

CLASS-12 A
HOLIDAY HOMEWORK 2026-27
PHYSICS

SECTION : A : Solve the following problems:

- 1-Two point charges of + 1 uc and +4 uc are kept 30 cm apart. How far from the +1uc charge on the line joining the two charges, will the net electric field be zero.
- 2.- A charge is distributed uniformly over a ring of radius a' . Obtain an expression for the electric field intensity at a point on the axis of the Ring. Hence prove that for points at large distances from the ring, it behaves like a point charge.
- 3-A thin semi circular ring of radius a' is charged uniformly and the charge per unit length is t . Find the electric field at its centre.
- 4-show graphically the variation of electric field E as a function of distance r from the wire in the application of Gauss's law.
- 5-Two similar balls each having mass m and charge q are hung from a silk thread of length l . Prove that equilibrium separation, $x = (q^2 l / 2\pi\epsilon^0 mg)^{1/3}$
- 6- A simple pendulum consists of a small sphere of mass m suspended by a thread of length l' . The sphere carries a positive charge q . Pendulum is placed in a uniform electric field of strength E directed vertically downwards. Find the period of oscillation of the pendulum due to the electrostatic force acting on the sphere. Neglecting the effect of gravitational force.
- 7-A charge q is placed at the centre of the line joining two equal charges Q . Prove that the system of three charges will be in equilibrium if $q = -Q/4$.
- 8- Five point charges each of value $+q$ coulomb are placed on five vertices of a regular hexagon of side L metres. find the magnitude of force on a charge $-q$ coulomb placed at the centre of the hexagon.
- 9- Twenty seven drops of the same size are charged at 220 volts each. They coalesce to form a bigger drop. Calculate the potential of the bigger drop.

SECTION: B Complete the Experiments in the experiment file prescribed by the C.B.S.E. board . Experiment No(01-11).

SECTION: C Complete the Activities in Activity file prescribed by the C.B.S.E. board. Activity No (01-07).

CHEMISTRY

Henry's Law (PYQ)

1. The Henry's law constant for oxygen dissolved in water is 4.34×10^4 atm at 25°C . If partial pressure of oxygen in air is 0.2 atm under ordinary atmospheric condition, calculate the concentration of dissolved oxygen in water in equilibrium with air at 25°C .
2. Total pressure is one atm and temperature is 25°C , mole fraction of N_2 in air is 0.78 and $K_H(\text{N}_2) = 8.42 \times 10^7$ mmHg. What is the concentration of N_2 in a glass of water at 25°C ?

Raoult's Law

3. Two liquids X and Y on mixing form ideal solution. At 30°C, the vapour pressure of the solution containing 3 moles of X and 1 mole of Y is 550 mm. But when 4 moles of X and 1 mole Y are mixed the vapour pressure of the solution is 560 mm. Calculate the vapour pressures of pure liquid X and Y at this temperature.
4. The vapour pressures of A and B at 25°C are 75 mm Hg and 25 mm Hg respectively. If A and B are mixed so that mole fraction of A in the mixture is 0.4 then calculate the mole fraction of B in vapour phase.

Relative Lowering in V.P

5. 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 Hg at 300 K. Calculate the molar mass of the solute. (vapour pressure of pure water at 300 K = 32 mm Hg)

Osmotic Pressure

6. 100 mg of a protein is dissolved in water to make 10 mL of solution. If this solution has an osmotic pressure of 13.3 mm Hg at 25°C, what is the molar mass of protein?

Elevation in Boiling Point

7. B.P of carbon disulphide is 46.3°C. A solution containing 3.795 g sulphur in 100 g carbon disulphide gave an elevation in boiling point of 0.36 K. If molal elevation constant for carbon disulphide is 2.42 K kg/mol. Calculate the molecular formula of sulphur.
8. A solution of glycerol ($M = 92$ g/mol) in water was prepared by dissolving some glycerol in 500 g of water. This solution has boiling point of 100.42°C. What mass of glycerol was dissolved to make the solution? [$K_b = 0.512$ K kg/mol]
9. A solution prepared by dissolving 1.25 g of oil of winter green (methyl salicylate) in 99 g of benzene has boiling point of 80.31°C. Determine the molar mass of the compound. B.P. of pure benzene is 80.1°C and K_b for benzene is 2.53 K kg/mol.

