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Department of
Education
FREE STATE PROVINCE

PHYSICAL SCIENCES PAPER 2 (CHEMISTRY)

GRADE 12

TERMS & DEFINITIONS, QUESTIONS & ANSWERS PER TOPIC

2021



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Physical Science Paper Memorandum September 2013

Rita R Colwell, Daniela Ceccarelli



Physical Science Paper Memorandum September 2013:

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 **Space**

Studies Board Annual Report 2013 National Research Council, Division on Engineering and Physical Sciences, Space Studies Board, 2014-04-09 The original charter of the Space Science Board was established in June 1958 3 months before the National Aeronautics and Space Administration NASA opened its doors The Space Science Board and its successor the Space Studies Board SSB have provided expert external and independent scientific and programmatic advice to NASA on a continuous basis from NASA's inception until the present The SSB has also provided such advice to other executive branch agencies including the National Oceanic and Atmospheric Administration NOAA the National Science Foundation NSF the U S Geological Survey USGS the Department of Defense as well as to Congress Space Studies Board Annual Report 2013 covers a message from the chair of the SSB Charles F Kennel This report also explains the origins of the Space Science Board how the Space Studies Board functions today the SSB's collaboration with other National Research Council units assures the quality of the SSB reports acknowledges the audience and sponsors and expresses the necessity to enhance the outreach and improve dissemination of SSB reports This report will be relevant to a full range of government audiences in civilian space research including NASA NSF NOAA USGS and the Department of Energy as well members of the SSB policy makers and researchers **This Changes Everything** Naomi Klein, 2014-09-16 The most important book yet from the

author of the international bestseller *The Shock Doctrine* a brilliant explanation of why the climate crisis challenges us to abandon the core free market ideology of our time restructure the global economy and remake our political systems In short either we embrace radical change ourselves or radical changes will be visited upon our physical world The status quo is no longer an option In *This Changes Everything* Naomi Klein argues that climate change isn't just another issue to be neatly filed between taxes and health care It's an alarm that calls us to fix an economic system that is already failing us in many ways Klein meticulously builds the case for how massively reducing our greenhouse emissions is our best chance to simultaneously reduce gaping inequalities re-imagine our broken democracies and rebuild our gutted local economies She

exposes the ideological desperation of the climate change deniers the messianic delusions of the would be geoengineers and the tragic defeatism of too many mainstream green initiatives And she demonstrates precisely why the market has not and cannot fix the climate crisis but will instead make things worse with ever more extreme and ecologically damaging extraction methods accompanied by rampant disaster capitalism Klein argues that the changes to our relationship with nature and one another that are required to respond to the climate crisis humanely should not be viewed as grim penance but rather as a kind of gift a catalyst to transform broken economic and cultural priorities and to heal long festering historical wounds And she documents the inspiring movements that have already begun this process communities that are not just refusing to be sites of further fossil fuel extraction but are building the next regeneration based economies right now Can we pull off these changes in time Nothing is certain Nothing except that climate change changes everything And for a very brief time the nature of that change is still up to us

A History of Scientific Journals Aileen Fyfe, Noah Moxham, Julie McDougall-Waters, Camilla Mørk Røstvik, 2022-10-03

Modern scientific research has changed so much since Isaac Newton's day it is more professional collaborative and international with more complicated equipment and a more diverse community of researchers Yet the use of scientific journals to report share and store results is a thread that runs through the history of science from Newton's day to ours Scientific journals are now central to academic research and careers Their editorial and peer review processes act as a check on new claims and findings and researchers build their careers on the list of journal articles they have published The journal that reported Newton's optical experiments still exists First published in 1665 and now fully digital the Philosophical Transactions has carried papers by Charles Darwin Dorothy Hodgkin and Stephen Hawking It is now one of eleven journals published by the Royal Society of London Unrivalled insights from the Royal Society's comprehensive archives have enabled the authors to investigate more than 350 years of scientific journal publishing The editorial management business practices and financial difficulties of the Philosophical Transactions and its sibling Proceedings reveal the meaning and purpose of journals in a changing scientific community At a time when we are surrounded by calls to reform the academic publishing system it has never been more urgent that we understand its history

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 *Decision Making and Knowledge Decision Support Systems* Anna Maria

