

7. At a high temperature, 0.50 mol of HBr was placed in a 1.0 L container and allowed to decompose according to the reaction:



At equilibrium the $[\text{Br}_2]$ was measured to be 0.13 M. What is K_{eq} for this reaction at this temperature?

$$2\text{HBr} \rightleftharpoons \text{H}_2 + \text{Br}_2$$

[I]	0.50	0	0
[C]	-0.26	+0.13	+0.13
[E]	0.24	0.13	0.13

$$K_{\text{eq}} = \frac{[\text{H}_2][\text{Br}_2]}{[\text{HBr}]^2} = \frac{(0.13)^2}{(0.24)^2} = 0.29$$

Answer $K_{\text{eq}} = 0.29$

8. When 1.0 mol of $\text{NH}_3\text{(g)}$ and 0.40 mol of $\text{N}_2\text{(g)}$ are placed in a 5.0 L vessel and allowed to reach equilibrium at a certain temperature, it is found that 0.78 mol of NH_3 is present. The reaction is:



$$\text{initial } [\text{NH}_3] = \frac{1.0 \text{ mol}}{5.0 \text{ L}} = 0.20 \text{ M} \quad \text{initial } [\text{N}_2] = \frac{0.40 \text{ mol}}{5.0 \text{ L}} = 0.080 \text{ M}$$

$$\text{Equil. } [\text{NH}_3] = \frac{0.78 \text{ mol}}{5.0 \text{ L}} = 0.156 \text{ M}$$

$$2\text{NH}_3 \rightleftharpoons 3\text{H}_2 + \text{N}_2$$

[I]	0.20	0	0.080
[C]	-0.044	+0.066	+0.022
[E]	0.156	0.066	0.102

- a) Calculate the equilibrium concentrations of all three species.

$$[\text{NH}_3] = 0.16 \text{ M} \quad [\text{H}_2] = 0.066 \text{ M} \quad [\text{N}_2] = 0.10 \text{ M}$$

- b) Calculate the value of the equilibrium constant at this temperature.

(use unrounded concs, then round to 2 sigs)

$$K_{\text{eq}} = \frac{[\text{H}_2]^3 [\text{N}_2]}{[\text{NH}_3]^2} = \frac{(0.066)^3 (0.102)}{(0.156)^2} = 0.0012$$

Answer 1.2×10^{-3}

- c) How many moles of H_2 are present at equilibrium?

$$0.066 \text{ M} \times 5.0 \text{ L} = 0.33 \text{ mol}$$

Answer 0.33 mol

- d) How many moles of N_2 are present at equilibrium?

$$0.102 \text{ M} \times 5.0 \text{ L} = 0.51 \text{ mol}$$

Answer 0.51 mol

Modeling Chemistry Ws Answers

Paul Arena



Modeling Chemistry Ws Answers:

Modeling Chemical Systems using Cellular Automata Lemont B. Kier, Paul G. Seybold, Chao-Kun Cheng, 2006-02-23

Modeling Chemical Systems using Cellular Automata provides a practical introduction to an exciting modeling paradigm for complex systems. The book first discusses the nature of scientific inquiry using models and simulations and then describes the nature of cellular automata models. It then gives detailed descriptions with examples and exercises of how cellular automata models can be used in the study of a wide variety of chemical, physical, and biochemical phenomena. Topics covered include models of water itself, solution phenomena, solution interactions with stationary systems, first and second order kinetic phenomena, enzyme kinetics, vapor liquid equilibrium, and atomic and molecular excited state kinetics. The student experiences these systems through hands-on examples and guided studies. This book is the first of its kind, a textbook and a laboratory manual about cellular automata modeling of common systems in chemistry. The book is designed to be used as a text in undergraduate courses dealing with complex systems and/or as a computational supplement to laboratory courses taught at the undergraduate level. The book includes compact descriptions of a large variety of physical and chemical phenomena. Illustrative examples of simulations with exercises for further study. An instructor's manual for use of the program. The book will be of great value in undergraduate courses in chemistry, physics, biology, applied mathematics, and bioinformatics and as a supplement for laboratory courses in introductory chemistry, organic chemistry, physical chemistry, medicinal chemistry, chemical engineering, and other courses dealing with statistical and dynamic systems. It allows the exploration of a wide range of dynamic phenomena, many of which are not normally accessible within conventional laboratory settings due to limitations of time, cost, and experimental equipment. The book is both a textbook on applied Cellular Automata and a lab manual for chemistry, physics, engineering courses with lab activity. It would supplement other lab work and be an additional book the students would use in the course. The authors have assessed the emerging need for this kind of activity in science labs because of the cost of the practical activities and the frequent failure of some exercises leading to lost didactic value of some experiments. This book is pioneering an alternative that will grow in use. There are no course directors who would use Cellular Automata exclusively. The authors see an emerging interest in this kind of work in courses that contain lab exercises. One such course is the graduate course that Lemont Kier gives in Life Sciences about complexity. He uses many examples and studies from Cellular Automata in the latter part of this course. Science Worksheets Don't Grow Dendrites Marcia L. Tate, Warren G. Phillips, 2010-10-20. Best-selling author Marcia L. Tate outlines 20 proven brain-compatible strategies, rationales from experts to support their effectiveness, and more than 250 activities in this practical resource.

