CARMEL
JAMMU
BELIEF ENHANCES LIFE

CARMEL CONVENT SCHOOL

SUMMER HOLIDAY HOMEWORK

2025-26

Class 12th B

PHYSICS

Prepare project report as per the guidelines Your project should have the following elements:

Synopsis - This is a summary of your idea and should include the purpose of the experiment, procedure used, data, and conclusion

• **Research paper** - A research paper should be prepared and must be available along with the project data book with relevant written material. A research paper helps organize data as well as thoughts. A good paper includes the following sections:

Title page - Centre the project title, and put your name, address, and school

Aim / Objective - The introduction sets the stage for your report. The aim includes your hypothesis, an explanation of what prompted your research and what you hoped to achieve.

Scientific Principle Involved - In this section describe the principal involved.

Material Used - List all the items used here this will help you in working out the final cost.

Method - This section describes how you did the study. Describe in detail the methodology used to collect your data or make your observations. Your report should be detailed enough for someone to be able to repeat the experiment. Include photographs or drawings of self-designed equipment. The research work conducted by you may have taken more than a year. In such case, include this year's work only.

Discussion - This is the essence of your paper. The results and conclusions should flow smoothly and logically from your data. Be thorough. This should let the reader know exactly what you did, compare your results with theoretical values, published data and expected results. Include a section of possible errors. How did the data vary between repeated observations of a similar

ASSIGNMENT -1 ELECTRIC CHARGES AND FIELDS

Q1 Define electric dipole moment . Is it a scalar or a vector ? Derive the expression for the electric field of a dipole at a point on the equatorial line of the dipole .

Q2. State Gauss theorem . Using Gauss's law deduce the expression for the electric field due to a
uniformly charged spherical conducting shell of radius R at a point (i) outside & (ii) inside the shell . Plot a graph showing variation of electric field as a function of r > R and r < R (r being the distance from the centre of the shell) .

Q3 .(a)Define electric flux . Write its S.I . unit .
(b) Using Gauss's law ,prove that the electric field at a point due to a uniformly charged infinite
plane sheet is independent of the distance from it .
(c) How is the field directed if (i) the sheet is positively charged (ii)negatively charged ?

Q4. (a) Derive an expression for the torque experienced by an electric dipole kept in a uniform electric field . When is this torque maximum.

Q5 .Sketch the electric lines of force of
(a) a point charge q >0 ,
(b) a point charge q < 0,
(c) an electric dipole or two equal & opposite charges separated by a small distance ,
(d) two equal positive charges placed small distance apart in air ,

Q6. What is meant by quantisation of electric charge ?

Q7 .Define dielectric constant of a medium in terms of force between electric charges .
Q8. An infinite line charge produces a field of 9×10^4 N/C at a distance of 4cm. Calculate the linear charge density.

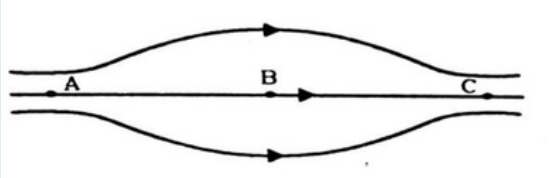
Q9. Two infinite parallel plane thin sheets have uniform charge densities of σ1 and σ2 . Determine the electric field at points
(i) (iii) to the left of the sheets
(ii) between them to the right of the sheets.

Q10 .Is the force acting between two point electric charges q1 and q2 kept at some distance in air, attractive or repulsive when : (i) q1 q2 > 0 (ii) q1 q2 < 0

Q11.An electric dipole of dipole moment 20μC is enclosed by closed surface. What is the net electric flux coming out of this surface ?
Q12 . 1 C of charge is equal to charge of 'n' number of electrons in magnitude. What is the value
of 'n'?

Q13.The distance of the field point , on the equatorial plane of a small electric dipole is halved . By what factor does the electric field due to the dipole change ?

Q14. . Fig . shows some of the electric field lines corresponding to an electric field .The electric field at which point is minimum.



