Holiday Homework
Class-XII Science
ENGLISH

Q1.

a) You are Sonia of Simon Public School, Meerut. Your school has decided to organize a cultural programme to raise funds for the victims of earthquake. Draft a notice, for your school notice-board.
b) You have recently constructed a house with all the facilities in a posh area. As you have decided to give it on rent, draft a suitable advertisement for the “To Let” column of a local daily.

Q2.

a) ‘Down to Earth’ an environmental awareness magazine has launched a marathon ‘clean your city campaign’ As an active participant, write a speech on urging students to participate in the campaign.
b) Komal had a discussion with her friend on Information Technology. After getting from her a lot of ideas, she decides to write an article on Information Technology for her school Magazine in 200 words. Imagine you are Komal.

Q3.

a) You are Ram/Isha, Secretary of Harmony Residents Welfare Association, Karnal. Write a letter to the Editor of ‘The Herald’ on the problem of frequent power failure faced by the people during the summer season in your locality, giving suitable suggestions to solve this problem.
b) You have noticed many polythene bags full of litter lying along the road early in the morning. These litter bags cause pollution. You have already written to the concerned authorities, but no action has been taken so far. Write a letter to the Editor of leading newspaper expressing your views on the nuisance created by plastic bags full of litter. Sign yourself as Parul/ Prem, of B-22, Lajpat Nagar, New Delhi

Q4. Learn questions and answers of Lesson-1,2 and 3 of flamingo.

Q5. Read the Novel “The Invisible Man”

BIOLOGY

Theory:- Learn chapters 1-4,8
All questions at the end of the chapters to be completed and learn them. All extra questions given in class are to be written and learnt.

Practical Record:
1) Experiment-1
   I. Flower and its parts
   II. Structure and germination of pollen grains
2) Experiment-2
   I. Identification of specimens- comments
3) Select your topic for project collect data, pictures etc write it and keep it ready.
ENGINEERING GRAPHICS

1. Finish Isometric Projections of solids and combination of solids
2. Draw all machine parts/ drawing on workbook
3. Make the machine block in three dimensions (drawn with soap –cake or floural foam.

PHYSICS

➢ Revise the ch-1 and ch-2 from note book and do the back exercise questions of ch-1 and ch-2 from N.C.E.R.T. Also do the additional question from back exercise.

COMPUTER SCIENCE

• Q1. Specify a class counter whose class description is given below:
  • Class Name: Salesman
  • Data Member:
  • Member Functions:
  • Float add_mon_sale(float sales)
  • Design a C__ prog. To use this class Salesman to calculate the monthly sales.
  • Note:-add_mon_sale will be calculated only after adding salesmade + sales.

• Q2. Specify a class counter whose description is given below :
  • Class Name : Counter
  • Data Member: int count [ to store the count]
  • Member functions:
  • init() function that initializes count to 0
  • Incount() increment count by 1
  • givecount() returns the value of count
  • Design a prog in C++ to use this counter to count the number of ladies, gentleman & children in a guest list. The guest list is stored as a char type of array guest[]. It consists of the following codes :
  • Code Stand For
  • “g” Gentleman
  • “l” Ladies
  • “c” Child
  • The guest list may have code for 15 people. The input data could be
  • c,c,l,g,l,g,l,g,c,l,g,c,l
  • The output should be in the following format:
  • No. of Ladies:
  • No. of Gentleman:
  • No fo Children

