BCM SCHOOL, BASANT AVENUE, DUGRI ROAD, LUDHIANA

HOLIDAYS HOMEWORK

CLASS: XII SCIENCE

SESSION: 2023-24

Dear Students, hope all of you are safe and fit at your homes. 'Summer Vacation' is a leisure time for you to improve your academic knowledge as well as personality. The Holidays Homework designed for you aims at fulfilling both the motives. The homework must be done in a very neat and presentable manner.

NOTE:

WORK IS TO BE SUBMITTED BETWEEN JULY 13, 2023 TO JULY 17, 2023.

KINDLY ENSURE TIMELY SUBMISSION.

CHEMISTRY: PROJECT

Make a Research based Project file containing following –

- Acknowledgement
- Title page
- Introduction
- Actual Presentation/ Content
- Data collection and data representation
- Case study /Experiment
- Observation/Data analysis
- Conclusion
- Bibliography

Add pictures, photographs wherever necessary.

Write the project title, your name, name of the school and session.

ORGANISE YOUR WRITING MATERIAL AND WRITE IN YOUR OWN HANDWRITING IN THE FILE.

2-Write following practicals in your chemistry practical file

- Titration KMnO4 vs Mohr's salt
- Titration KMnO4 vs Oxalic Acid
- Tests of functional groups in Organic compounds
- Salt analysis

3-ART INTEGRATED PROJECT

• Make digital infographics on any of the following topics-

*Gaseous solutions in day to day life & industries

* Solid solutions in day to day life & industries

* Liquid solutions in day to day life & industries

Note- Submit Hardcopy of it printed on A-3 size thick sheet

PHYSICS: ASSIGNMENT

2 MARK QUESTIONS

1) A force F is acting between two charges placed some distance apart in vacuum. If a brass rod is placed between these two charges how does the force change?
2) Two dipoles made charges + q and + Q respectively have equal dipole moments. Give the (i) ratio between the separation of these two pairs of charges (ii) angle between the dipole axes of these two dipoles.
3) A metallic spherical shell has an inner radius R1 and outer radius R2. A charge Q is placed at the center of the spherical cavity. What will be the surface charge density on (i) the inner surface and (ii) the outer surface?
4) A thin metallic spherical shell of radius R carries a charge Q on its surface. A point charge Q/2 is placed at its center C and another charge +2Q is placed outside the shell at a distance x from the center as shown.

A. 2Q

Find (i) the force on the charge at the center of the shell and at the point A .
(ii) the electric flux through the shell.

5) Explain the meaning of the statement 'electric charge of a body is 'quantized'.
6) Why can one ignore quantization of electric charge when dealing with macroscopic i.e., large scale charges?
7) When a glass rod is rubbed with a silk cloth, charges appear on both. A similar phenomenon is observed with many other pairs of bodies. Explain how this observation is consistent with the law of conservation of charge.
8) Four-point charges $q_A = 2\ \mu C$, $q_B = -5\ \mu C$, $q_C = 2\ \mu C$, and $q_D = -5\ \mu C$ are located at the corners of a square ABCD of side 10 cm. What is the force on a charge of 1 μC placed at the center of the square?
9) A system has two charges $q_A = 2.5 \times 10^{-7}$ C and $q_B = -2.5 \times 10^{-7}$ C located at points A: (0, 0, −15 cm) and B: (0, 0, +15 cm), respectively. What are the total charge and electric dipole moment of the system?
10) **(a)** An electrostatic field line is a continuous curve. That is, a field line cannot have sudden breaks. Why not?
(b) Explain why two field lines never cross each other at any point?

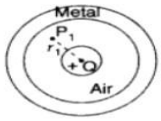
3 MARK QUESTIONS

1) Define the term dipole moment $\overline{P}$ of an electric dipole indicating its direction. Write its S.I unit. An electric dipole is placed in a uniform electric field $\overline{E}$. Deduce the expression for the Torque acting on it.
2) Electric charge is uniformly distributed on the surface of a spherical balloon. Show how electric intensity and electric potential vary (a) on the surface (b) inside and (c) outside.

3) Two point charges +q and +9q are separated by a distance of 10 a. Find the point on the line joining the two changes where electric field is zero?
4) Consider a uniform electric field $\mathbf{E} = 3 \times 10^3\ \hat{i}\ N/C$. (a) What is the flux of this field through a square of 10 cm on a side whose plane is parallel to the yz plane? (b) What is the flux through the same square if the normal to its plane makes a $60°$ angle with the x-axis?
5) A conducting sphere of radius 10 cm has an unknown charge. If the electric field 20 cm from the centre of the sphere is $1.5 \times 10^3\ N/C$ and points radially inward, what is the net charge on the sphere?

