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## PHYSICAL SCIENCES PAPER 2 (CHEMISTRY)

GRADE 12

### TERMS & DEFINITIONS, QUESTIONS & ANSWERS PER TOPIC

2021



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# November 2013 Physical Science Paper 2 Memorandum

**Edward Clinton Ezell,Linda Neuman  
Ezell**



## November 2013 Physical Science Paper 2 Memorandum:

*Bulk Collection of Signals Intelligence* National Research Council, Division on Engineering and Physical Sciences, Computer Science and Telecommunications Board, Committee on Responding to Section 5(d) of Presidential Policy Directive 28: The Feasibility of Software to Provide Alternatives to Bulk Signals Intelligence Collection, 2015-03-24 The Bulk Collection of Signals Intelligence Technical Options study is a result of an activity called for in Presidential Policy Directive 28 PPD 28 issued by President Obama in January 2014 to evaluate U S signals intelligence practices The directive instructed the Office of the Director of National Intelligence ODNI to produce a report within one year assessing the feasibility of creating software that would allow the intelligence community more easily to conduct targeted information acquisition rather than bulk collection ODNI asked the National Research Council NRC the operating arm of the National Academy of Sciences and National Academy of Engineering to conduct a study which began in June 2014 to assist in preparing a response to the President Over the ensuing months a committee of experts appointed by the Research Council produced the report **The Secure and the Dispossessed** Nick Buxton, Ben Hayes, 2015-11-20 While the world's scientists and many of its inhabitants despair at the impact of climate change corporate and military leaders see nothing but opportunities For them melting ice caps mean newly accessible fossil fuels borders to be secured from climate refugees social conflicts to be managed and more failed states in which to intervene They are securing their assets at the expense of the planet and its inhabitants The Secure and the Dispossessed looks at these deadly approaches with a critical eye It also considers the flip side that the legitimacy of the elite is under unprecedented pressure from resistance by communities to resource grabs to those creating new ecological and socially just models for managing our energy food and water Topics covered include geoengineering militarism refugee protection greenwashing and the agricultural crisis among others Adaptation and resilience to a climate changed world is desperately needed but the form it will take will affect all of our futures Vibrio ecology, pathogenesis and evolution Rita R Colwell, Daniela Ceccarelli, 2014-10-24 Vibrios are Gram negative bacilli that occur naturally in marine estuarine and freshwater systems Some species include human and animal pathogens capable of causing gastroenteritis wound infections cholera and fatal septicemia Over the past decades cutting edge research on Vibrio genomics has promoted a tremendous advance in our knowledge of these pathogens Significant developments include the discovery of emerging epidemic clones tracking the spread of new strain variants and an intensified appreciation of the role of mobile genetic elements in antibiotic resistance spread as well as pathogenesis Furthermore improved understanding of the interaction of Vibrios with a variety of living organisms in the aquatic environment has documented the significant role of environmental reservoirs in their seasonal cycle favoring persistence of the pathogen during inter epidemic periods and enhancing disease transmission This Research Topic is dedicated to our current understanding in these areas and will bring together leading experts in the field to provide a deep overview of Vibrios ecology and evolution and will suggest the pathway of future research in this field **Food**

**Processing** Stephanie Clark, Stephanie Jung, Buddhi Lamsal, 2014-06-03 FOOD PROCESSING Food Processing Principles and Applications Second Edition is the fully revised new edition of this best selling food technology title Advances in food processing continue to take place as food scientists and food engineers adapt to the challenges imposed by emerging pathogens environmental concerns shelf life quality and safety as well as the dietary needs and demands of humans In addition to covering food processing principles that have long been essential to food quality and safety this edition of Food Processing Principles and Applications unlike the former edition covers microbial enzyme inactivation kinetics alternative food processing technologies as well as environmental and sustainability issues currently facing the food processing industry The book is divided into two sections the first focusing on principles of food processing and handling and the second on processing technologies and applications As a hands on guide to the essential processing principles and their applications covering the theoretical and applied aspects of food processing in one accessible volume this book is a valuable tool for food industry professionals across all manufacturing sectors and serves as a relevant primary or supplemental text for students of food science