• Q3. Design a C++ prog to calculate the tax for the people living in the Utopa. Specify a class taxpayer whose class description is given below:-
• Class Name: Tax Payer
• Data Members:
  - int pan: to store personal account no.
  - Char name[20]: to store the name of the person
  - Float taxableinc: total annual taxable income
  - Float tax: tax that is calculated
• Member Functions:
  - Inputdata(): to enter the data for a taxpayer
  - displaydata(): display the data
  - computetax(): compute tax for a taxpayer
  - the tax is calculated according to the following slab:
    - Total Annual Taxable Income: Rate of taxation
      - Upto 60000: 0%
      - Any amt above 60000 but upto 150000: 5%
      - Amt above 150000 but upto 500000: 10%
      - Amt above 500000: 15%
• In the main program, create an object of the type taxpayer. Calculate the tax for the taxpayer & output it in the following format:
  - Pan No. | Name | Total Annual Taxable Income | Tax
• Q4. Define a class Student with the following specifications:
  - Private member of the Class student
    - admno: integer
    - sname: 20 characters
    - eng,math,sc: float
    - total: float
    - ctotal(): a function to calculate eng+math+sc with float return type.
  - Public member functions of class student
    - Takedata(): to accept values for admno, sname, eng, math, sc and invoke ctotal to calculate total
    - Showdata(): function to display all the data members on the screen
• Q5. Define a class Student for the following specifications:
  - Private members of the students are:
    - roll_no: integer
    - name: array of the characters size 20.
    - class_st: array of the characters size 8
    - mark: array of integers of size 5
    - percentage: float
    - calculate(): that calculates overall percentage marks & returns the percentage
  - Public members of the students are:
    - readmarks(): read marks and invokes the calculate function.
    - displaymarks(): prints the data.
Q.1: Revise all NCERT Questions of Chapter-1, 2, 3, 4 and 5.

Q.2: Do assignment of Ch-1 solid state and Ch-3 Electrochemistry.

Q.3. Solve and do the following questions in Holiday Homework copy:

Chapter-2 Solution

1) Heptane and octane forms an ideal solution at 373K. The vapour pressure of pure liquids at this temperature are 105.2kPa and 46.8 kPa respectively. If the solution contains 25g of heptane and 28.5g of octane, calculate

i) Vapour pressure exerted by heptane.

ii) Vapour pressure exerted by solution.

iii) Mole-fraction of octane in the vapour phase.

2) On dissolving 19.5g of CH₂FCH₂COOH in 500g of water, a depression of 1°C in freezing point of water is observed. Calculate the van’t Hoff factor and dissociation constant of fluoroacetic acid. $K_f=1.86\text{K}\text{Kg}\text{mol}^{-1}$.

3) What is the freezing point of 0.4 molal solution of acetic acid in benzene in which it dimerises to the extent of 85%. Freezing point of benzene is 278.4K and its molar heat of fusion is 10.042 KJmol⁻¹.

4) A 1.00 molal aqueous solution of trichloroacetic acid (CCl₃COOH) is heated to its boiling point .The solution has the boiling point of 100.18°C. Determine the van’t Hoff factor for trichloroacetic acid. $K_b$ for water is 0.512 K Kgmol⁻¹.

Chapter-4 Chemical Kinetics

1) The rate constants of a reaction at 500K and 700K are 0.02s⁻¹ and 0.07s⁻¹ respectively. Calculate the value of activation energy for the reaction.

2) The decomposition of N₂O₅(g) is a first order reaction with a rate constant of $5\times10^{-4}$s⁻¹ at 45°C. $2\text{N}_2\text{O}_5(g)\rightarrow 4\text{NO}_2(g) + \text{O}_2(g)$.

If initial concentration of N₂O₅ is 0.25M, calculate its concentration after 2min. Also calculate half-life for decomposition of N₂O₅ (g).
4) For the decomposition of azoisopropane to hexane and nitrogen at 543K, the following data are obtained.

<table>
<thead>
<tr>
<th>t(sec)</th>
<th>P(mm of Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>35.0</td>
</tr>
<tr>
<td>360</td>
<td>54.0</td>
</tr>
<tr>
<td>720</td>
<td>63.0</td>
</tr>
</tbody>
</table>

Calculate the rate constant.

4) The experimental data for decomposition of N$_2$O$_5$ is

$$2\text{N}_2\text{O}_5 \rightarrow 2\text{NO}_2 + \text{O}_2$$

In gas phase at 318 K are given below:

<table>
<thead>
<tr>
<th>t/s</th>
<th>$10^2x[\text{N}_2\text{O}_5]/\text{mol L}^{-1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.63</td>
</tr>
<tr>
<td>400</td>
<td>1.36</td>
</tr>
<tr>
<td>800</td>
<td>1.14</td>
</tr>
<tr>
<td>1200</td>
<td>0.93</td>
</tr>
<tr>
<td>1600</td>
<td>0.78</td>
</tr>
<tr>
<td>2000</td>
<td>0.64</td>
</tr>
<tr>
<td>2400</td>
<td>0.53</td>
</tr>
<tr>
<td>2800</td>
<td>0.43</td>
</tr>
<tr>
<td>3200</td>
<td>0.35</td>
</tr>
</tbody>
</table>

i) Plot $[\text{N}_2\text{O}_5]$ against t.

ii) Find the half-life period for the reaction.

iii) Draw a graph between log $[\text{N}_2\text{O}_5]$ and t.

iv) What is rate law?