Depression in Freezing Point

10. What mass of ethylene glycol ($M = 62$ g/mol) must be added to 5.50 kg of water to lower the freezing point to -10°C? [$K_f = 1.86$ K kg/mol]
11. A 5% solution (by mass) of cane sugar in water has freezing point of 271 K. Calculate the freezing point of a 5% glucose (by mass) in water if freezing point of pure water is 273.15 K.
12. Calculate the osmotic pressure of an aqueous solution obtained by dissolving 1.71 g of CaCl_2 in 1 L solution at 27°C, molar mass of $\text{CaCl}_2 = 111$ and $R = 0.0821$ L atm K⁻¹ mol⁻¹. Salt is completely dissociated in water.
13. How many grams of KCl should be dissolved in 1 kg water to make the solution to freeze at -8°C? [$K_f = 1.86$ K kg/mol]

Van't Hoff Factor (i)

14. What mass of NaCl ($M = 58.5$ g/mol) must be dissolved in 65 g water to lower the freezing point by 7.5°C? The freezing point depression constant (K_f) for water is 1.86 K kg/mol. Assume the van't Hoff factor for NaCl is 1.87.
15. 2 gram benzoic acid dissolved in 25 g benzene showed depression in freezing point equal to 1.62 K. If K_f of benzene is 4.9 K kg/mol, what is the dissociation of the acid?

16. Calculate the boiling point elevation for a solution prepared by adding 10 g MgCl_2 in 200 g water. MgCl_2 is completely dissociated. Molar mass of $\text{MgCl}_2 = 95 \text{ g/mol}$, $K_b = 0.512 \text{ K kg/mol}$.

E° and Nernst Eqn

17. Consider the cell composed of two half-cells: $\text{Cu(s)} \mid \text{Cu}^{2+}(\text{aq})$, $\text{Ag(s)} \mid \text{Ag}^+(\text{aq})$

a) Calculate the standard cell potential

b) Calculate the cell potential when $[\text{Cu}^{2+}] = 2\text{M}$, $[\text{Ag}^+] = 0.05\text{M}$

Given:

$$E^\circ_{\text{Cu}^{2+}/\text{Cu}} = +0.34 \text{ V}$$

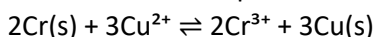
$$E^\circ_{\text{Ag}^+/\text{Ag}} = +0.80 \text{ V}$$

18. $E^\circ(\text{Cu}^{2+}/\text{Cu})$ and $E^\circ(\text{Ag}^+/\text{Ag})$ is $+0.337\text{V}$ and $+0.799\text{V}$. To make a cell whose $E^\circ_{\text{cell}} = +\text{V}$. If the concentration of Cu^{2+} is 0.01M and cell at 25°C is 0.40 , calculate the concentration of Ag^+ .

19. Calculate the potential for half-cell containing $0.10\text{M K}_2\text{Cr}_2\text{O}_7(\text{aq})$, $0.20\text{M Cr}^{3+}(\text{aq})$ and $1.0 \times 10^{-4} \text{ M H}^+(\text{aq})$.

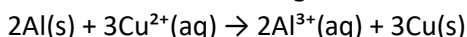
Equilibrium Constant

20. Calculate the equilibrium constant for the reaction (Given $E^\circ_{\text{cell}} = 1.80\text{V}$)



ΔG and ΔG°

21. Calculate ΔG° and $\log K_c$ for the following reaction at 298K :



Given $E^\circ_{\text{cell}} = 2.02\text{V}$

22. Write Nernst eqn and calculate ΔG for the galvanic cell:



$$E^\circ_{\text{Cu}^{2+}/\text{Cu}} = +0.34\text{V}$$

$$E^\circ_{\text{Ag}^+/\text{Ag}} = +0.80\text{V}$$

Faraday's Law

23. Calculate the time to deposit 1.27 g of copper at cathode when a current of 2A was passed through the solution of CuSO_4 . (MM of $\text{Cu} = 64 \text{ g/mol}$)

24. How many faradays are required to produce 40 g Ca from CaCl_2 (molten).

κ , ρ , λ_m

25. The electrical resistance of a column of 0.05M NaOH solution of diameter 1 cm and length 50 cm is $5.55 \times 10^3 \text{ ohm}$. Calculate the resistivity, conductivity and molar conductivity.