The Science of Armour Materials Ian Crouch, 2016-09-21 The Science of Armour Materials comprehensively covers the range of armor materials from steels and light alloys through glasses and ceramics to fibers textiles and protective apparel The book also discusses aspects of analytical and numerical modeling as well as laboratory based high strain rate testing and ballistic testing methodologies Each chapter is written from an international perspective including reviews of the current global literature and incorporates case studies that focus upon real life applications research outcomes and lessons learned The threat spectrum is restricted to small arms ammunition high velocity fragments and stab and spike attacks as well as blast loadings Features input from an editor who is an expert in his field Dr Ian Crouch the author of over 80 publications in his field with three patents to his name Provides systematic and comprehensive coverage of armor materials modeling and testing Offers a cross disciplinary approach that brings together expertise in materials science and defense engineering Discusses aspects of analytical and numerical modeling as well as laboratory based high strain rate testing and ballistic testing methodologies

Overcoming Barriers to Deployment of Plug-in Electric Vehicles National Research Council, Transportation Research Board, Division on Engineering and Physical Sciences, Board on Energy and Environmental Systems, Committee on Overcoming Barriers to Electric-Vehicle Deployment, 2015-06-26 In the past few years interest in plug in electric vehicles PEVs has grown Advances in battery and other technologies new federal standards for carbon dioxide emissions and fuel economy state zero emission vehicle requirements and the current administration s goal of putting millions of alternative fuel vehicles on the road have all highlighted PEVs as a transportation alternative Consumers are also beginning to recognize the advantages of PEVs over conventional vehicles such as lower operating costs smoother operation and better acceleration the ability to fuel up at home and zero tailpipe emissions when the vehicle operates solely on its battery There are however barriers to PEV deployment including the vehicle cost the short all electric driving range the long

battery charging time uncertainties about battery life the few choices of vehicle models and the need for a charging infrastructure to support PEVs What should industry do to improve the performance of PEVs and make them more attractive to consumers At the request of Congress *Overcoming Barriers to Deployment of Plug in Electric Vehicles* identifies barriers to the introduction of electric vehicles and recommends ways to mitigate these barriers This report examines the characteristics and capabilities of electric vehicle technologies such as cost performance range safety and durability and assesses how these factors might create barriers to widespread deployment *Overcoming Barriers to Deployment of Plug in Electric Vehicles* provides an overview of the current status of PEVs and makes recommendations to spur the industry and increase the attractiveness of this promising technology for consumers Through consideration of consumer behaviors tax incentives business models incentive programs and infrastructure needs this book studies the state of the industry and makes recommendations to further its development and acceptance

*Tunnel Visions* Michael Riordan, Lilian Hodgeson, Arienne W. Kolb, 2015-11-20 A detailed and engaging account of the development of the superconducting supercollider one of the largest scientific undertakings in the United States *Journal of American History* Starting in the 1950s US physicists dominated the search for elementary particles aided by the association of this research with national security they held this position for decades In an effort to maintain their hegemony and track down the elusive Higgs boson they convinced President Reagan and Congress to support construction of the multibillion dollar Superconducting Super Collider project in Texas the largest basic science project ever attempted But after the Cold War ended and the estimated SSC cost surpassed ten billion dollars Congress terminated the project in October 1993 Drawing on extensive archival research contemporaneous press accounts and over one hundred interviews with scientists engineers government officials and others involved *Tunnel Visions* tells the riveting story of the aborted SSC project The authors examine the complex interrelated causes for its demise including problems of large project management continuing cost overruns and lack of foreign contributions In doing so they ask whether Big Science has become too large and expensive including whether academic scientists and their government overseers can effectively manage such an enormous undertaking Focusing on the scientific technical and political conflicts that led to delays ever rising costs and eventually the SSC's cancellation by Congress *Tunnel Visions* is a true techno thriller Burton Richter winner of the Nobel Prize in Physics Most good science stories are tales of discovery and success but failure can be just as riveting Here two historians and an archivist describe the greatest particle physics experiment that never was *Scientific American*