V) Calculate rate constant.

vi) Calculate half-life period from k and compare it with ii).
A. WORKSHEET

1. Dr. Kumar, a famous heart surgeon, would be high on ________ intelligence.
   a) Interpersonal b) linguistic c) Naturalistic d) Bodily – kinaesthetic

2. When Aryan was a small child, his parents adopted a little girl. Aryan promptly “Forgot” that he was toilet trained and began wetting the bed. As an adult, Aryan cannot remember that he did this, despite what his parents tell him. This is an example of
   a) Projection b) Rationalisation c) Reaction formation d) Repression

3. Sunita has recently decided to leave medical school and pursue a career as an artist. Her parents, however, are deeply disappointed with her decision. Sunita is experiencing ________ from her parents.
   a) Positive regard b) Conditional positive regard c) Unconditional positive regard d) Negative regard

4. Many students face high levels of anxiety while preparing for the Board examination which interferes with their preparation, concentration and performance. This could be due to
   a) Eustress b) Pathogens c) Weakened immune system d) Evaluative stress

5. A person’s resolution of problems at any stage of development less than the adequate, demonstrates regression. (True / False)

6. The cognitive theory of stress was proposed by ________

7. Disease-causing agents are known as ________

8. Leela just doesn’t enjoy doing much of anything lately. She has lost interest in food and all activities. She seems agitated most of the time and is unable to think clearly. Most of the days she stays in bed. If these symptoms get prolonged, she may be diagnosed as having:
a) Bipolar disorder b) Agoraphobia c) Major depressive disorder d) Schizophrenia

9. What does Eysenck consider to be the two most important dimensions of personality?

10. Elucidate the differences in various areas of functioning at different levels of mental retardation.

11. How do projective tests provide insight into personality?

12. Stress is an inevitable part of life. Suggest techniques to manage stress in life.

13. Identify the unhelpful habits that make us vulnerable to stress.

14. Reena is 5 years old. She cries when she is dropped to school. Explain the disorder and list its symptoms.

15. How can virtues of wisdom and knowledge be applied by students to enhance their well-being? Illustrate with 2 examples.

B. CASE STUDY FILE:

Case study is an in-depth analysis of a person. You are required to choose a person on whom you want to do your case study and the person should be willing to cooperate with you.
Inverse Trigonometric Function

1. Prove that \( \tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1} \frac{2x}{x^2 - 1} \).

2. Prove that \( \tan^{-1} 5 + \tan^{-1} 8 = \tan^{-1} \frac{13}{7} \).

3. Prove that \( \sin^{-1} \frac{4}{5} + \sin^{-1} \frac{5}{13} + \sin^{-1} \frac{16}{65} = \frac{\pi}{2} \).

4. Using principal value, evaluate the following:
   \[ \cos^{-1}(\cos \frac{2\pi}{3}) + \sin^{-1}(\sin \frac{\pi}{3}) \]

5. Prove that \( \sin^{-1}(1) + \tan^{-1}(2) + \tan^{-1}(3) = \pi \).

6. If \( \tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi \), then show that \( xy + yz + zx = 1 \).

7. If \( \cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi \), prove that \( x^2 + y^2 + z^2 - 2xyz = 1 \).

8. If \( \cos^{-1} \frac{x}{a} + \cos^{-1} \frac{y}{b} = \beta \), prove that
   \[ \frac{x^2}{a^2} - \frac{2xy \cos \beta}{ab} + \frac{y^2}{b^2} = \sin^2 \beta \]

9. Prove that \( \cos(\tan^{-1}(\sin(\cos^{-1} x))) = \frac{x}{\sqrt{x^2 + 1}} \).

10. Find greatest and least value of \( \frac{(\sin^{-1} x)^2 + (\cos^{-1} x)^2}{2} \).
continuity and differentiability

11. If \( x = a (\cos \theta - \sin \theta) \) and \( y = a (1 - \cos \theta) \), find \( \frac{dy}{dx} \) at \( \theta = \frac{\pi}{2} \).

