

# CLASS-12 BOARDS

# FORMULA SHEET

By - Bharat Panchal Sir...

Bharat Panchal Sir Chemistry Guruji 2.0

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## SOLUTIONS

Mass Percentage (w/w)% =  $\frac{w_2}{w_1 + w_2} \times 100$

Volume Percentage (v/v)% =  $\frac{V_2}{V_1 + V_2} \times 100$

Mass by Volume Percentage (w/v) =  $\frac{w_2}{V \text{ (in ml)}} \times 100$

### Mass Fraction

$X_1 = \frac{w_1}{w_1 + w_2}$  or  $X_2 = \frac{w_2}{w_1 + w_2}$

Parts per million (ppm) =  $\frac{w_2}{w_1 + w_2} \times 10^6$

Molarity (M) =  $\frac{w_2}{M_2} \times \frac{1000}{V \text{ (ml)}}$  Unit = mol/litre

Molality (m) =  $\frac{w_2}{M_2} \times \frac{1000}{W \text{ (g)}}$  Unit = mole/kg

↳ molarity is inversely proportional to temperature

### Mole Fraction (X)

$X_A = \frac{n_A}{n_A + n_B}$        $X_B = \frac{n_B}{n_A + n_B}$

$X_A + X_B = 1$  mole fraction is a unitless quantity

### Henry Law

$P = K_H X_B$   
↳ partial pressure of gas  
↳ mole fraction of solute

### RAOULT'S LAW

$P_A \propto X_A$        $P_B \propto X_B$   
 $P_A = P_A^0 \times X_A$        $P_B = P_B^0 \times X_B$

For Volatile Solute

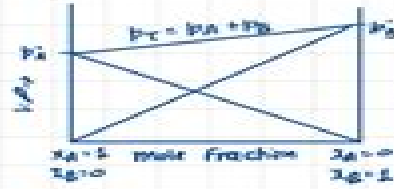
For Non-Volatile Solute

$P_T = P_A + P_B$

$P_T = P_A = P_A^0 \times X_A$

### IDEAL SOLUTION

Interaction of A-B are equal to Interaction of A-A and B-B



$\Delta V_{mix} = 0$   
 $\Delta H_{mix} = 0$   
eg n-Hexane + n-Heptane

### NON-IDEAL SOLUTION

#### Positive Deviation

A-B interaction are weaker than A-A and B-B interaction

$\Delta V_{mix} = +ve$   
 $\Delta H_{mix} = +ve$



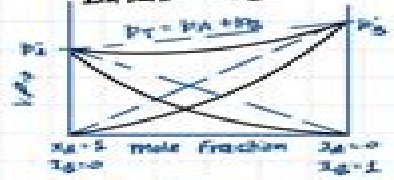
Form minimum boiling Azeotropes

eg Acetone + Ethanol

#### Negative Deviation

A-B interaction are stronger than A-A and B-B interaction

$\Delta V_{mix} = -ve$   
 $\Delta H_{mix} = -ve$



Form maximum boiling Azeotropes

eg acetone + Chloroform

### Colligative Properties

depends on number of solute

Relative lowering of V.P.  $\Rightarrow \frac{P_A^0 - P_A}{P_A^0} = X_B$  or  $i X_B$

Elevation in Boiling Point  $\rightarrow \Delta T_b = K_b m$  or  $i K_b m$

Depression in Freezing Point  $\rightarrow \Delta T_f = K_f m$  or  $i K_f m$

Osmotic Pressure  $\rightarrow \pi = CRT$  or  $\frac{n}{V} RT$  or  $i \frac{n}{V} X RT$

Unit of  $K_b$  and  $K_f = K \text{ kg mol}^{-1}$

$\Delta T_b = T_b - T_b^0$

$\Delta T_f = T_f^0 - T_f$

$\Delta T_b = K_b \times \frac{w_2}{M_2} \times \frac{1000}{W \text{ (g)}}$

$\Delta T_f = K_f \times \frac{w_2}{M_2} \times \frac{1000}{W \text{ (g)}}$

$\Delta T_b$  - Elevation in B.P.T

$\Delta T_f$  - Depression in F.P.T

$T_b$  - B.P.T of solution

$T_b^0$  - B.P.T of pure solvent

$T_f^0$  - F.P.T of pure solvent

$T_f$  - F.P.T of solution

$K_b$  - molal elevation constant

$K_f$  - molal depression constant

### Vanit Hoff factor (i)

= Normal molecular mass / observed molecular mass

$i > 1$  solute undergoes dissociation

$i < 1$  solute undergoes association

$i = 1$  no association no dissociation

$\alpha$  dissociation =  $\frac{i-1}{n-1}$        $\alpha$  association =  $\frac{i-1}{1-i}$