*Formality of the Little  $\mathbb{N}\mathbb{S}$ -disks Operad* Pascal Lambrechts, Ismar Volić, 2014-06-05 The little disks operad along with its variants is an important tool in homotopy theory It is defined in terms of configurations of disjoint dimensional disks inside the standard unit disk in  $\mathbb{R}^n$  and it was initially conceived for detecting and understanding fold loop spaces Its many uses now stretch across a variety of disciplines including topology algebra and mathematical physics In this paper the authors develop the details of Kontsevich's proof of the formality of little disks operad over the field of real

numbers More precisely one can consider the singular chains on as well as the singular homology of These two objects are operads in the category of chain complexes The formality then states that there is a zig zag of quasi isomorphisms connecting these two operads The formality also in some sense holds in the category of commutative differential graded algebras The authors additionally prove a relative version of the formality for the inclusion of the little disks operad in the little disks operad when

*Fluid Mechanics and Hydraulics* Vedat Batu, 2024-05-27 Fluid Mechanics and Hydraulics Illustrative Worked Examples of Surface and Subsurface Flows presents the basic principles of fluid mechanics through the use of numerous worked examples Some readers may have interest only in the application parts of various principles without paying too much attention to the derivation details of equations Other readers may have interest both in derivation details and their applications As a result this book is designed to address both needs and most derivation details are included as example problems Therefore those who are not interested in the details of derivations may skip them without interrupting the effective use of the book It serves as an effective learning source for college students and as a teaching tool for instructors with an included solutions manual as well as for practicing professionals in the areas of fluid mechanics and hydraulics

*Spacecraft Dynamics and Control* Enrico Canuto, Carlo Novara, Donato Carlucci, Carlos Perez-Montenegro, Luca Massotti, 2018-03-08 Spacecraft Dynamics and Control The Embedded Model Control Approach provides a uniform and systematic way of approaching space engineering control problems from the standpoint of model based control using state space equations as the key paradigm for simulation design and implementation The book introduces the Embedded Model Control methodology for the design and implementation of attitude and orbit control systems The logic architecture is organized around the embedded model of the spacecraft and its surrounding environment The model is compelled to include disturbance dynamics as a repository of the uncertainty that the control law must reject to meet attitude and orbit requirements within the uncertainty class The source of the real time uncertainty estimation prediction is the model error signal as it encodes the residual discrepancies between spacecraft measurements and model output The embedded model and the uncertainty estimation feedback noise estimator in the book constitute the state predictor feeding the control law Asymptotic pole placement exploiting the asymptotes of closed loop transfer functions is the way to design and tune feedback loops around the embedded model state predictor control law reference generator The design versus the uncertainty class is driven by analytic stability and performance inequalities The method is applied to several attitude and orbit control problems The book begins with an extensive introduction to attitude geometry and algebra and ends with the core themes state space dynamics and Embedded Model Control Fundamentals of orbit attitude and environment dynamics are treated giving emphasis to state space formulation disturbance dynamics state feedback and prediction closed loop stability Sensors and actuators are treated giving emphasis to their dynamics and modelling of measurement errors Numerical tables are included and their data employed for numerical simulations Orbit and attitude control problems of the European GOCE mission are

the inspiration of numerical exercises and simulations The suite of the attitude control modes of a GOCE like mission is designed and simulated around the so called mission state predictor Solved and unsolved exercises are included within the text and not separated at the end of chapters for better understanding training and application Simulated results and their graphical plots are developed through MATLAB Simulink code [Federal Register](#) ,2013-09