Gil-Lafuente,Constantin Zopounidis,2014-12-01 This book presents recent advancements of research new methods and techniques applications and projects in decision making and decision support systems It explores expert systems and neural networks knowledge engineering and management fuzzy sets and systems and computational methods for optimization data analysis and decision making It presents applications in Economics Finance Management and Engineering The book undertakes to stimulate scientific exchange ideas and experiences in the field of decision making in Economy and Management Researchers and practitioners alike will benefit from this book when they are dealing with imprecision vagueness and uncertainty in the context of decision making *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 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

Indigenous Peoples' Governance of Land and Protected Territories in the Arctic Thora Martina Herrmann,Thibault Martin,2015-12-22 This book addresses critical questions and analyses key issues regarding Indigenous Aboriginal Peoples and governance of land and protected areas in the Arctic It brings together contributions from scientists indigenous and non indigenous researchers local leaders and members of the policy community that document Indigenous Aboriginal approaches to governance of land and protected areas at the local regional and international level explore new territorial governance models that are emerging as part of the Indigenous Aboriginal governance within Arctic States provinces territories and regions analyse the recognition or lack thereof concerning indigenous rights to self determination in the Arctic and examine how traditional decision making arrangements and practices can be linked with governments in the process of good governance The book highlights essential lessons learned success stories and remaining issues all of which are useful to address issues of Arctic governance of land and protected areas today and which could also be relevant for future governance arrangements

Technological Innovation in Legacy Sectors William B. Bonvillian,Charles Weiss,2015-08-18 The American economy misses opportunities for innovation growth and job creation because of a neglected problem the resistance to innovation from Legacy sectors like energy manufacturing and health care which constitute most of our economy The book offers systematic strategies to overcome the structural obstacles to innovation in critically important Legacy sectors

The UFO Phenomenon Robert Davis,2015-02-28 A comprehensive perspective of evidence and future directions associated with the UFO phenomenon Includes review and analysis of studies evidence theories and research needs involving UFO topics Extensive scientific endnotes

Biofuels for Aviation Christopher Chuck,2016-06-02 *Biofuels for Aviation* Feedstocks Technology and Implementation presents the issues surrounding the research and use of biofuels for aviation such as policy markets certification and performance requirements life cycle assessment and the economic and technical barriers to their full implementation Readers involved in bioenergy and aviation sectors research planning or policy making activities will benefit from this thorough overview The aviation industry s commitment to reducing GHG emissions along with increasing oil prices have sparked the need for renewable and affordable energy sources tailored to this sector s very specific needs As jet

engines cannot be readily electrified turning to biofuels is the most viable option However aviation is a type of transportation for which traditional biofuels such as bioethanol and biodiesel do not fulfill key fuel requirements Therefore different solutions to this situation are being researched and tested around the globe which makes navigating this scenario particularly challenging This book guides readers through this intricate subject bringing them up to speed with its current status and future prospects both from the academic and the industry point of view Science and technology chapters delve into the technical aspects of the currently tested and the most promising technology in development as well as their respective feedstocks and the use of additives as a way of adapting them to meet certain specifications Conversion processes such as hydrotreatment synthetic biology pyrolysis hydrothermal liquefaction and Fisher Tropsch are explored and their results are assessed for current and future viability Presents the current status of biofuels for the aviation sector including technologies that are currently in use and the most promising future technologies their production processes and viability Explains the requirements for certification and performance of aviation fuels and how that can be achieved by biofuels Explores the economic and policy issues as well as life cycle assessment a comparative techno economic analysis of promising technologies and a roadmap to the future Explores conversion processes such as hydrotreatment synthetic biology pyrolysis hydrothermal liquefaction and Fisher Tropsch

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

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 Engineering Vulnerability Sarah E. Vaughn,2022-02-07 In Engineering Vulnerability Sarah E Vaughn examines climate adaptation against the backdrop of ongoing processes of settler colonialism and the global climate change initiatives that seek to intervene in the lives of the world s most vulnerable Her case study is Guyana in the aftermath of the 2005 catastrophic flooding that ravaged the country s Atlantic coastal plain The country s ensuing engineering projects reveal the contingencies of climate adaptation and the capacity of flooding to shape Guyanese expectations about racial in equality Analyzing the coproduction of race and vulnerability Vaughn details why climate adaptation has implications for how we understand the past and the continued human settlement of a place Such understandings become particularly apparent not only through experts and ordinary citizens disputes over resources but in their attention to the ethical practice of technoscience over time Approaching climate adaptation this way Vaughn exposes the generative openings as well as gaps in racial thinking for theorizing climate action environmental justice and more broadly future life on a warming planet Duke University Press Scholars of Color First Book Award recipient **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 **Breakout** Newt