26. Calculate the equivalent conductivity of $1\text{M H}_2\text{SO}_4$ solution, if its conductivity is $25 \times 10^{-2} \text{ S cm}^{-1}$.

Infinite Dilution – Kohlrausch's Law

27. The specific conductance of 10^{-2} M acetic acid solution at 25°C is $1.65 \times 10^{-4} \text{ S cm}^{-1}$. If $\lambda^\circ(\text{H}^+)$ and $\lambda^\circ(\text{CH}_3\text{COO}^-)$ are 349.6 and $40.9 \text{ S cm}^2 \text{ mol}^{-1}$ respectively, calculate dissociation constant of acetic acid.

28. The conductivity of 0.001 mol/L solution of CH_3COOH is $3.905 \times 10^{-5} \text{ S cm}^{-1}$. Calculate its molar conductivity and degree of dissociation (α).

Given $\lambda^\circ(\text{H}^+) = 349.6 \text{ S cm}^2 \text{ mol}^{-1}$ and $\lambda^\circ(\text{CH}_3\text{COO}^-) = 40.9 \text{ S cm}^2 \text{ mol}^{-1}$.

BIOLOGY

Summer Vacation Homework

Class 12 Biology

Chapters:

1. Sexual Reproduction in Flowering Plants
2. Human Reproduction
3. Reproductive Health

Instructions

1. Complete all questions neatly in your Biology notebook.
2. Draw labelled diagrams wherever required.
3. Practice NCERT back exercises thoroughly.
4. Attempt all questions.

Section A – Very Short Answer Questions (1 Mark)

1. Define pollination.
2. What is syngamy?
3. Name the male reproductive part of a flower.
4. What is placentation?
5. Name the hormone responsible for ovulation.
6. Define parturition.
7. What is amniocentesis?
8. Expand IVF.
9. Name one sexually transmitted disease.
10. What is contraception?

Section B – Short Answer Questions (2 Marks)

1. Differentiate between self-pollination and cross-pollination.
2. Explain double fertilization in flowering plants.
3. Write two functions of placenta.
4. What are the changes that occur during puberty?
5. Explain menstrual cycle briefly.
6. Differentiate between vasectomy and tubectomy.
7. Mention two methods of contraception.
8. What are sexually transmitted infections?
9. Explain the role of pollen grains in fertilization.
10. Why is reproductive health important?

Section C – Case-Based Questions

Case Study – 1

A farmer observed that some flowers in his field failed to produce fruits due to lack of pollination.

1. What is pollination?
2. Name two agents of pollination.
3. Why is pollination necessary?
4. What happens after fertilization in flowers?

Case Study – 2

A couple visited a doctor for advice regarding family planning and reproductive health awareness.

1. What is family planning?
2. Name one natural contraceptive method.
3. Mention one benefit of reproductive health education.
4. Expand AIDS.

Section D – Long Answer Questions (3/5 Marks)

1. Explain the structure of a mature embryo sac with diagram.
2. Describe the process of fertilization in flowering plants.
3. Explain spermatogenesis in humans.
4. Describe the female reproductive system with labelled diagram.
5. Explain menstrual cycle in detail.
6. Describe various methods of contraception.
7. What are STDs? Explain their prevention.
8. Explain artificial reproductive techniques (ART).

Assertion & Reason Questions

Options:

- A. Both Assertion and Reason are true and Reason is the correct explanation.
- B. Both Assertion and Reason are true but Reason is not the correct explanation.
- C. Assertion is true but Reason is false.