**Technological Innovation in Legacy Sectors** William B. Bonvillian, Charles Weiss, 2015-08-18 The American economy faces two deep problems expanding innovation and raising the rate of quality job creation Both have roots in a neglected problem the resistance of Legacy economic sectors to innovation While the U S has focused its policies on breakthrough innovations to create new economic frontiers like information technology and biotechnology most of its economy is locked into Legacy sectors defended by technological economic political social paradigms that block competition from disruptive innovations that could challenge their models Americans like to build technology covered wagons and take them out west to open new innovation frontiers we don't head our wagons back east to bring innovation to our Legacy sectors By failing to do so the economy misses a major opportunity for innovation which is the bedrock of U S competitiveness and its standard of living Technological Innovation in Legacy Sectors uses a new unifying conceptual framework to identify the shared features underlying structural obstacles to innovation in major Legacy sectors energy air and auto transport the electric power grid buildings manufacturing agriculture health care delivery and higher education and develops approaches to understand and transform them It finds both strengths and obstacles to innovation in the national innovation environments a new concept that combines the innovation system and the broader innovation context for a group of Asian and European economies Manufacturing is a major Legacy sector that presents a particular challenge because it is a critical stage in the innovation process By increasingly offshoring production the U S is losing important parts of its innovation capacity Innovate here produce here where the U S took all the gains of its strong innovation system at every stage is being replaced by innovate here produce there which threatens to lead to produce there innovate there To bring innovation to Legacy sectors authors William Bonvillian and Charles Weiss recommend that policymakers focus on all stages of innovation from research through implementation They should fill institutional gaps in the innovation system and take measures to address structural obstacles to needed disruptive innovations In the specific case of advanced manufacturing the production ecosystem can be recreated to reverse jobless innovation and add manufacturing led innovation to the U S's still strong research oriented innovation system [Scientists at War](#) Sarah Bridger, 2015-04-06 Sarah Bridger examines the ethical debates that tested the U S scientific community during the Cold War and scientists contributions to military technologies and strategic policymaking from the dawning atomic age through the Strategic Defense Initiative Star Wars in the 1980s which sparked cross generational opposition among scientists [Constructing Quantum Mechanics](#) Anthony Duncan, Michel Janssen, 2019-08-29 Constructing Quantum Mechanics is the first of two volumes on the genesis of quantum mechanics This volume traces the early contributions by Planck Einstein and Bohr all

showing the need for drastic changes to the physics of their day It examines the efforts by Sommerfeld and others to develop a new theory now known as the old quantum theory After some striking successes this theory ran into serious difficulties and ended up serving as the scaffold on which the arch of modern quantum mechanics was built This volume breaks new ground both in its treatment of the work of Sommerfeld and his associates and by offering new perspectives on classic papers by Planck Einstein Bohr and others Paying close attention to both primary and secondary sources Constructing Quantum Mechanics provides an in depth analysis of the heroic struggle to come to terms with the wealth of mostly spectroscopic data that eventually gave us modern quantum mechanics

**Where Have All the Democrats Gone?** Ruy Teixeira, John B. Judis, 2023-11-07 A Wall Street Journal Best Political Book of 2023 A much needed wake up call for the Democrats which reveals how the party has lost sight of its core principles and endangered its political future from the authors of one of the most influential political books of the 21st century The New York Times For decades American politics has been plagued by a breakdown between the Democratic and Republican parties in which victory has inevitably led to defeat and vice versa Both parties have lost sight of the people at the center of the American electorate leading to polarization and paralysis In Where Have All the Democrats Gone John B Judis and Ruy Teixeira reveal the tectonic changes shaping the country's current political landscape that both pundits and political scientists have missed The Democratic Party once the preserve of small towns as well as big cities and of the industrial working class and the newly immigrated has abandoned and even actively alienated many of these voters In this clarion call and essential argument for common sense and common ground Judis and Teixeira reveal the transformation of American politics and provide a razor sharp critique of where the Democrats have gone awry and how they can avoid political disaster in the days ahead