Q15. An electrostatic field line is a continuous curve. That is a field line cannot have sudden breaks. Why not?

Q16. Explain why two Electric field lines never cross each other at any point.

Q17.Three equal charges, each having a magnitude of 2.0x10-6 C, are placed at the three corners of a right -angled triangle of sides 3cm,4cm and 5cm.Find the force on the charge at the right- angle corner.

Q18.Three charges ,each equal to q, are placed at the three corners of a square of side ' a' . Find the electric field at the fourth corner.

Q19. A glass rod when rubbed with silk cloth, acquires a charge of 1.6 ×10-13 C. What is the charge on silk cloth ?

Q20. Two charges q and -3q are placed fixed on x-axis separated by distance 'd' .Where should a third charge 2q be placed such that it will not experience any force?

Q21. A point charge causes an electric flux -3 × 10-14 Nm2/ C to pass through a spherical Gaussian surface .
(a) Calculate the value of the point charge .
(b) If the radius of the Gaussian surface is double , how much flux would pass through the surface ?

Q22. Fill in the blanks:
(i) Two spheres of equal radii have charges q and 3q. The ratio of their surface charge densities is .....
(ii) Net electric field inside the charged spherical shell is .....
(iii)Electric flux is a .....quantity and its SI unit is .....
(iv) The force of repulsion between two positive charges of 1C each, kept 1m apart in vacuum , is.....

(v) In a uniform electric field, an electric dipole experiences no net but a non-zero
_____

ASSIGNMENT 2 (ELECTROSTATIC POTENTIAL & CAPACITANCE)

Q1 .Draw graphs showing the variations of
(i)Electrostatic potential V with distance 'r' for a charge q
(ii) **Electrostatic field E with distance 'r' for a charge q**

Q2 .Show that the electric field at any point is equal to the negative of the potential gradient at
that point .

Q3 .What is an equipotential surface ? Give an example .

Q4 .Sketch equipotential surfaces for
(i) A positive point charge
(ii) A uniform electric field .

Q5 .Show that the amount of work done in moving a test charge over an equipotential surface is
zero point .

Q7.Fill in the blanks:
(i) The electric potential of a point charge is_____ symmetric.
(ii) Electric potential is _____quantity while potential gradient is a quantity.
(iii)_____ at a point is equal to the negative of the potential gradient at that point.
(iv) The potential energy of two like charges is_____ _.
(v) For a constant electric field in the z-direction , equipotential surfaces will be planes parallel to_____.

Q8.How much is the electric potential of a charge at a point at infinity.

Q9.The work done in moving a charge of 3 Coulomb between two points is 6 J. What is the potential difference between the two points ?

Q10. The electric potential at 0.9 m from a point charge is +50 V. What is the magnitude and sign of the charge.

Q11.Derive an expression for the potential at a point along the axial line of a short dipole.
Q12.Derive an expression for the electric potential at a distance 'r' from a point charge 'q'.
Q13.Derive an expression for the potential energy of a dipole rotated in a uniform electric field.
Q14.Deduce expressions for the potential energy of a system of two point charges and three point charges and hence generalise the result for a system of 'N' point charges.
Q15. Two point charges +10μC and -10μC are separated by a distance of 2.0 cm in air. Calculate the potential energy of the system

Q16.Deduce the expression for the capacitance of a parallel plate capacitor when a dielectric slab is inserted between the plates. Assume the slab thickness less than the plate separation.

