مـــدارس دارة الســـلام الـعـــالمية – الـــريـــاض

Daratassalam International

Delhi Public School – Riyadh

Summer Holiday Homework

Academic Session: 2026-27

Grade: XII (Science)

Subject: Chemistry

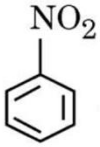
1. Prepare a small notebook, divide it into two halves:
   a. Write all the **formulae** from Solutions and Electrochemistry.
   b. Write all the **name reactions** in the above notebook from (Haloalkanes and haloarenes and Alcohol, phenols and ethers).
   [Note: This book will be used to write reactions and formulas for all the remaining chapters.]
2. Choose the topic for Investigatory project and prepare the same, as guided by teacher.
3. A solution is prepared by dissolving 5 g of a 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).
4. The conductivity of 0·2 M solution of KCl is 2·48 x 10^{-2} S cm^{-1}. Calculate its molar conductivity and degree of dissociation (α). Given :

$$\lambda^{o}_{K^+} = 73{\cdot}5 \text{ S cm}^2 \text{ mol}^{-1}$$

$$\lambda^{o}_{Cl^-} = 76{\cdot}5 \text{ S cm}^2 \text{ mol}^{-1}$$

5. Give the structures of A, B and C in the following reactions:

(a) $CH_3CH_2Cl \xrightarrow{KCN} A \xrightarrow{LiAlH_4} B \xrightarrow[0°C]{HNO_2} C$

(b)  $\xrightarrow{Fe/HCl} A \xrightarrow[273\ K]{NaNO_2 + HCl} B \xrightarrow{C_6H_5OH} C$

6. (i) Calculate emf of the following cell at 25ºC :
   $Zn(s)|\ Zn^{2+}\ (0{\cdot}001M)||\ Cd^{2+}\ (0{\cdot}1\ M)|\ Cd\ (s)$
   Given : $E^{o}(Zn^{2+}/Zn) = 0{\cdot}76$ V, $E^{o}(Cd^{2+}/Cd) = 0{\cdot}40$ V [log 10 = 1]

(ii)

Calculate the $\Delta_r G^0$ and $\log K_c$ for the following cell reaction :

$$Fe\,(s) + Ag^+\,(aq) \rightleftharpoons Fe^{2+}(aq) + Ag\,(s)$$

Given : $E^0_{Fe^{2+}/Fe} = -0{\cdot}44\ V$, $E^0_{Ag^+/Ag} = +0{\cdot}80\ V$,

$1\ F = 96500\ C\ mol^{-1}$

(iii) Write any two advantages of the fuel cells over primary and secondary batteries?

7. (a) What type of nucleophilic substitution (S_N1 or S_N2) occurs in the hydrolysis of 2-Bromobutane to form (±)-Butan-2-ol? Give reason.
   (b) What happens when chlorobenzene and methyl chloride are treated with sodium metal in dry ether?
8. Account for the following:
   (a) The C – Cl bond length in chlorobenzene is shorter than that in methyl chloride.
   (b) Grignard reagents should be prepared under anhydrous conditions.
   (c) In case of optically active alkyl halides, S_N1 reactions are accompanied by racemisation.
9. (a) Arrange the following compounds in the increasing order of their acidic strength

   3,5-dinitrophenol, 4-methylphenol, phenol, 2,4,6-trinitrophenol

   (b) What happens when : (write equations)
   (i) Phenol is distilled with Zn dust?
   (ii) Anisole is treated with HBr?
10. How will you bring about the following conversions:

   (i) Chlorobenzene to biphenyl
   (ii) Propene to 1-Iodopropane
   (iii) 2-Boromobutane to but-2-ene.

Subject: Physics

Do all the solved examples of ch-1 to 4

Subject: Biology

Prepare an Investigatory project on chosen topic.

Subject: English

	Subjects	Assignments
	Summaries of the chapters	***Biographies of the Poets and Authors.***
1.	***My Mother At Sixty-Six.***	***Biography of Kamala Das.***
2.	***Keeping Quiet***	***Biography of Pablo Neruda.***
3.	***A Roadside Stand.***	***Biography of John Keats.***
4.	***A Thing of Beauty.***	***Biography of Robert Frost.***
5.	***Aunt Jennifer's Tigers.***	***Biography of Adrienne Rich.***
6.	***Deep Water***	***Biography of William Douglas.***
7.	***The Rattrap***	***Biography of Selma Lagerlöf.***
8.	***Indigo***	***Biography of Louis Fischer.***
9.	***The Third Level***	***Biography of Jack Finney.***
10.	***The Interview***	***Biography*** of ***Christopher Silvester.***
Write the Summaries and Biographies of the above-mentioned chapters.		