D. Assertion is false but Reason is true.

1. Assertion: Double fertilization is unique to angiosperms.

Reason: Two male gametes participate in fertilization.

2. Assertion: Placenta acts as an endocrine tissue.

Reason: It secretes hormones during pregnancy.

3. Assertion: Condoms help prevent STDs.

Reason: They act as a physical barrier.

Diagram Practice

1. Structure of anatropous ovule

2. L.S. of flower

3. Human male reproductive system

4. Human female reproductive system

5. Structure of embryo sac

MCQs

1. Double fertilization occurs in:

a) Gymnosperms

b) Bryophytes

c) Angiosperms

d) Pteridophytes

2. The site of fertilization in humans is:

a) Ovary

b) Uterus

c) Fallopian tube

d) Cervix

3. Which contraceptive method also prevents STDs?

a) Copper-T

b) Condom

c) Pills

d) Rhythm method

4. The functional unit of testis is:

a) Ovule

b) Seminiferous tubule

c) Placenta

d) Follicle

Activity Work

1. Prepare a chart on "Methods of Contraception".

2. Make a labelled model/chart of Human Reproductive System.

3. Collect information on common STDs and their prevention.

Revision Task

- Learn all important diagrams from NCERT.

- Practice previous year CBSE questions.

- Revise important terms and definitions daily.

ENGLISH

Instructions for the students:

- Do your holiday homework in your English language notebook.
- Mention date and day when you do your work.
- Use your creativity and imagination wherever required.
- Submit your holiday homework when the school re-opens.
- Evaluation will be done and the scored marks will be a part of the Internal Assessment.

1. Read any one chapter of your choice and write the review.

A) The Rattrap.

B) The Enemy

- Write the review of the lesson in 200-250 words keeping in mind the given Information about the writer aspects.
- About favourite character and his/her role in the story

2. Being Innovative with ideas:

- What could be the alternate ending of the lesson The Third Level?

3. Research about the renowned Poet – John Keats.

Write a brief description about the poet's life. Make a list of the poems written by him.

4. Choose a city or state you dream of visiting and prepare a travel brochure highlighting its unique culture, famous landmark and local cuisine.

5. Research the data & Write an article on the following topics.

(a) Mental Health Awareness: Alarming rise in mental health issues and ways to combat.

(b) Climate Change: Increasing carbon footprints- How to achieve sustainable solutions.

MATHS

Complete all four chapter by ncert in new copy

1. Relation and functions
2. ITF
3. Matrices
4. Determinants

HINDI

1. दो नए अप्रत्याशित विषयों पर लेख लिखिए। विषय स्वयं से लें।
2. विषयों पर आलेख और फीचर तैयार कीजिए।
क लड़कियों की घटती जनसंख्या आलेख लेखन।
ख विज्ञापनों की लुभावनी दुनिया आलेख लेखन।
ग पर्यटन स्थल की प्राकृतिक सुषमा फीचर लेखन।
घ सेना में महिलाओं की बढ़ती रुचि फीचर लेखन।
3. 10-10 अपठित गद्यांश पद्यांश अभ्यास कार्य रूप में अपनी उत्तर पुस्तिका पर करने हैं।
4. कहानी व नाटक की रचना विषय को अपनी उत्तर पुस्तिका पर लिखिए।
सम्पूर्ण कार्य आपको लेखन उत्तर पुस्तिका पर करना है।

COMPUTER SCIENCE

Instructions

1. **Five Programs Per Day** & Write all programs in Python.
2. Use proper comments and meaningful variable names.
3. Execute each program and write the output.
4. Practice programs without copying from the internet.
5. Create a separate notebook/file for each section.

Section A - Python Basics

Q1. Write a program to input two numbers and print:

- Sum
- Difference
- Product
- Quotient

Q2. Write a program to calculate the area and perimeter of a rectangle.

Q3. Write a program to swap two numbers:

- Using third variable
- Without using third variable

Q4. Write a program to input temperature in Celsius and convert it into Fahrenheit.

Q5. Write a program to calculate simple interest.

Q6. Write a program to check whether a number is even or odd.