Chemistry Guruji 2.0

# **Solution Formula**

**Douglas B. Allen, Dwight W. Allen**



## Solution Formula

*Formula 2+2* Douglas B. Allen, Dwight W. Allen, 2004-10-10 Even the best managers often view employee coaching and feedback as necessary evils In this work Allen provides managers with a simple yet powerful approach to revolutionizing feedback conversations and making them a regular and even welcome part of their duties *The Ultimate Book of Outfit Formulas* Alison Lumbatis, 2021-09-14 If you don't have time to worry about what to wear every day but still want to look good this book will help you create a stylish wardrobe for any season on any budget Decision fatigue is real You have many important choices to make during the day and only so much mental bandwidth Getting dressed can be a dreaded daily task that takes up valuable time best spent on something else Style expert Alison Lumbatis wants to help you make fashion fun again Alison shows you how easy it is to build a basic yet beautiful wardrobe starting with the clothes you already own and adding other classic mix and match elements that work for any season on any budget Once your wardrobe is set you can use the easy outfit formulas in the book to take the guesswork out of getting dressed freeing you up to focus on bigger priorities Looking fabulous while saving time is the ultimate win win [How To Derive A Formula - Volume 2: Further Analytical Skills And Methods For Physical Scientists](#) Alexei A Kornyshev, Dominic J O' Lee, 2023-07-21 Will artificial intelligence make scientific formulae redundant by eventually solving all current and future physical problems The authors of this book would argue that there is still a vital role for humans to play in making sense of the laws of nature To derive a formula one follows a series of steps only the last of which is to check that the result is correct The book is about unravelling this machinery Mathematics is the queen of all sciences but students encounter many obstacles in learning the subject familiarization with the proofs of hundreds of theorems mysterious symbols and technical routines for which the usefulness is not obvious upfront Learners could lose motivation not seeing the wood for the trees This two volume book *How to Derive a Formula* is an attempt to engage learners by presenting mathematical methods in as simple terms as possible with more of an emphasis on skills as opposed to technical knowledge Based on intuition and common sense rather than mathematical rigour it teaches students from scratch using pertinent examples many taken from across the physical sciences to demonstrate the application of the methods taught This book draws on humour and historical facts to provide an interesting new perspective on what a mathematics textbook could be The two volumes are presented as an ascent to Everest Volume 1 covered the necessary basics taking readers from Base Camp to Camps 1 and 2 This volume moves readers from Camp 2 up to Camps 3 and 4 tackling more advanced methods for deriving formulae Inevitably Volume 2 requires readers to tackle more challenging terrain than was experienced in Volume 1 and so is targeted at more advanced students **The Secret Formula** Fabio Toscano, 2024-12-03 The legendary Renaissance math duel that ushered in the modern age of algebra *The Secret Formula* tells the story of two Renaissance mathematicians whose jealousies intrigues and contentious debates led to the discovery of

a formula for the solution of the cubic equation Niccol Tartaglia was a talented and ambitious teacher who possessed a secret formula the key to unlocking a seemingly unsolvable two thousand year old mathematical problem He wrote it down in the form of a poem to prevent other mathematicians from stealing it Gerolamo Cardano was a physician gifted scholar and notorious gambler who would not hesitate to use flattery and even trickery to learn Tartaglia s secret Set against the backdrop of sixteenth century Italy The Secret Formula provides new and compelling insights into the peculiarities of Renaissance mathematics while bringing a turbulent and culturally vibrant age to life It was an era when mathematicians challenged each other in intellectual duels held outdoors before enthusiastic crowds Success not only enhanced the winner s reputation but could result in prize money and professional acclaim After hearing of Tartaglia s spectacular victory in one such contest in Venice Cardano invited him to Milan determined to obtain his secret by whatever means necessary Cardano s intrigues paid off In 1545 he was the first to publish a general solution of the cubic equation Tartaglia eager to take his revenge by establishing his superiority as the most brilliant mathematician of the age challenged Cardano to the ultimate mathematical duel A lively account of genius betrayal and all too human failings The Secret Formula reveals the epic rivalry behind one of the fundamental ideas of modern algebra