Q17. Two capacitors of equal capacitance when connected in series have net capacitance C1 and
when connected in parallel have net capacitance C2 . What is the value of C1/C2 ?
Q18.Sketch a graph to show how the charge Q acquired by a capacitor of capacitance C varies
with increase in potential difference between its plates.
Q19. Why does the electric field inside a dielectric decrease when it is placed in an external electric field ?
Q20. A parallel plate capacitor of capacitance C is charged to a potential V by a battery. Without disconnecting the battery, the distance between the plates is tripled and a dielectric
medium of k = 10 is introduced between the plates of the capacitor. Explain giving reasons, how will the following be affected :
(i)capacitance of the capacitor (ii) charge on the capacitor (iii) energy density of the capacitor

Biology

Theory-Based Assignments

- *Reproduction in Organisms*: Explain the types of reproduction (asexual and sexual) in different organisms, including plants and animals.
- *Human Reproduction*: Describe the male and female reproductive systems, gametogenesis, fertilization, and embryonic development.
- *Genetics*: Explain Mendel's laws of inheritance, including the law of segregation and the law of independent assortment.

Practical-Based Assignments

- *Pedigree Analysis*: Create and analyzepedigree charts to study the inheritance of traits in families.
- *Genetic Problems*: Solve genetic problems related to Mendelian inheritance, including monohybrid and dihybrid crosses.

Investigatory project on any one of the following topics:

- *Drug Addiction*: Study the effects of drug addiction, classification of drugs, and prevention methods.
- *Cancer Biology*: Explore the differences between healthy and cancer cells, causes of cancer, and treatment options.
- *AIDS*: Investigate the causes, symptoms, and prevention methods of AIDS.
- *Common Diseases*: Analyze various communicable and non-communicable diseases, their causes, symptoms, and prevention methods.
- *Study of Bacteria Growth*: Investigate the effects of antibiotics on bacterial growth.
- *Antibacterial Properties*: Explore the antibacterial properties of natural substances like garlic, turmeric, or ginger.
- *Microbes in Human Welfare*: Study the role of microbes in human health and disease.
- *Pollination*: Investigate the different types of pollination and their importance in plant reproduction.
- *Effect of Oil Spills*: Study the impact of oil spills on marine ecosystems.
-*Environmental Conservation*: Explore ways to conserve agricultural irrigation water and reduce transpiration loss.
- *DNA Fingerprinting*: Learn about the technique of DNA fingerprinting and its applications.
-*RecombinantDNA Technology*: Study the principles and applications of recombinant DNA technology in medicine.
- *Genetic Disorders*: Investigate the causes and prevention methods of genetic disorders like sickle cell anemia.

Presentation and Submission Guidelines

- Submit the assignments and project report in a neatly typed or handwritten format.
- Include diagrams, illustrations, and tables to support your answers and project findings.
- Ensure proper citation and referencing of sources used in the project.

Tips for Success

- Start working on the assignments and project early to avoid last-minute rush.
- Use reliable sources, including textbooks, online resources, and scientific journals.
- Seek guidance from teachers or mentors if needed.
- Showcase your creativity and critical thinking skills in the project and assignments.

Do self study of chapter organisms and population.

(HINDI)

HOLIDAYS HOMEWORK

CLASS 12th AB

1. परियोजना कार्य :-

भीमराव अम्बेडकर, महादेवी वर्मा, हरिवंशराय बच्चन, तुलसीदास इन लेखकों और कवियों का जीवन परिचय, शिक्षा, साहित्यिक संबंधी जानकारी एकत्र कीजिए।

- **इन से जुड़े चित्र चिपकाए व फाइल को आकर्षित बनाइए।**
- **परियोजना कार्य की फाइल में अक्षरों की बनावट पर विशेष ध्यान देना है**
- **जिन विद्यार्थियों का पहले का कार्य भी पूरा नहीं है वह समय पर कार्य समाप्त करें।**

Mathematics

1.Project(Art Integrated) :

To minimise the cost of the food, meeting the dietary requirements of the staple food of the adolescent students of your school.

Task to be done

- (i) Make a survey of atleast 100 students to find which staple food they consume on daily basis.
- (ii) Select two food items constituting one cereal and one pulse.
- (iii) Find from dietician the minimum requirement of protein and carbohydrate for an adolescent and also find the content of protein and carbohydrate in 1 kg. of selected cereal and pulse respectively.
- (iv) Find the minimum cost of the selected cereal and pulse from market.
- (v) Formulate the corresponding Linear Programming problem.
- (vi) Solve the problem graphically.
- (vii) Interpret the result.
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2.Revise the whole syllabus that you have done in the class.