Gingrich,2013-11-04 It is not between the Left and the Right but between the past and the future America is on the edge of a breakout In fact we are poised for one of the most spectacular leaps in human well being in history Pioneers of the future innovators and entrepreneurs are achieving breakthroughs in medicine transportation energy education and other fields that will make the world a dramatically different and better place Unless the prison guards of the past stop them Every American must choose a side Will you be a champion of the future or a prisoner of the past Every potential breakthrough has to get past a host of individuals and institutions whose power and comfort depend on the status quo These prison guards of the past will strangle every innovation that threatens to change the way things have always been done if we let them **Governance**

Feminism Janet Halley,Prabha Kotiswaran,Rachel Rebouché,Hila Shamir,2019-03-26 An interdisciplinary multifaceted look at feminist engagements with governance across the global North and global South Governance Feminism Notes from the Field brings together nineteen chapters from leading feminist scholars and activists to critically describe and assess contemporary feminist engagements with state and state like power Gathering examples from North America South America Europe Asia and the Middle East it complements and expands on the companion volume Governance Feminism An Introduction Its chapters argue that governance feminism GF is institutionally diverse and globally distributed emerging from traditional sites of state power as well as from various forms of governance and operating at the grassroots level in the private sector in civil society and in international relations The book begins by confronting the key role that crime and punishment play in GFeminist projects Here contributors explore the ideological and political conditions under which this branch of GF became so robust and rethink the carceral turn Other chapters speak to another face of GFeminism feminists finding in mundane and seemingly unspectacular bureaucratic tools leverage to bring about change in policy and governance practices Several contributions highlight the political strategic and ethical challenges that feminists and LGBT activists must negotiate to play on the governmental field The book concludes with a focus on feminist interventions in postcolonial legal and political orders looking at new policy spaces opened up by conflict postconflict and occupation Providing a clear cross cutting critical lens through which to map developments in feminist governance around the world Governance Feminism Notes from the Field makes sense of the costs and benefits of current feminist realities to reimagine feminist futures Contributors Libby Adler Northeastern U Aziza Ahmed Northeastern U Elizabeth Bernstein Barnard College Amy J Cohen Ohio State U Karen Engle U of Texas at Austin Jacob Gersen Harvard U Leigh Goodmark U of Maryland Aeyal Gross Tel Aviv U Aya Gruber U of Colorado Boulder Janet Halley Harvard U Rema Hammami Birzeit U Palestine Vanja Hamzi U of London Isabel Cristina Jaramillo Sierra Prabha Kotiswaran King s College London Maleiha Malik King s College London Vasuki Nesiah New York U Dianne Otto Melbourne Law School Helen Reece Darren Rosenblum Pace U Jeannie Suk Gersen Harvard U Mariana Valverde U of Toronto **New Critical Spaces in Transitional Justice** Arnaud Kurze,Christopher K. Lamont,2019-01-10 Since the 1980s transitional justice mechanisms have been increasingly applied to account for mass

atrocities and grave human rights violations throughout the world Over time post conflict justice practices have expanded across continents and state borders and have fueled the creation of new ideas that go beyond traditional notions of amnesty retribution and reconciliation Gathering work from contributors in international law political science sociology and history New Critical Spaces in Transitional Justice addresses issues of space and time in transitional justice studies It explains new trends in responses to post conflict and post authoritarian nations and offers original empirical research to help define the field for the future Host Bibliographic Record for Boundwith Item Barcode 30112050443578 and Others ,2013

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In a fast-paced digital era where connections and knowledge intertwine, the enigmatic realm of language reveals its inherent magic. Its capacity to stir emotions, ignite contemplation, and catalyze profound transformations is nothing short of extraordinary. Within the captivating pages of **Physical Science Paper Memorandum September 2013** a literary masterpiece penned by way of a renowned author, readers embark on a transformative journey, unlocking the secrets and untapped potential embedded within each word. In this evaluation, we shall explore the book's core themes, assess its distinct writing style, and delve into its lasting effect on the hearts and minds of those who partake in its reading experience.

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