**Beyond the Quadratic Formula** Ron Irving,2020-01-29

The quadratic formula for the solution of quadratic equations was discovered independently by scholars in many ancient cultures and is familiar to everyone Less well known are formulas for solutions of cubic and quartic equations whose discovery was the high point of 16th century mathematics Their study forms the heart of this book as part of the broader theme that a polynomial s coefficients can be used to obtain detailed information on its roots The book is designed for self study with many results presented as exercises and some supplemented by outlines for solution The intended audience includes in service and prospective secondary mathematics teachers high school students eager to go beyond the standard curriculum undergraduates who desire an in depth look at a topic they may have unwittingly skipped over and the mathematically curious who wish to do some work to unlock the mysteries of this beautiful subject

**Chemistry 2e** Paul Flowers,Richard

Langely,William R. Robinson,Klaus Hellmut Theopold,2019-02-14 Chemistry 2e is designed to meet the scope and sequence requirements of the two semester general chemistry course The textbook provides an important opportunity for students to learn the core concepts of chemistry and understand how those concepts apply to their lives and the world around them The book also includes a number of innovative features including interactive exercises and real world applications designed to enhance student learning The second edition has been revised to incorporate clearer more current and more dynamic explanations while maintaining the same organization as the first edition Substantial improvements have been made in the figures illustrations and example exercises that support the text narrative Changes made in Chemistry 2e are described in the preface to help instructors transition to the second edition

**How To Derive A Formula - Volume 1: Basic**

**Analytical Skills And Methods For Physical Scientists** Alexei A Kornyshev,Dominic J O' Lee,2020-02-26 Will artificial

intelligence solve all problems making scientific formulae redundant The authors of this book would argue that there is still a vital role in formulating them to make sense of the laws of nature To derive a formula one needs to follow a series of steps last of all check that the result is correct primarily through the analysis of limiting cases The book is about unravelling this machinery Mathematics is the queen of all sciences but students encounter many obstacles in learning the subject familiarization with the proofs of hundreds of theorems mysterious symbols and technical routines for which the usefulness is not obvious upfront Those interested in the physical sciences could lose motivation not seeing the wood for the trees How to Derive a Formula is an attempt to engage these learners presenting mathematical methods in simple terms with more of an emphasis on skills as opposed to technical knowledge Based on intuition and common sense rather than mathematical rigor it teaches students from scratch using pertinent examples many taken across the physical sciences This book provides an interesting new perspective of what a mathematics textbook could be including historical facts and humour to complement the material

The National Druggist, 1912      Principles and Practice of Structural Equation Modeling Rex B. Kline, 2023-05-24 Significantly revised the fifth edition of the most complete accessible text now covers all three approaches to structural equation modeling SEM covariance based SEM nonparametric SEM Pearl's structural causal model and composite SEM partial least squares path modeling With increased emphasis on freely available software tools such as the R lavaan package the text uses data examples from multiple disciplines to provide a comprehensive understanding of all phases of SEM what to know best practices and pitfalls to avoid It includes exercises with answers rules to remember topic boxes and a new self test on significance testing regression and psychometrics The companion website supplies helpful primers on these topics as well as data syntax and output for the book's examples in files that can be opened with any basic text editor

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Ordinary Differential Equations Radu Precup, 2018-01-22 This introductory text combines models from physics and biology with rigorous reasoning in describing the theory of ordinary differential equations along with applications and computer simulations with Maple Offering a concise course in the theory of ordinary differential equations it also enables the

reader to enter the field of computer simulations Thus it is a valuable read for students in mathematics as well as in physics and engineering It is also addressed to all those interested in mathematical modeling with ordinary differential equations and systems Contents Part I Theory Chapter 1 First Order Differential Equations Chapter 2 Linear Differential Systems Chapter 3 Second Order Differential Equations Chapter 4 Nonlinear Differential Equations Chapter 5 Stability of Solutions Chapter 6 Differential Systems with Control Parameters Part II Exercises Seminar 1 Classes of First Order Differential Equations Seminar 2 Mathematical Modeling with Differential Equations Seminar 3 Linear Differential Systems Seminar 4 Second Order Differential Equations Seminar 5 Gronwall s Inequality Seminar 6 Method of Successive Approximations Seminar 7 Stability of Solutions Part III Maple Code Lab 1 Introduction to Maple Lab 2 Differential Equations with Maple Lab 3 Linear Differential Systems Lab 4 Second Order Differential Equations Lab 5 Nonlinear Differential Systems Lab 6 Numerical Computation of Solutions Lab 7 Writing Custom Maple Programs Lab 8 Differential Systems with Control Parameters