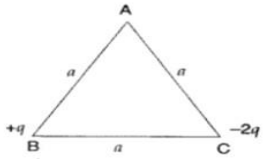
6) A system has two charges $q_A = 2.5 \times 10^{-7}$ C and $q_B = -2.5 \times 10^{-7}$ C located at points A: $(0, 0, -15\ \text{cm})$ and B: $(0, 0, +15\ \text{cm})$, respectively. What are the total charge and electric dipole moment of the system?

7) A small metal sphere carrying charge +Q is located at the centre of a spherical cavity in a large uncharged metallic spherical shell. Write the charges on the inner and outer surfaces of the shell. Write the expression for the electric field at the point P_1 .

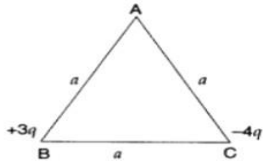


8) A thin conducting spherical shell of radius R has charge Q spread uniformly over its surface. Using Gauss's law, derive an expression for an electric field at a point outside the shell.
Draw a graph of electric field E(r) with distance r from the centre of the shell for $0 \leq r \leq \infty$

9) Two point charges + q and -2q are placed at the vertices 'B' and 'C' of an equilateral triangle ABC of side as given in the figure. Obtain the expression for (i) the magnitude and (ii) the direction of the resultant electric field at the vertex A due to these two charges.



10) Two point charges + 3q and – 4q are placed at the vertices 'B' and 'C' of an equilateral triangle ABC of side 'a' as given in the figure. Obtain the expression for



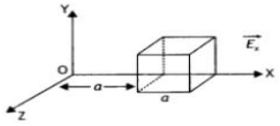
(i) the magnitude and

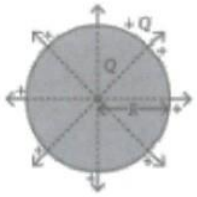
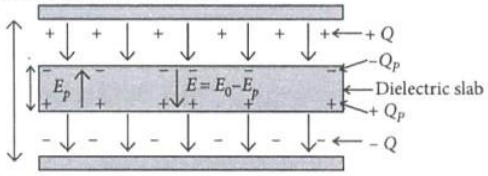
(ii) the direction of the resultant electric field at the vertex A due to these two charges.

11) Two spherical conductors of radii Ra and R2 ($R_2 > R_1$) are charged. If they are connected by a conducting wire, find out the ratio of the surface charge densities on them.

LONG ANSWER QUESTIONS

1. (a) State Gauss theorem in electrostatics. Using it, prove that the electric field at a point due to a uniformly charged infinite plane sheet is independent of the distance.
   (b) How is the field directed if (i) the sheet is positively charged, (ii) negatively charged?
2. Use Gauss's law to derive the expression for the electric field ($\vec{E}$) due to a straight uniformly charged infinite line of charge λ Cm^{-1}.
3. Define electric flux and write its SI unit. The electric field components in the figure shown are : $E_x = \alpha x$, $E_y = 0$, $E_z = 0$ where $\alpha = 100$N/cm. Calculate the charge within the cube, assuming a = 0.1m.



CASE BASED QUESTIONS (Each sub question carry 1 mark)	
46	The electrical capacitance of a conductor is the measure of its ability to hold electric charge. Figure shows an isolated spherical conductor of radius R. The charge Q is uniformly distributed over its entire surface. It can be assumed to be concentrated at the centre of the sphere. The potential at any point on the surface of the spherical conductor will be $V=Q/4\pi\varepsilon_0 R$. Capacitance of the spherical conductor situated in vacuum is $C = QV = 4\pi\varepsilon_0 R$ Clearly, the capacitance of a spherical conductor is proportional to its radius  (i) If an isolated sphere has a capacitance 50pF. Then radius is (a) 90 cm (b) 45 cm (c) 45 m (d) 90 m (ii) How much charge should be placed on a capacitance of 25 pF to raise its potential to 10^5 V? (a) 1μC (b) 1.5μC (c) 2μC (d) 2.5μC (iii) Metallic sphere of radius R is charged to potential V. Then charge q is proportional to (a) V (b) R (c) both V and R (d) none of these. (iv) If 64 identical spheres of charge q and capacitance C each are combined to form a large sphere. The charge and capacitance of the large sphere is (a) 64q, C (b) 16q,4C (c) 64q,4C (d) 16q,64C
47	A dielectric slab is a substance that does not allow the flow of charges through it but permits them to exert electrostatic forces on one another. When a dielectric slab is placed between the plates, the field E_o polarises the dielectric. This induces charge $-Q_p$ on the upper surface and $+ Q_p$ on the lower surface of the dielectric. These induced charges set up a field E_p inside the dielectric in the opposite direction of external field E.  (i) In a parallel plate capacitor, the capacitance increases from 4μF to 80μF on introducing a dielectric medium between the plates. What is the dielectric constant of the medium? (a) 10 (b) 20 (c) 50 (d) 80 (ii) A parallel plate capacitor with air between the plates has a capacitance of 8 pF. The separation between the plates is now reduced by half and the space between them is filled with a medium of dielectric constant 5. Calculate the value of capacitance of the capacitor in the second case. (a) 20 pF (b) 40 pF (c) 60 pF (d) 80 pF (iii) A dielectric introduced between the plates of a parallel plate capacitor with battery remain connected (a) decreases potential difference between the plates (b)decreases the electric field between the plates (c) increases the charge on the plates (d) all the above