Subject: Computer Science.

*** Revise all the Chapters covered till June 2026.**
*** Complete all the Question Answers & Class Notes.**
*** Complete Practical Notebook as per the Number of Questions required from each chapter.**

Subject: Mathematics

1. Let S be the set of all straight lines in a plane. Let R be the relation on S defined by $a\ R\ b \Leftrightarrow a \perp b$. Then R is
   a) reflexive but neither symmetric nor transitive
   b) symmetric but neither reflexive nor transitive
   c) transitive but neither reflexive nor symmetric
   d) an equivalence relation.

2. $f: R \to R$, defined as $f(x) = x^2$ is:

a) one- one and onto
b) many-one and onto
c) one-one and into
d) many-one and into

3. Let $f(x) = \frac{x}{x^2-1}$. Then domain (f) =

a) R
b) $R - \{1\}$
c) $R - \{-1\}$
d) $R - \{-1, 1\}$

4. Let $f(x) = \sqrt{9 - x^2}$, then domain of $f(x) =$

a) $[-3, 3]$
b) $[3, \infty)$
c) $[-3, 0]$
d) $[-3, 9]$

5. The principal value of $cos^{-1}\left(\frac{-1}{\sqrt{2}}\right)$ is

a) $-\frac{\pi}{4}$
b) $\frac{\pi}{4}$
c) $\frac{3\pi}{4}$
d) $\frac{5\pi}{4}$

6. The value of $tan^{-1}(1) + sin^{-1}\left(\frac{-1}{2}\right)$ is

a) $\frac{\pi}{4}$
b) $\frac{\pi}{6}$
c) $\frac{\pi}{12}$
d) $\frac{\pi}{2}$

7. Find the value of $tan^{-1}\left(tan\frac{7\pi}{6}\right)$ is:

a) $\frac{7\pi}{6}$
b) $\frac{\pi}{6}$
c) $\frac{\pi}{4}$
d) $\frac{\pi}{2}$

8. If $[2x \quad 4]\begin{bmatrix} x \\ -8 \end{bmatrix} = [0]$, the positive value of x is:

a) 2
b) -2
c) -4
d) 4

9. If $\begin{bmatrix} a+4 & 3b \\ 8 & -6 \end{bmatrix} = \begin{bmatrix} 2a+2 & b+2 \\ 8 & a-8b \end{bmatrix}$, then the value of a and b is

a) a =1, b = 2
b) a = -1, b = -2
c) a = 2, b = -1
d) a = 2, b = 1

10. If $A = \begin{bmatrix} -2 & 5 \\ -1 & 3 \end{bmatrix}$, adj. A =

a) $\begin{bmatrix} -2 & -1 \\ 5 & 3 \end{bmatrix}$
b) $\begin{bmatrix} 3 & -5 \\ 1 & -2 \end{bmatrix}$
c) $\begin{bmatrix} -2 & 5 \\ 3 & -1 \end{bmatrix}$
d) $\begin{bmatrix} -2 & 5 \\ -1 & 3 \end{bmatrix}$

11. If $\begin{vmatrix} 3x & 7 \\ -2 & 4 \end{vmatrix} = \begin{vmatrix} 8 & 7 \\ 6 & 4 \end{vmatrix}$, then the value of x is