Q7. Write a program to check whether a number is positive, negative, or zero.

Q8. Write a program to find the largest among three numbers,

Q9. Write a program to check whether a year is a leap year or not.

Q10. Write a program to calculate electricity bill using the following conditions:

- First 100 units ₹5/unit
- Next 100 units - 27/unit
- Above 200 units ₹10/unit

Section B-Loops

Q11. Write a program to print numbers from 1 to 100 using a loop.

Q12. Write a program to print all even numbers between 1 and 100.

Q13. Write a program to find the sum of first N natural numbers.

Q14. Write a program to display multiplication table of a number.

Q15. Write a program to calculate factorial of a number.

Q16. Write a program to check whether a number is prime or not.

Q17. Write a program to print all prime numbers between 1 and 100.

Q18. Write a program to print Fibonacci series up to N terms.

Q19. Write a program to reverse a number.

Q20. Write a program to check whether a number is palindrome or not.

Q21. Write a program to check whether a number is Armstrong number or not.

Section C-Strings

Q22. Write a program to count total vowels in a string.

Q23. Write a program to check whether a string is palindrome or not.

Q24. Write a program to count:

Uppercase letters

Lowercase letters

Digits

Special characters

Q25. Write a program to replace all spaces with underscore ().

Q26. Write a program to display frequency of each character in a string.

Q27. Write a program to find the longest word in a sentence. Q28. Write a program to check whether two strings are anagrams.

Section D-Lists

Q29. Write a program to input 10 numbers in a list and display:

Largest number

Smallest number

Sum of all numbers

Q30. Write a program to sort a list in ascending and descending order.

Q31. Write a program to search an element in a list.

Q32. Write a program to remove duplicate elements from a list.

Q33. Write a program to merge two lists.

Q34. Write a program to count even and odd numbers in a list.

Q35. Write a program to find second largest element in a list.

Section E-Tuples & Dictionaries

Q36. Write a program to create a tuple and display its elements.

Q37. Write a program to count occurrence of an element in a tuple.

Q38. Write a program to create a dictionary of student details:

Name

Roll Number

Marks

Display all details properly.

Q39. Write a program to count frequency of words in a sentence using dictionary.

Q40. Write a program to store employee details in a dictionary and search employee by ID.

Section F-Functions

Q41. Write a function to find greatest of three numbers.

Q42. Write a function to calculate factorial of a number.

Q43. Write a function to check whether a number is prime or not.

Q44. Write a function to calculate sum of digits of a number.

Q45. Write a recursive function to print Fibonacci series:

Section G-Pattern Programs

Q46. Write a program to print the following pattern:

```
*  
**  
***  
****  
*****
```

Q47. Write a program to print:

```
1  
12  
123  
1234  
12345
```

Q48. Write a program to print:

```
*****  
*****
```

**

*

Q49. Write a program to print Floyd's Triangle.

Q50. Write a program to print Pascal's Triangle.

Mini Project Work (Any One)

Option 1: Student Report Card System

Features:

Input student details

Calculate total and percentage

Display grade

Option 2: Library Management System

Features:

Add books

Search books

Issue/Return books

Option 3:

Quiz Game

Features:

Multiple questions

Score calculation

Result display

Viva Questions:

1. Difference between list and tuple.
2. Difference between while loop and for loop.
3. What is recursion?
4. What is a dictionary?
5. Difference between mutable and immutable data types.
6. Difference between append() and extend().
7. What is a function?
8. What is an Armstrong number?
9. What is the use of break and continue statements?

Submission Guidelines

Submit handwritten programs in practical notebook.

Attach output screenshots wherever possible.

Mini project should include:

Problem definition

Algorithm

Program

Output

PHYSICAL EDUCATION

Complete your work in lab manual file :

Practical–1 : Fitness Tests Administration (SAI Khelo India Test)

Practical–2 : Procedure for Asanas, Benefits & Contraindications for any two Asanas of each lifestyle disease.

Practical–3 : Any one IOA recognised Sport/Game of choice. Labelled diagram of Field & Equipment. Also mention its Rules, Terminologies & Skills.