MATHEMATICS:

ACTIVITIES OF LAB MANUAL

- To verify that the relation R in the set L of all lines in a plane, defined by R = {(l, m): l || m} is an equivalence relation.
- To demonstrate a function which is one-one but not onto.
- To sketch the graphs of a x and $\log_a x$, $a > 0$, $a \neq 1$ and to examine that they are mirror images of each other.
- To understand the concepts of local maxima, local minima and point of inflection.

  PROJECT WORK:

  Form a differential equation for the growth of bacteria in different environments.

  Project in ppt/ video/model form

BIOLOGY:

ART INTEGRATED PROJECT WORK: POSTER MAKING on the topics

- Translation – Synthesis of proteins. (Roll No. 1-5)
- DNA – Double helical structure. (Roll No. 6- 10)
- Lac operon Model. (Roll No. 11-15)
- Transcription in prokaryotes and Eukaryotes . (Roll No. 16- 21)

ENGLISH: ASSIGNMENT

1. What universality of human nature does M. Hamel comment upon in the story?

2. What had the narrator often counted upon on reaching school? What did he find on the contrary on the last day?

3.How did M Hamel react when Franz was unable to recite the rules of participles?

4.What was the mood in the classroom when M Hamel gave his last French lesson?

5.‘Saheb wants to bloom and blossom but is nipped in the bud’. Explain briefly.

6.Throughout the years ,it has acquired the proportions of a fine art.” What does ‘it’ refer to here and Why has it been called a fine art?

7. What does the reference to ‘Chappals’ tell the readers about the economic condition?

8. What meaning do the most women attach to glass bangles? What is the sanctity of glass bangles for an Indian woman?

9. “It is his karam, his destiny ”What is Mukesh’s grandmother’s attitude towards their situation?

10. What common complaints does Anees Jung hear in every bangle making household?

11. ‘When I sense a flash of it in Mukesh, I am cheered.’ What is this a reference to and why did it gladden the narrator’s heart?

12. Why did the narrator decide to learn swimming after he grew up?

13. What was the touch of reason that the narrator had in his mind during his downward journey to the pool?

14. What does the statement “All we have to fear is fear itself “ imply ?

15. Justify the title of the chapter ‘Deep Water’.

TYPOGRAPHY AND COMPUTER APPLICATIONS

Make two PowerPoint presentations. One presentation should be automatic with voice recording and second one should run manually and student will explain it in class after vacation.

Topics of Presentation

1. Chemistry in Everyday life
2. Mathematics in Nature
3. Go Green with Technology
4. Human Cloning and Genetic Engineering

Presentations should consist of atleast 20 slides. Students can use audio, videos, music in presentation.

COMPUTER SCIENCE:

Implement all the following programs using Python Interface

1. WAP to accept a number, find and display whether it’s a Armstrong number or not.
2. WAP to accept a string (a sentence) and returns a string having first letter of each word in capital letter.

3. WAP that counts the number of alphabets and digits, uppercase letters, lowercase letter, spaces and other characters in the string entered.
4. WAP to remove all odd numbers from the given Index list.
5. WAP to display second largest element of a given list.
6. WAP in Python to find and display the sum of all the values which are ending with 3 from a list.
7. WAP to swap the content with next value divisible by 7.
8. WAP to accept values from user and create a tuple.

PAINTING: PROJECT

- Indian miniature painting
- Prepare one Lippan art project related
- Any religious image
- Any geometrical work
- Any abstract or mandala design

(Mirrors are compulsory to use)

MUSIC: PROJECT

1: Write ragas Composition with simple elaborations and few tanas in the following Ragas-

Bhairav

Bageshwari

Malkauns.

2. One Tarana and one Dhamar with Dugun and Chaugun in any one of the prescribed Ragas.

3: Write Knowledge of the structure and tuning of Tanpura.

4: Write the Thekas of prescribed Talas with hand beats with Thah, Dugun and Chaugun:

Jhaptala Rupak Tilwada Dhamar

PHYSICAL EDUCATION

1. **Make a practical notebook**

   Topic – ATHLETICS

   - Introduction
   - History
   - Latest rules
   - Draw a diagram of standard track (400 M)
   - Track & field events
   - Any two events of jumping
   - Any two events of throwing
   - Terminologies related to athletic events
   - Sports awards, records
   - Write detail of any two games / sports which is in your syllabus

2. **Make a project file**

   - It should consists of 18 to 22 pages
   - **Write in detail –** Any one **competition / tournament** of International level

   OR

   - Write down the **biography** of any one International player

     any International tournament.