a) 2
b) 3
c) -2
d) -3

12. The value of $\begin{vmatrix} x^2-x+1 & x-1 \\ x+1 & x+1 \end{vmatrix}$ is _____.

13. If A is a nonsingular square matrix of order n , then $|adj\ A| =$ _____

14. If $= \frac{1-tanx}{1+tanx}$, then $\frac{dy}{dx} =$ _____.

15. If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, then $A^2 =$ _____

16. The slope of the tangent to curve $y = 2x^2 + 3sinx\ at\ x = 0$ is _____.

17. If $x = asec\theta,\ y = b\ tan\theta$ then $\frac{dy}{dx} =$ _____.

18. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$, find $(A - A')$

19. If $y = \sqrt{x + \sqrt{x + \sqrt{x + \cdots \infty}}}$ find dy/dx

20. If $y = 2^x$ then find dy/dx.

21. Find the maximum and minimum value of $(sin2x + 5)$.

22. Find the intervals on which the function $f(x) = (10 - 6x - 2x^2)$ is strictly increasing.

23. Find the equation of tangent to the curve $y = x^3 - 2x + 7$ at $(1, 6)$

24. Find the domain and range of the real function, defined by $f(x) = \frac{x^2}{1+x^2}$. Show that f is many-one.

25. Find the domain and range of the real function, defined by $f(x) = \frac{1}{(1-x^2)}$

26. Find the value of: $cos[tan^{-1}\{sin(cot^{-1}x)\}]$

27. Prove that: $tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right) = \frac{1}{2}tan^{-1}x$

28. If $A = \begin{bmatrix} 2 & -3 & -5 \\ -1 & 4 & 5 \\ 1 & -3 & -4 \end{bmatrix}, and\ B = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$, find AB

29. If $\begin{vmatrix} x+1 & x-1 \\ x-3 & x+2 \end{vmatrix} = \begin{vmatrix} 4 & -1 \\ 1 & 3 \end{vmatrix}$, find the value of x.

30. Show that the function $f(x) = \begin{cases} 3x-2 & when \quad x \leq 0 \\ x+1 & when \quad x > 0 \end{cases}$ is discontinuous at $x = 0$.

31. If $e^x + e^y = e^{x+y}$, prove that $\frac{dy}{dx} = -e^{(y-x)}$

32. Prove that:

$$cot^{-1}\left\{\frac{\sqrt{1+sinx}+\sqrt{1-sinx}}{\sqrt{1+sinx}-\sqrt{1-sinx}}\right\} = \frac{x}{2}, x \in \left(0, \frac{\pi}{4}\right)$$

33. Prove that:

$$tan^{-1}\left\{\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right\} = \frac{\pi}{4} - \frac{1}{2}cos^{-1}x$$

34. Find $\frac{dy}{dx}$ if $x = \frac{sin^3 t}{\sqrt{cos 2t}}$, $y = \frac{cos^3 t}{\sqrt{cos 2t}}$

35. Find the inverse of the matrix:

$$\begin{bmatrix} 3 & -10 & -1 \\ -2 & 8 & 2 \\ 2 & -4 & -2 \end{bmatrix}$$

36. Given that:

$$f(x) = \begin{cases} \frac{(1-cos 4x}{x^2}, & if \quad x < 0 \\ a, & if \quad x = 0 \\ \frac{\sqrt{x}}{\sqrt{16+\sqrt{x}}\ -4,} & if \quad x > 0 \end{cases}$$

if $f(x)$is continuous at $x = 0$, find the value of a.

37. If the following function $f(x)$ is continuous at $x = 0$, find the value of k

$$f(x) = \begin{cases} \frac{1-cos2x}{2x^2}, & x \neq 0 \\ k, & x = 0 \end{cases}$$

38. If $y = \frac{e^{x^2} tan^{-1}x}{\sqrt{1+x^2}}$, find $\frac{dy}{dx}$.

39. Show that $y = \log(1+x) - \frac{2x}{2+x}, x > -1$ is an increasing function of x throughout its domain.

40. Given $A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$, find AB use the product to solve the following

system of equations:

$x - y + 2z = 1; \quad 2y - 3z = 1; \quad 3x - 2y + 4z = 2$

41. If $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$, find A^{-1} and hence solve the system of linear equations:

$x + 2y - 3z = -4; \quad 2x + 3y + 2z = 2; \quad 3x - 3y - 4z = 11$

42. Consider $f: R_* \to [5, \infty)$ given by $f(x) = 4x^2 + 12x + 5$. Show that f is one-one onto.

43. If $(tan^{-1}x)^y + y^{cotx} = 1$, the find $\frac{dy}{dx}$

44. Show that semi vertical angle of a right circular cone of given surface and maximum volume is $sin^{-1}\left(\frac{1}{3}\right)$

45. Show that the height of the cylinder of maximum volume that can be inscribed in a sphere of radius R is $2R/\sqrt{3}$. Find the volume of the largest cylinder inscribed in a sphere of radius R.

Art Integration Project

Graphing Art with Mathematical Functions: Creating Artistic Designs Using Algebra and Calculus

NOTE: Homework should be done on A4-size sheets. Arrange the answer sheets properly, keep them in a folder, and submit them. The front page should be decorated and should include your name, grade, and section. Kindly adhere to the submission date, i.e., 25/08/2026.

Subject: Physical Education

Make an investigatory project for practical exam.

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