CLASS - XII	SCIENCE

COMPUTER SCIENCE

Complete the following assignment in Computer science notebook.

Data Representation

1. What is the full form of bit, ASCII, ISCII?

2. Determine the octal equivalent of the following binary numbers.

(i) 011001 (ii) 10101000110

3. Determine the Hexa Decimal equivalent of the following binary numbers.

(i) 101111100001 (ii) 10101111

4. Convert 120_{16} to its Decimal equivalent

5. Convert 25.25_{10} its binary equivalent.

General OOP Concepts

1. What is the difference between an object and a Class?

2. What do you mean by Abstraction and Encapsulation? How are these two terms interrelated?

3. Define Polymorphism and Inheritance.

4. What do you mean by Modular Programming? Define module?

Getting Started with C++

1. What is the difference between keyword and an identifier?

2. What are literals in C++? How many types of literals are allowed in C++?

3. What is the difference between ‘a’ and “a” in C++?

4. Differentiate between Syntax and semantic errors with example.

Flow of Control

1. What is meant by an entry-controlled loop? Which C++ loops are entry-controlled?
2. What is meant by an exit-controlled loop? Which C++ loops are exit-controlled?
3. Write a program to find the factorial of a given number.
4. Write a program to print Fibonacci series (10 terms).

Structured Data Type: Array

1. How many elements can the array store?
2. Write a program to arrange 10 numbers in ascending order.
3. Write a program to check whether the string is palindrome or not.
4. Write a program to find the sum of diagonal elements.
5. Write a program to find the sum of odd numbers in a matrix.

Functions

1. What is the difference between Call by value and Call by reference?
2. What do you mean by scope and life time of a variable?
3. Write a program to print the largest element of an array using function.

Programming Methodology

1. What are the characteristics of a good program?
2. What is the purpose of comments and indentation in a program?
3. Define (i) Robustness (ii) Guard Code.
4. What is Program Documentation?
5. What do you mean by Internal & External Documentation?
6. Define Testing and Debugging.

CHEMISTRY

I Complete the project report (typed and printed) in the following order

- Index
- Name of the experiment
- Theory
- Procedure
- Observations
- Inference
- Bibliography

II Complete the Chemistry practical file.

III Complete the following assignment and submit in chemistry notebook

Q1. What is SHE? How will you determine the potential of

a) Zn electrode
b) Cu electrode using SHE?

Q2. $E^0(Zn^{2+} / Zn) = -0.76$ V and . $E^0 (Cu^{2+} / Cu) = +0.34$ V. What does positive and negative sign convey?

Q3. Account for the following:

a) Zn displaces hydrogen from dilute HCl while Cu cannot.
b) Li is the strongest reducing agent while Fluorine is strongest oxidising agent.
c) Copper sulphate solution cannot be stored in zinc vessel.
$E^0 (Cu^{2+} / Cu) = +0.34$ V, $E^0 (Zn^{2+} / Zn) = -0.76$ V, $E^{0(} Li+ / Li) = -3.05$ V,
$E^{0(} F_2 /2 F^-) = +2.87$ V)

Q4. Write Nernst equation for the following cells at 298 K

a) $Cr/ Cr^{3+} (0.1M) \;||\; Fe^{2+}(0.1M) / Fe$

b) $Zn + Sn^{4+} (1.5M) \longrightarrow Zn^{2+}(0.5M) + Sn^{2+} (2M)$

Q5. What is the effect of temperature on

a) electrolytic conductivity
b) metallic conductivity

Q6. How does conductivity and molar conductivity of an electrolytic solution vary with the dilution?

Q7. State Kohlrausch law of independent migration of ions.. Mention two applications of the law.

Q8. Give the products of electrolysis of

a) NaCl (molten)
b) NaCl (aq)
c) H_2SO_4(aq)
d) $CuSO_4$(aq) using inert electrode like Pt
e) $CuSO_4$(aq) using Cu electrodes
f) $AgNO_3$(aq) using Ag electrode
g) $AgNO_3$(aq) using Pt electrode.

Q9. What are fuel cells? Write the reactions involved at each electrode in H_2-O_2 fuel cell.

Q10. Give one similarity and one difference between fuel cell and other primary cells.

Q.11. What are secondary cells? Write the reactions involved at each electrode in lead storage cell when a) battery is in use b) battery is not in use

Q12. Iron bar A is coated with Zn and another bar B is coated with Sn. Which will rust faster when the coating is broken?

Q.13. State Faraday's laws of electrolysis. What is Faraday constant?

Q.14. Resistance of a column of 0.05 M NaOH solution of diameter 1 cm and length 50 cm is 5.55×10^3 ohm. Calculate the resistivity and molar conductivity of the solution.