3. Write the activities on the lab manual that will be Shared in the group.

4. Solve the worksheets that will be shared later on.

Informatics Practices

Pandas Programs:

• Creating Series:
Programs demonstrating how to create a Pandas Series from a dictionary, scalar value, and NumPy array.

• Dataframe Creation:
Programs showing how to create DataFrames from nested lists and dictionaries.

• Data Manipulation:
Programs demonstrating operations like modifying existing values in a Series, performing arithmetic operations on Series, adding data to existing Series, and filtering data based on conditions (e.g., selecting rows where percentage > 70).

• Dataframe Operations:
Programs showcasing operations like renaming columns, dropping rows, and joining DataFrames.

• Data Access:
Programs demonstrating how to access values in rows and columns of a DataFrame.

• Data Display:
Programs demonstrating how to display attributes of a Series or DataFrame, and how to display data row-wise and column-wise.

SQL:

• Create a student table with the student id, name, and marks as attributes where the student id is the primary key.
• Insert the details of a new student in the above table.
• Delete the details of a particular student in the above table.
• Use the select command to get the details of the students with marks more than 80.
• Create a new table (order ID, customer Name, and order Date) by joining two tables(orderID,customerID,andorderDate)and(customerID,customer
• Create a foreign key in one of the two tables mentioned above
• Find the min, max, sum, and average of the marks in a student marks table.
• Find the total number of customers from each country in the table (customer ID, customer Name, country) using group by.
• Create a new table(name,dateofbirth)by joining two tables(studentid, name) and (student id, date of birth).
• Write a SQL query to order the(studentID, marks)table in descending order of the marks.

Physical education

Draw any two, two yogasana of five disease on your practical note book.
Draw any one game of your choice on your practical note book.
SAI, khelo India physical fitness test
1. Flamingo Balance Test
2. Plate Tapping Test
3. 50mt. Speed test
4. 600mt Run/Walk test
5. Sit and Reach flexibility test
6. Partial Abdominal Curl Up Test
7. Push, ups for boys
8. Modified Push-Ups for girls.

CHEMISTRY

Prepare one Investigatory Project on any one of the following topic
"Preparation of soya bean milk and its comparison with the natural milk with respect to curd formation, effect of temperature and taste ".
based on concept of Chemistry (as per CBSE guidelines).
a) INTRODUCTORY PAGE

b) CERTIFICATE

c) ACKNOWLEDGEMENT

d) INDEX/CONTENTS

e) INTRODUCTION

f) AIM

g) OBSERVATIONS

h) RESULT

i) CONCLUSION

j) BIBLIOGRAPHY

(Assignment A)

SOLUTION

1. Give reason for the following. Aquatic animals are more comfortable in cold water than in warm water.

2. State Henry's law. Calculate the solubility of CO_2 in water at 298 K under 760 mm Hg. (KH for CO_2 in water at 298 K is 1.25 x 106 mm Hg)

3. Calculate the molarity of 9.8% (w/w) solution of H_2SO_4 if the density of the solution is 1.02 gmL^{-1}. [Molar mass of H_2SO_4 = 98 $gmol^{-1}$]

4. State Raoult's law for a solution containing volatile components. What is the similarity between Raoult's law and Henry's law?

5. (i) Gas (A) is more soluble in water than gas (B) at the same temperature. Which one of the two gases will have the higher value of KH (Henry's constant) and why?

(ii) Explain why a solution of chloroform and acetone shows negative deviation from Raoult's law?