**Cybersecurity** Damien Van Puyvelde, Aaron F. Brantly, 2024-09-27 In the last decade the proliferation of billions of new Internet enabled devices and users has significantly expanded concerns about cybersecurity How much should we worry about cyber threats and their impact on our lives society and international affairs Are these security concerns real exaggerated or just poorly understood In this fully revised and updated second edition of their popular text Damien Van Puyvelde and Aaron F Brantly provide a cutting edge introduction to the key concepts controversies and policy debates in cybersecurity today Exploring the interactions of individuals groups and states in cyberspace and the integrated security risks to which these give rise they examine cyberspace as a complex socio technical economic domain that fosters both great potential and peril Across its ten chapters the book explores the complexities and challenges of cybersecurity using new case studies such as NotPetya and Colonial Pipeline to highlight the evolution of attacks that can exploit and damage individual systems and critical infrastructures This edition also includes reader's guides and active learning exercises in addition to questions for group discussion Cybersecurity is essential reading for anyone interested in understanding the challenges and opportunities presented by the continued expansion of cyberspace

**Oceanobs'19: An Ocean of Opportunity. Volume II** Tong Lee, Sabrina Speich, Laura Lorenzoni, Sanae Chiba, Frank E.



Muller-Karger,Minhan Dai,Amos T. Kabo-Bah,John Siddorn,Justin Manley,Maria Snoussi,Fei Chai,2020-12-31 This eBook is a collection of articles from a Frontiers Research Topic Frontiers Research Topics are very popular trademarks of the Frontiers Journals Series they are collections of at least ten articles all centered on a particular subject With their unique mix of varied contributions from Original Research to Review Articles Frontiers Research Topics unify the most influential researchers the latest key findings and historical advances in a hot research area Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers Editorial Office frontiersin.org about contact **On**

**Mars** Edward Clinton Ezell,Linda Neuman Ezell,2013-02-19 Although it was only designed for a ninety day surface mission the Viking 1 lander ultimately transmitted science messages to Earth for seven years This authoritative history chronicles the remarkable achievements of the Viking program during its first three decades Commissioned by NASA it recounts the events surrounding the first planetary landing on Earth's closest neighbor and the first on site search for evidence of extraterrestrial life It also portrays a human drama in which thousands of professionals from government industry and academia joined together to accomplish the seemingly impossible This history begins with a survey of the qualities that make the surface and atmosphere of Mars prime targets for scientific investigation A retrospective of NASA's Mariner program follows detailing the series of robotic interplanetary probes that led to the initiation of the Viking program in 1968 The authors trace the ensuing technological developments including the first lander vehicles and orbiter They also profile the cooperation of managerial technical and scientific teams during the mission's data gathering and analysis phases The final chapters outline the scientific results of the Viking investigations examine some of the unresolved questions and consider possible future explorations Dozens of photos taken by Viking cameras illuminate the text **The FFT in the 21st Century** James K.

Beard,2013-03-09 This book was undertaken to provide a text and reference on the theory and practice of the FFT and its common usage This book is organized in only four chapters and is intended as a tutorial on the use of the FFT and its trade space The trade space of the FFT is the parameters in its usage and the relationships between them the sample rate the total number of points or the interval over which processing occurs in a single FFT the selectivity of tuning to a given frequency over signals out of band and the bandwidth over which a signal appears The examples given in this text are in FORTRAN 9512003 FORTRAN 2003 was frozen as a standard while this work was in progress The listings given here are intended as an aid in understanding the FFT and associated algorithms such as spectral window weightings with the goal of making the best of them more accessible to the reader The code I use here provides a simple bridge between the material in the text and implementation in FORTRAN 2003 C Java MATLAB and other modern languages The examples are sufficiently simple to be translated into older languages such as C and FORTRAN 77 if desired *Literature 1984, Part 1* S. Böhme,Prof. Dr. Walter Fricke,H. Hefele,Inge Heinrich,W. Hofmann,D. Krahn,V. R. Matas,Dr. Lutz D. Schmadel,G. Zech,2013-11-11

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