12. If \( x^p y^q = (x+y)^{p+q} \) prove that \( \frac{dy}{dx} = \frac{y}{x} \).

13. Find if Lagrange's mean value theorem is applicable to function \( f(x) = x + \frac{1}{x} \) on \([1, 3] \).

14. If \( y = \log \tan \left( \frac{\pi x}{4} \right) \). Show that \( \frac{dy}{dx} = -\sec x \).

15. Prove that \( \int \frac{\ln \sqrt{x^2 - x^2 + a^2 \sin^2 x}}{a} \) \( dx \) equals \( \sqrt{a^2 - x^2} \).

16. Differentiate w.r.t. \( x \tan^{-1} \left( \frac{1 + \sin x + 1 - \sin x}{1 + \sin x - 1 - \sin x} \right) \).

17. Find \( \frac{dy}{dx} \), if \( y = \sin^{-1} \left( \frac{5x + 13\sqrt{1-x^2}}{13} \right) \).

18. If \( y = (x + \sqrt{x^2 + a^2})^7 \), prove that \( \frac{dy}{dx} = \frac{7y}{\sqrt{x^2 + a^2}} \).

19. Differentiate \( x^m \sin^{-1} \sqrt{x} \) w.r.t. \( x \).

20. If \( y = x^n \), show that \( \frac{d^2 y}{dx^2} = \frac{1}{y} \left( \frac{dy}{dx} \right)^n - \frac{n}{x} = 0 \).
21. If \( y = \sqrt{x + \frac{1}{x}} \), show that \( \frac{dy}{dx} + y = e^{\sqrt{x}} \).

22. If \( y = \left[ \log (x + \sqrt{1+x^2}) \right]^2 \), show that
\[
(1+x^2) \frac{d^2y}{dx^2} + x \frac{dy}{dx} - 2 = 0
\]

23. If \( y = \frac{\sin^{-1} x}{\sqrt{1-x^2}} \), show that
\[
(1-x^2) \frac{d^2y}{dx^2} + 3y \frac{dy}{dx} - y = 0
\]

24. If \( x = a \sin pt \) and \( y = b \cos pt \), find value of \( \frac{d^2y}{dx^2} \) at \( t = 0 \).

25. If \( xy = e^{y-x} \), prove that \( \frac{dy}{dx} = \frac{2-\log x}{1-\log x^2} \).

**Application of Derivatives**

26. At what points on curve \( x^2 + y^2 - 2x - 4y + 1 = 0 \) is tangent parallel to y-axis?

27. An open box with square base is to be made out of given quantity of sheet of area \( a \). Show that maximum volume of box is \( \frac{a^3}{6\sqrt{3}} \).
28. Find intervals on which function 
\[ f(x) = \frac{-x}{1 + x^2} \]
(a) Increasing  (b) Decreasing

29. A window is in form of rectangle surmounted by semi-circle. If perimeter of window is 100 m, find dimensions of window so that maximum light enters through window.

30. Find intervals in which 
\[ f(x) = \frac{4x^2 + 1}{x} \]
is (i) Increasing  (ii) Decreasing

31. Find a point on parabola \( f(x) = (x-3)^2 \)
where tangent is parallel to chord joining the points \((3,0)\) and \((4,1)\)

32. Find equation of tangent to curve \( y = \sqrt{4x-2} \) which is parallel to line \( 4x-2y+5 = 0 \)

33. Find equation of tangent to curve \( y = \frac{x-1}{(x-3)(x-3)} \)
at point where it cuts x-axis.

34. Find intervals in which function \( f(x) \) is given by 
\[ f(x) = \sin x - x, \quad 0 \leq x \leq \pi \]
is strictly increasing or decreasing.

35. If length of three sides of trapezium other than base is 10 cm each, find area of trapezium, when it is maximum.
Ch. 7
Ex 7.1 Ques - 21, 22
Ex 7.2 Ques - 5, 10, 12, 14, 16, 18, 21
Ex 7.3 Ques - 3, 6, 9, 10, 11, 13, 16, 19, 21, 22
Ex 7.4 Ques - 3, 7, 12, 14, 15, 17, 18, 19, 21, 23
Ex 7.5 Ques - 3, 6, 8, 9, 12, 15, 16, 18.