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

7. A 4% solution (w/w) of sucrose (M = 342 g mol^{-1}) in water has a freezing point of 271.15 K. Calculate the freezing point of 5% glucose (M = 180 g mol^{-1}) in water. (Given: Freezing point of pure water = 273.15 K)

8. 45 g of ethylene glycol ($C_2H_6O_2$) is mixed with 600 g of water. Calculate (i) the freezing point depression and (ii) the freezing point of the solution. (Given, Kf of water = 1.86 K kg mol-1)

9. A solution is prepared by dissolving 10 g of non-volatile solute in 200 g of water. It has a vapour pressure of 31.84 mm of Hg at 308 K. Calculate the molar mass of the solute. (Vapour pressure of pure water at 308 K = 32 mm Hg)

10. Some ethylene glycol, $HOCH_2CH_2OH$, is added to your car's cooling system along with 5 kg of. water. If the freezing point of water-glycol solution is −15°C, what is the boiling point of the solution? (Kb = − 0.52 K kg mol-1 and Kf = 1.86 K kg mol^{-1} for water)

(Assignment B).

1. What is a galvanic cell?

2. Give the cell representation for Daniell Cell.

3. Mention the purpose of salt-bridge placed between two half-cells of a galvanic cell?

4. Give the condition for Daniell Cell in which there is no flow of electrons or current.

5. How is electrode potential different from cell potential?

6. Can you store zinc sulphate solution in a copper container? Give suitable reason. (E0 Zn^{2+}/Zn = – 01.76V, E0. Cu^{2+}/Cu = 0.34v)

7. How does electrochemical series help us in predicting whether a redox reaction is feasible or not?

8. Write Nernst equation for the electrode reaction.

$M^{n+}(aq) + ne \rightarrow M(s)$ at 298 K and 1 bar pressure.

9.Write the unit of Faraday constant.

10. List the two factors that influence the value of cell potential of a galvanic cell.

11. How is equilibrium constant of a reaction related to standard cell potential?

12. Write the relation between E cell and equilibrium constant (K) of cell reaction.

13. Define cell constant. Write the SI unit of cell constant.

14 How does specific conductance or conductivity of electrolytic solution vary with temperature?

15. What is the SI unit of (i) Conductance; (ii) Conductivity.

16. Represent a concentration cell with a suitable example.

17. State one difference between a primary battery and secondary battery.

18. Write the name of a chemical substance which is used to prevent corrosion.

19. Show is the direction of flow of electrons in the following cell :

$Zn(s) \mid Zn^{2+}(aq) \parallel Ag^{+}(aq) \mid Ag(s)$

20. Rusting of iron becomes quicker in saline water?

English

Project Work)

SUGGESTIONS FOR PROJECT WORK:

The Project is inter-disciplinary in theme. The students must take any one of the techniques Given below as a methodology of project work

Interview-Based Research:

YOU can choose a topic and conduct interviews with a few neighbors/ friends/acquaintances etc. on the topic. Frame questions based on the preliminary Research/background and then write an essay/ write up / report etc. up to 1000 words on her research and submit it.

Audio/ Video based Research

Students can listen to podcasts/ interviews/radio or TV documentary on a topic and prepare a Report countering or agreeing with the speakers. Write an 800 –1000 words report and submit the ideas/issues highlighted in the chapters/ drama given in the prescribed books can be developed in the form of a project with the suggestive sub topics given below:_

1. RATTRAP-THE STUDY OF CRIME AND Criminals.

a)Circumstances that lead to crime.
b)Case Study
c)Corrective Measures
d)Impact of Criminal Behaviors on Society
e)How to bring them into mainstream.
f)Attitude of society towards criminals.

2. INDIGO

a) Condition of Farmers in Champaran -Then and Now
b) Farm Bill Agitation
c) Gandhi's Contribution
d)Other Political Leaders who brought about a change in the lives of farmers.
e)Farmer Protection Laws in Indigo
f)Condition of Farmers in India vis-à-vis world.
g)Future Prospects-Growth-Suggestions

3.THE ENEMY- WAR AND PEACE

To maintain peace, we need to go to war.
Impact of War on Society
Predicament of War
Escapism and Depression due to war.
Stance of the Political Lobby and Civilians.