Q.15. Resistance of 0.01M CH_3COOH solution is 2220 ohm. Cell constant is 0.366 cm^{-1}. Calculate the degree of dissociation and dissociation of CH_3COOH at this concentration. Given

λ^0(HCl), λ^0(NaCl), λ 0(CH_3COONa) are 425 ,128 and 96 $Scm^2 mol^{-1}$ respectively.

Q.16. $\lambda^0(Al_2(SO_4)_3)$ is 858 $Scm^2 mol^{-1}$. Find λ^0 of Al^{3+} if λ^0 of SO_4^{2-} is 160 $Scm^2 mol^{-1}$.

Q.17. At what pH of HCl solution will the standard hydrogen electrode will have a potential of 0.118V ?

Q.18. Calculate the cell potential at 298K

$$Zn + Sn^{4+}(1.5M) \longrightarrow Zn^{2+}(0.5M) + Sn^{2+} (2M)$$

Given $E^0(Zn^{2+}/Zn) = -0.76V$ $E^0(Sn^{4+}/Sn^{2+}) = 0.13V$

Q.19. Calculate the amount of chlorine gas liberated when a current of 1.5 amperes for 90 minutes is passed through molten NaCl. (Atomic mass of Cl = 35.5u)

Q.20. Silver is electrodeposited by passing a current of 0.2 amperes for 3 hours on a vessel of surface area 800 cm^2 using silver nitrate as an electrolyte solution. Calculate the thickness of silver deposited..(Atomic mass of Ag=108, Density of Ag = 10.8 g/cm^2)

Q.21. Electrolysis of a metal salt solution resulted in the deposition of 1gram of metal by passing 1.5 amperes for 2 hours. Determine the charge carried by the metal ion. (Atomic mass of the metal = 27g/mol)

PHYSICAL EDUCATION

Complete the following reports in Record File

1. Write benefits of Yoga aasnas (10), Swiss ball and Pollymetric.
2. Athletics – Middle and Long Distance runs and Throws. (The events must be other than from those administered under Physical Fitness Test).
3. Draw a neat diagram of the Field/ Court of any one Game of choice (Athletics, Basketball, Football, Handball, Hockey, Kho Kho and Volleyball). Write its history, Rules & Regulations, terminologies and Important Tournaments.
4. Measure Resting Heart Rate and Respiratory Rate of ten members from family or neighbourhood for three weeks and show graphical representation of the data.

ENGLISH

Q1. Write a Book Review in a file/folder on "The Invisible Man" by HG Wells, as per the format given below:

S. No.	CONTENT
1	Preface
2	Particulars of the book
3	Chapter wise summary and analysis
4	Character sketch- 5 main characters
5	Evaluation of plot and structure
6	Chapterwise Summary
7	Suggestions
8	Conclusion

Attach the above table on the content page of the Book Review

MATHS

Complete the following assignment in Maths notebook

1. If $\tan^{-1}1 + \tan^{-1}(1/2) = \tan^{-1}\alpha$, find α.
2. Let $f : R - \{ - 4/3\} \rightarrow R$ be a function defined as $f(x) = 4x / 3x+4$. Find the inverse of f.
3. Evaluate $\sin [\pi - \sin^{-1} (-1)]$.
4. Prove that $\cos^2(\tan^{-1}2)+\sin^2(\cot^{-1}3) = 3/10$.
5. If a binary operation * is defined on the set Z of integers as $a*b = 3a - b$, then find the value of $(2*3)*4$.
6. Find the principal value of $\tan^{-1}[\sin(\sin^{-1}x+\cos^{-1}x)]$, $x \in [-1,1]$.
7. Evaluate $\sin\{ 1/2 \cos^{-1}(4/5) \}$.
8. If : $R \rightarrow R$,a,b,c,d $\in$ R such that (a,b) *(c,d) = (ac, b + ad) Find the identity element of the function.
9. Evaluate: $\cos (\pi/3- \sin^{-1}(-\sqrt{3}/2))$.
10. Show that the function $f: R \rightarrow R$ such that $f(x) = x^2$ is neither one –one nor onto.
11. If $f(x) = e^x$ and $g(x) = \log_e x$, find fog and gof. Is fog = gof ?
12. Prove that: $4\tan^{-1}\frac{1}{5} - \tan^{-1}\frac{1}{70} + \tan^{-1}\frac{1}{99} = \frac{\pi}{4}$
13. Prove: $2\tan^{-1}(1/2) + \tan^{-1}(1/7) = \tan^{-1}(31/17)$

