure of water for this solution and its relative lowering.

10.Boiling point of water at 750 mm Hg is $99.63°C$. How much sucrose is to be added to 500 g of water such that it boils at $100°C$. Molal elevation constant for water is $0.52 \, K \, Kg \, mol^{-1}$.

11. Few suggested Projects. Do any one.

Study of the presence of oxalate ions in guava fruit at different stages of ripening.
Study of quantity of casein present in different samples of milk.
Preparation of soybean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.
Study of the effect of Potassium Bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)
Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, etc.
Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).
Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.

12. Working model on distillation of water.

MATHEMATICS

1. Express $= \begin{bmatrix} 2 & 5 & 6 \\ 1 & 2 & 3 \\ -1 & 0 & 6 \end{bmatrix}$ as a sum of symmetric and skew symmetric matrix.

2. Solve the system of linear equation by matrix method.
   (a) $x - y + z = 4$ (b) $2x + y - 3z = 0$ (c) $x + y + z = 2$

3. If A $= \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$ find A-1 . Using A-1 solve the system of equation

   x +2y +z = 4

   -x +y +z = 0

   x -3y + z = 2

4. Find the value of $\cos(\frac{\pi}{6} + \cot^{-1}(- \sqrt{3}\ ))$.

5. Let L be the set of all lines in a plane and R be a relation on L defined by l_1 R l_2 iff l_1 is perpendicular to l_2 , then R is equivalence relation or not.

6. Find the value of $\cos^{-1} (\cos(-680^0))$.

7. Which is greater tan1 or $\tan^{-1}$1.

8. Find the range of $\sec^{-1}(2x - 1)$.

9. Draw the graph of $\tan^{-1}$x and $\sec^{-1}$x.

10. **Case-Study** : Read the following passage and answer the questions given below.
    Consider the system of equations:
    3x – y – 2z = 2
    2y – z = -1
    3x – 5y = 3
    (a) Express the above equations in matrix form . If A denotes the coefficient matrix, find $|A|$.
    (b) Calculate (adj.A).B and comment on the consistency of the system.

11. **Case-Study** : Read the following passage and answer the questions given below.
    A diet is to contain 30 units of vitamin A , 40 units of vitamin B and 20 units of vitamin C. Three type of foods F1, F2, F3 are available . One unit of Food F1 contains 3 units of vitamin A, 2 units of vitamin B and 1 unit of vitamin C. One unit of Food F2 contains 1 unit of vitamin A, 2 units of vitamin B and 1 unit of vitamin C. One unit of Food f3 contains 5 units of vitamin A, 3 units of vitamin B and 2 units of vitamin C.
    (a) If the diet contains x units of food F1 , y units of food 2 , z units of food F3 . Then write the matrix equation representing the above situation. . If A denotes the coefficient matrix, find $|A|$.
    (b) If A is the matrix formed by coefficients of x and y of the given situation, then what is the value of $|adj.A|$?

12. Do Lab Activities as given in the class.

BIOLOGY

Q. 1. Differentiate between Geitonogamy and Xenogamy in plants. Which one between the two will lead to Inbreeding Depression and why?

Q. 2. The flower of brinjal is referred to as chasmogamous while that of beans is cleistogamous. How are they different from each other?

Q. 3. State the significance of pollination. List any four differences between wind pollinated and animal pollinated flowers.

Q. 4. Explain the male reproductive system with all parts and their functions in details with well labelled diagram.

Q. 5. Give the summary of mensural cycle with all events with diagram.

Q. 6. Explain the female reproductive system with all parts and their functions in details with well lebelled diagram.

Q. 7. Describe the pre-fertilisation and post-fertilisation events.

Q. 8. Difference between oogenesis and spermatogenesis.

Q. 9. Explain the medical termination of pregnancy (MTP).

Q. 10. what is sexually transmitted disease (STDs)? explain with suitable examples.

Q No 11 - Make a detailed Project on Reproductive Health , Pollination and their Agents Female Reproductive Organ and their Functions.

Q No 12 - Make a Working Model on :

★ Reproduction in Flower

★ Double Fertilization, Ovule

★ Reproductive Organ

★ Gametogenesis

★ Genetic Code, DNA , Histone Octamer

PHYSICAL EDUCATION

1. What do you mean by kyphosis?
2. Explain flat foot with precaution and remedies.
3. Describe knock-knock-knees and its causes.
4. Enlist the symptoms of female athletes trade.
5. What are the corrective measures of flat foot?
6. Explain the exercise guidelines for different age groups.
7. What is planning right any four objective of planning?
8. Explain the management of sport events.
9. What are the responsibilities of publicity committee?
10. Draw the fixture 45 teams on the basis of league tournament with cyclic method.
11. Explain knockout tournament.
12. Complete
    A. Practical record book,
    B. Practical 1,
    C. Fitness test administration for all items.