**Introduction to Multidimensional Integrable Equations** B.G. Konopelchenko,2013-06-29 The soliton represents one of the most important of nonlinear phenomena in modern physics It constitutes an essentially localized entity with a set of remarkable properties Solitons are found in various areas of physics from gravitation and field theory plasma physics and nonlinear optics to solid state physics and hydrodynamics Nonlinear equations which describe soliton phenomena are ubiquitous Solitons and the equations which commonly describe them are also of great mathematical interest Thus the discovery in 1967 and subsequent development of the inverse scattering transform method that provides the mathematical structure underlying soliton theory constitutes one of the most important developments in modern theoretical physics The inverse scattering transform method is now established as a very powerful tool in the investigation of nonlinear partial differential equations The inverse scattering transform method since its discovery some two decades ago has been applied to a great variety of nonlinear equations which arise in diverse fields of physics These include ordinary differential equations partial differential equations integrodifferential and differential difference equations The inverse scattering transform method has allowed the investigation of these equations in a manner comparable to that of the Fourier method for linear equations

*The Elegant Solution* Matthew May,2008-09-04 One million That s how many new ideas the Toyota organization receives from its employees every year These ideas come from every level of the organization from the factory floors to the corporate suites And organizations all over the world want to learn how they do it Now Matthew May Senior Advisor to the University of Toyota reveals how any company can create an environment of every day innovation and achieve the elegant solutions found only on the far side of complexity A tactical guide for team based innovation THE ELEGANT SOLUTION delivers the formula to the three principles and ten practices that drive business creativity Innovation isn t just about technology it s about value opportunity and impact When a company embeds a real discipline around the pursuit of perfection the sky is the limit Dozens of case studies from Toyota and other companies illustrate the power and universality

of these concepts a unique clamshell strategy prepares managers to ensure organizational success At once a thought shaper a playmaker and a taskmaster THE ELEGANT SOLUTION is a practical field manual for everyone in corporate life **The World Formula** Norbert Schwarzer,2022-01-31 Surely the reader had come across situations where he would have given his life to get the final answer the reason for our existence a Theory of Everything a true World Formula that contains it all So did the author of this book There was this deep seated and forever unquenchable thirst for fundamental explanations on the one hand and then there was this very special motivation from somebody else who needed this knowledge on the other How to explain the world to my dying child Perhaps this provided the driving force to actually start this million mile long journey with the first small and very tentative step Considering all the efforts taken money spent disputes fought papers and books written and conferences held it is almost shocking to find that in principle the World Formula was already there It was David Hilbert who wrote it down during World War I in November 1915 The complexity of the math involved was not the only thing that obscured what should have been obvious This book explains why apparently only very few people had realized his immortal stroke of genius Official Documents, Comprising the Department and Other Reports Made to the Governor, Senate, and House of Representatives of Pennsylvania Pennsylvania,1909 **The Theory of Equations** William Snow Burnside,Arthur William Panton,1881 Modelling with Differential and Difference Equations Glenn Fulford,Peter Forrester,Arthur Jones,1997-06-12 Any student wishing to solve problems via mathematical modelling will find that this book provides an excellent introduction to the subject *Metal Industry* ,1921 Ordinary Differential Equations Morris Tenenbaum,Harry Pollard,1985-10-01 Skillfully organized introductory text examines origin of differential equations then defines basic terms and outlines the general solution of a differential equation Subsequent sections deal with integrating factors dilution and accretion problems linearization of first order systems Laplace Transforms Newton s Interpolation Formulas more **Differential Equations And Asymptotic Theory In Mathematical Physics** Hua Chen,Roderick S C Wong,2004-10-18 This lecture notes volume encompasses four indispensable mini courses delivered at Wuhan University with each course containing the material from five one hour lectures Readers are brought up to date with exciting recent developments in the areas of asymptotic analysis singular perturbations orthogonal polynomials and the application of Gevrey asymptotic expansion to holomorphic dynamical systems The book also features important invited papers presented at the conference Leading experts in the field cover a diverse range of topics from partial differential equations arising in cancer biology to transonic shock waves The proceedings have been selected for coverage in Index to Scientific Technical Proceedings ISTP ISI Proceedings Index to Scientific Technical Proceedings ISTP CDROM version ISI Proceedings CC Proceedings Engineering Physical Sciences **The Principles and practice of Roentgenological technique** Isaac Seth Hirsch,1919

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