14. Solve for x: $\tan^{-1}2x + \tan\text{-}13x = \pi/4$
15. Prove that the function f: R →R defined as f(x) = 2x-3 is invertible and find $f^{-1}(x)$
16. Show that $\sin^{-1} 12/13 + \cos^{-1} 4/5 + \tan^{-1} 63/16 = \pi$.
17. Show that the relation are in the set a = {x : x ϵ w, x ≤10}given by $R=\{(a,b): |a-b| \text{ is a multiple of } 3\}$ is an equivalence relation , find the elements related to 3.
18. Examine if the following are binary operations:
    (i) a*b =a+b/2,a,b ϵ N
    (ii) a*b=a+b/2, a,b ϵ Q .
19. Prove that

$$\tan\left(\frac{\pi}{4}+\frac{1}{2}\cos^{-1}\frac{a}{b}\right)+\tan\left(\frac{\pi}{4}-\frac{1}{2}\cos^{-1}\frac{a}{b}\right)=\frac{2b}{a}.$$

20. Prove: $2\tan^{-1}1/2) + \tan^{-1}(1/7) = \tan^{-1}(31/17)$.
21. Solve for x: $\tan^{-1}2x + \tan^{-1}3x = \pi/4$.
22. Prove that $\tan^{-1}(1/5) + \tan^{-1}(1/7) + \tan^{-1}(1/3) + \tan^{-1}(1/8) = 1$.
23. Prove that $\tan^{-1}\left(\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right)=\frac{\pi}{4}-\frac{1}{2}\cos^{-1}x, -\frac{1}{\sqrt{2}}\le x\le 1$.
24. Prove that $\cot^{-1}\left(\frac{\sqrt{1+\sin x}-\sqrt{1-\sin x}}{\sqrt{1+\sin x}+\sqrt{1-\sin x}}\right)=\frac{x}{2}, x\in\left(0.\frac{\pi}{4}\right)$.
25. Prove that $\tan^{-1}\left(\frac{\sqrt{1+\cos x}+\sqrt{1-\cos x}}{\sqrt{1+\cos x}-\sqrt{1-\cos x}}\right)=\frac{\pi}{4}+\frac{x}{2}$.
26. Write in simplest form: $\tan^{-1}\left(\frac{a\cos x-b\sin x}{b\cos x+a\sin x}\right)$.
27. If $A=\begin{bmatrix}4 & 3\\ 2 & 1\end{bmatrix}$ and $B=\begin{bmatrix}2 & 4\\ 5 & 1\end{bmatrix}$, verify $(AB)^{-1} = B^{-1}A^{-1}$.
28. Split matrix $\begin{bmatrix}3 & 1 & 1\\ 2 & 3 & 4\\ 1 & 0 & 1\end{bmatrix}$ in two matrices, one of which is symmetric and the other is skew – symmetric.
29. If $A=\begin{bmatrix}3 & 1\\ -1 & 2\end{bmatrix}$ verify $A^2 - 5A + 7I = 0$, hence find A^{-1}.
30. Find the inverse of $A=\begin{bmatrix}2 & 3 & 1\\ 1 & 4 & 1\\ 2 & 1 & 0\end{bmatrix}$, using elementary row transformation.
31. If $A'=\begin{bmatrix}-2 & 3\\ 1 & 2\end{bmatrix}$, $B=\begin{bmatrix}-1 & 0\\ 1 & 2\end{bmatrix}$ find (A +2B)'.

32. If A = $\begin{bmatrix} -1 & 4 \\ 3 & -7 \end{bmatrix}$, verify that $(A^2)' = (A')^2$.

33. If A' = $\begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 0 & 1 \end{bmatrix}$ and B = $\begin{bmatrix} -1 & 2 & 1 \\ 1 & 2 & 3 \end{bmatrix}$ then verify that

(A + B)' = A' + B' (ii) (A – B)' = A' - B'

34. For the matrix A = $\begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$, verify that

(i) (A + A') is a symmetric matrix. (ii) (A – A') is a skew – symmetric matrix.

35. Using elementary column transformations, find the inverse of the following matrices:

(i) $\begin{bmatrix} 3 & -1 \\ -4 & 2 \end{bmatrix}$ (ii) $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$

36. Prove , using the properties of determinants

$(i) \begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix}$ = (a – b)(b – c)(c – a) $(ii) \begin{vmatrix} a & b & c+\beta \\ a & b+\beta & c \\ a+\beta & b & c \end{vmatrix} = \beta^2(a+b+c+\beta)$

$(iii) \begin{vmatrix} a & b & c \\ ab & bc & ca \\ a^2 & b^2 & c^2 \end{vmatrix}$ = abc $(iv) \begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$

$(v) \begin{vmatrix} x+y & x & x \\ 6x+4y & 4x & 6x \\ 10x+8y & 8x & 3x \end{vmatrix} = x^3$ $(vi) \begin{vmatrix} y+z & z & y \\ z & z+x & x \\ y & x & x+y \end{vmatrix} = 4xyz$

$(vii) \begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & 10a-6b+3c \end{vmatrix} = (a+b+c)^3$

PHYSICS

Complete the following assignment in Physics notebook.

