



education

Department of
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PHYSICAL SCIENCES PAPER 2 (CHEMISTRY)

GRADE 12

TERMS & DEFINITIONS, QUESTIONS & ANSWERS PER TOPIC

2021



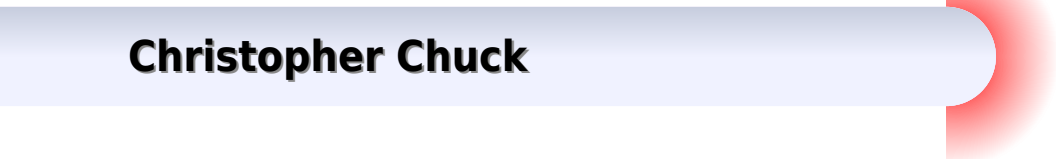
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Physical Science Paper 2 Memorandum September 2013

Christopher Chuck



Physical Science Paper 2 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

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 *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

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.

Ocean Science and the British Cold War State Samuel A. Robinson, 2018-05-03 This book focuses on the activities of the scientific staff of the British National Institute of Oceanography during the Cold War. Revealing how issues such as intelligence gathering, environmental surveillance, the identification of enemy science along with administrative practice informed and influenced the Institute's Cold War program. In turn, this program helped shape decisions taken by Government, military and the civil service towards science in post war Britain. This was not simply a case of government ministers choosing to patronize particular scientists but a relationship between politics and science that profoundly impacted on the future of ocean science in Britain.

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.

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 **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 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

The Squares Cyrus C. M. Mody, 2022-07-12 When ungroovy scientists did groovy science how non activist scientists and engineers adapted their work to a rapidly changing social and political landscape In *The Squares* Cyrus Mody shows how between the late 1960s and the early 1980s some scientists and engineers who did not consider themselves activists New Leftists or members of the counterculture accommodated their work to the rapidly changing social and political landscape of the time These square scientists Mody shows began to do many of the things that the counterculture urged turn away from military industrial funding become more interdisciplinary and focus their research on solving problems of civil society During the period Mody calls the long 1970s ungroovy scientists were doing groovy science Mody offers a series of case studies of some of these collective efforts by non activist scientists to use their technical knowledge for the good of society He considers the region around Santa Barbara and the interplay of public universities think tanks established firms new companies philanthropies and social movement organizations He looks at Stanford University s transition from Cold War science to commercialized technoscience NASA s search for a post Apollo mission the unsuccessful foray into solar energy by Nobel laureate Jack Kilby the civilianization of the US semiconductor industry and systems engineer Arthur D Hall s ill fated promotion of automated agriculture

Quantum Interaction Harald Atmanspacher, Claudia Bergomi, Thomas Filk, Kirsty Kitto, 2015-02-20 This book constitutes the refereed proceedings of the 8th International Conference on Quantum Interaction QI 2014 held in Filzbach Switzerland in June July 2014 The 19 papers together with 20 invited keynotes presented in this book were carefully selected from 22 submissions Quantum Interaction has developed into an emerging interdisciplinary area of science combining research topics in fundamental issues semantic and memory decision making games politics and social aspects non locality and entanglement

Federal Register , 2013-09

Adolescent Psychology in Today's World Michael J. Nakkula, Andrew J. Schneider-Muñoz, 2018-11-02 This groundbreaking three volume set spotlights how conditions around the world are affecting the healthy development of adolescents in their respective environments on all six continents Continually unstable or perpetually poor economic conditions globalization and rapid technological change are just three of the forces affecting a group 1 2 billion strong today a demographic poised to become our world leaders and catalysts in the not too distant future the world s adolescents Led by two editors who have been dedicated to studying adolescent development worldwide for decades this novel collection of works from contributors in more than 40 countries emphasizes how possibilities for healthy mental and physical development are affected by the difficulties youths face in their countries and how these challenges have shaped and are shaping contemporary teenage life today The set comprehensively addresses issues for adolescents across the globe such as the day to day challenges of poverty inadequate education violence or war disease reproductive matters globalization and technological challenges and more while also providing a strengths based focus in the volumes showing how and why some teenagers in each country have surmounted the challenges and forged stronger characters to better their worlds These stories document more than personal victories and their experiences matter to far more than the adolescents themselves In its State of the World s Children 2011 report UNICEF noted that the world community needs to turn its attention to adolescents in need explaining that focusing on this large and potentially powerful group makes economic sense as well as being a necessary step in working towards achieving human justice By addressing the risks challenges and strengths of teenagers as a group in countries worldwide this work serves to break the cycle of poverty violence discrimination and death for adolescents [The Family Planning Association and Contraceptive Science and Technology in Mid-Twentieth-Century Britain](#) Natasha Szuhan, 2022-08-18 This book offers the first in depth investigation into the relationship between the National Birth Control Association later the Family Planning Association and contraceptive science and technology in the pre Pill era It explores the Association s role in designing and supporting scientific research employment of scientists engagement with manufacturers and pharmaceutical companies and use of its facilities patients staff medical scientific and political networks to standardise and guarantee contraceptive technology it prescribed and produced By taking a micro history approach to the archives of the Association this book highlights the importance of this organisation to the history of science technology and medicine in twentieth century Britain It examines the Association s participation within Western family planning networks working particularly closely with its American counterparts to develop chemical and biological means of testing contraception for efficacy quality and safety [Freedom's Laboratory](#) Audra J. Wolfe, 2018-11-15 The Cold War ended long ago but the language of science and freedom continues to shape public debates over the relationship between science and politics in the United States Scientists like to proclaim that science knows no borders Scientific researchers follow the evidence where it leads their conclusions free of prejudice or ideology But is that really the case In Freedom s Laboratory Audra J Wolfe shows how these

ideas were tested to their limits in the high stakes propaganda battles of the Cold War Wolfe examines the role that scientists in concert with administrators and policymakers played in American cultural diplomacy after World War II During this period the engines of US propaganda promoted a vision of science that highlighted empiricism objectivity a commitment to pure research and internationalism Working both overtly and covertly wittingly and unwittingly with governmental and private organizations scientists attempted to decide what exactly they meant when they referred to scientific freedom or the US ideology More frequently however they defined American science merely as the opposite of Communist science Uncovering many startling episodes of the close relationship between the US government and private scientific groups Freedom's Laboratory is the first work to explore science's link to US propaganda and psychological warfare campaigns during the Cold War Closing in the present day with a discussion of the 2017 March for Science and the prospects for science and science diplomacy in the Trump era the book demonstrates the continued hold of Cold War thinking on ideas about science and politics in the United States

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