Model-oriented Systems Engineering Science Duane W. Hybertson, 2016-04-19. Systems engineering (SE) is experiencing a significant expansion that encompasses increasingly complex systems. However, a common body of knowledge on how to apply complex systems engineering (CSE) has yet to be developed. A combination of people and other autonomous

agents crossing organization boundaries and continually changing these hybrid sy *Handbook of Research on Predictive Modeling and Optimization Methods in Science and Engineering* Kim, Dookie, Sekhar Roy, Sanjiban, Länsivaara, Tim, Deo, Ravinesh, Samui, Pijush, 2018-06-15 The disciplines of science and engineering rely heavily on the forecasting of prospective constraints for concepts that have not yet been proven to exist especially in areas such as artificial intelligence Obtaining quality solutions to the problems presented becomes increasingly difficult due to the number of steps required to sift through the possible solutions and the ability to solve such problems relies on the recognition of patterns and the categorization of data into specific sets Predictive modeling and optimization methods allow unknown events to be categorized based on statistics and classifiers input by researchers The Handbook of Research on Predictive Modeling and Optimization Methods in Science and Engineering is a critical reference source that provides comprehensive information on the use of optimization techniques and predictive models to solve real life engineering and science problems Through discussions on techniques such as robust design optimization water level prediction and the prediction of human actions this publication identifies solutions to developing problems and new solutions for existing problems making this publication a valuable resource for engineers researchers graduate students and other professionals Advanced Pre-Med Studies (Teacher Guide) Gary Parker, Alan Gillen, John Hudson Tiner, 2016-09-06 The vital resource for grading all assignments from the Advanced Pre Med Studies course which includes The fascinating history of medicine providing students with a healthy dose of facts mini biographies and vintage illustrations Insight into how germs are symptomatic of the literal Fall and Curse of creation as a result of man s sin and the hope we have in the coming of Jesus Christ OVERVIEW From surgery to vaccines man has made great strides in the field of medicine Quality of life has improved dramatically in the last few decades alone and the future is bright But students must not forget that God provided humans with minds and resources to bring about these advances A biblical perspective of healing and the use of medicine provides the best foundation for treating diseases and injury The evolutionary worldview can be found filtered through every topic at every age level in our society It has become the overwhelmingly accepted paradigm for the origins of life as taught in all secular institutions This dynamic course helps young people not only learn science from a biblical perspective but also helps them know how to defend their faith in the process FEATURES The calendar provides lesson planning with clear objectives and the worksheets and quizzes are all based on the materials provided for the course **Colors-TM** Jyoti Swaroop, Geeta Oberoi, A Text book on Computers **Jacaranda Core Science Stage 4 New South Wales Australian Curriculum, 3e learnON and Print** Paul Arena, 2025-01-28

Expanding the Frontiers of Design Gabriela Goldschmidt, Ezri Tarazi, 2023-10-31 Design Thinking a method widely used in design business and management has changed the landscape of contemporary design Whereas in the past non designers were called upon to serve as external consultants ad hoc in an effort to promote creativity and innovation most design teams now consist of a mix of designers and other professionals The impact of this development on the design

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Proceedings of the 9th Mathematics, Science, and Computer Science Education International Seminar (MSCEIS 2023) Fitri Khoerunnisa, Galuh Yuliani, Rizki Zakwandi, 2024-09-01 This is an open access book On behalf of the Organizing Committee it gives me great pleasure to invite you to be part of the 9th Mathematics Science and Computer Science Education International Seminar MSCEIS which will be held in Bandung October 21th 2023 This conference is the biannual meeting of academia researchers and practitioner from across the country and the globe and is organized by Faculty of Mathematics and Science Education Indonesia University of Education This conference provides great opportunities for strengthening collaboration as well as network not only with international but also national participants The theme for the MSCEIS 2023 is Shaping the Future Trends and Insights in Mathematics Computer and Science Education researches to Support SDG s We are confident that this conference will be a successful scientific gathering and will give a better platform for all participants to engage in meaningful conversations and share research ideas This conference intends to bring together researchers academicians scientists and industrialists from across the world to discuss cutting edge research and development as well as identify futuristic trends and needs in the domains of chemistry and related fields such as Chemistry Chemistry Education Physic Physic Education Mathematic Mathematic Education Biology Biology Education Science Education Computer Science and Computer Science Education It will include keynote and invited lectures oral and poster presentations from distinguished professors and participants The attendees will get also the opportunity to share ideas as well as develop professional relationships and locate global partners for future collaboration We look forward to welcoming you to be part of MSCEIS in Bandung 2023 We are very confident that this conference will be an intellectually exciting and enjoyable event for all

Future Communication, Information and Computer Science Dawei Zheng, 2015-02-05 The 2014 International Conference on Future Communication Information and Computer Science FCICS 2014 was held May 22 23 2014 in Beijing China The objective of FCICS 2014 was to provide a platform for researchers engineers and academics as well as industrial professionals from all over the world to present their research results and development activities in Computer Network and Information Technology and Communication Engineering

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