1. A wire of 20 ohm resistance is stretched to thrice its original length. What will be its (i) new resistivity, and (ii) new resistance ? {R' = 180 ohm}

2. A voltage of 30 V is applied across a colour coded carbon resistor with first, second and third rings of blue, black and yellow colours. What is the current flowing through the resistor? {0.5 x 10^{-4} A}

3. A wire of uniform cross-section and length l has a resistance of 16 ohm. It is cut into four equal parts. Each part is stretched uniformly to length l and all the four stretched parts are connected in parallel. Calculate the total resistance of the combination so formed. Assume that stretching of wire does not cause any change in the density of its material. {R = 16ohm}

4. Name two factors on which electrical resistivity depends.A carbon resistor has a value of 62 kohm with a tolerence of 5%. Give the colour code of resistor.

5.In a meter bridge, the balance point is found to be 39.5cm from end A. The resistance Y is 12.5 ohm. Determine unknown resistance X. {8.16 ohm}

6. In a potentiometer arrangement a cell of 1.25 V gives a balance point of 35 cm length of the wire. If the cell is replaced by the other cell, then the balance point shifts to 63 cm.What is the emf of the second cell {2.25 V}

7. An electric heater and an electric bulb are rated 500 W, 220V and 100W, 220V respectively . Both are connected in series to a 220 V d.c. mains. Calculate the power consumed by (i) the heater and (ii) electric bulb.

8. A dry cell of emf 1.6 V and internal resistance 0.10 ohm is connected to a resistor of resistance R ohm. If the current drawn from the cell is 2 A, then (i) what is the voltage drop across R? (ii) what is the energy dissipation in the resistor?

9. Two cells of emfs 1.5V and 2V and internal resistances 2Ω and 1Ω respectively have their negative terminals joined by a wire of 6Ω and positive terminals by a wire of 4Ω resistance. A third resistance of wire of 8Ω connects middle points of these wires. Draw the circuit diagram. Using Kirchhoff laws, find the potential difference at the end of this third wire.

10. Two wires X, Y have the same resistivity, but their cross-sectional areas are in the ratio 2:3 and lengths in the ratio 1:2. They are first connected in series and then in parallel to a d.c.

source. Find out the ratio of drift speeds of the electrons in the two wires for the two cases.
{ 3:2 & 2:1}

11. Find the relaxation time for free electrons in copper, if the density of mobile electrons is 8.4 x 10^{28} m^{-3}. The resistivity of copper at room temperature is 1.7 x 10^{-8} Ωm.
12. A metal wire is bent in a circle of radius 10 cm. It is given charge of 200 microcoulomb which spreads on it uniformly. Calculate the electric potential at its centre.
{18 x 10^{6} V}

13.What is the relevance of large value of k=81 of water?

14. Electric charge is distributed uniformly on the surface of a spherical rubber balloon. Show how the value of electric intensity and potential vary (i) on the surface (ii) inside and (iii) outside?

15.A thin metal sheet is placed in the middle of a parallel plate capacitor. What will be the effect on capacitance?

16. Two point electric charges of unknown magnitude and size are placed at a distance 'd' apart. The electric field intensity is zero at a point, not between the charges but on line joining them. Write the essential conditions for this to happen.

17. An infinite plane sheet of charge density 10^{-8} Cm^{-2} is held in air. In this situation how far apart are two equipotential surfaces whose p.d. is 5 V ?
{ 8.85 mm}

18.Two point charges A and B of values + 15µC and + 9 µC are kept 18 cm apart in air. Calculate the work done when charge B is moved by 3cm towards A.
{ 1.35 J}

BIOLOGY

1. Prepare an investigatory project (typed and printed) on any of the following topics .It should include collection and recording of authentic data from hospitals/ health institutes:

a. Thalassemia/ Hemophilia/Any genetic disorder
b. Malaria/ Dengue/ Any communicable disease caused by a pathogen
c. Cancer / AIIDS
d. DNA fingerprinting Techniques

2. The project should be under the following heads:
a. Title / Aim

b. Introduction
c. Causes/Theory
d. Incubation period
e. Symptoms
f. Cure/ Treatment
g. Prevention
h. Incidence in India
i Incidence in the world
j. Comparisons
k. The road ahead…

3. Multiple data should be collected to have an authentic report.
4. Results should be discussed in the light of available information and meaningful conclusions should be drawn.
5. Use of histograms & pie charts, graphs, photographs, diagrams or models to support observation and conclusions add to the project.
6. Bibliography.
7. Acknowledgement the guide/teacher, parents, doctors, hospitals etc.

II Complete the practical record.
III Study Unit I thoroughly for a detailed test after vacations.

Happy Holidays!