



basic education

Department
Basic Education
REPUBLIC OF SOUTH AFRICA

FULL MEMORANDUM GRADE 12 PHYSICS 2022 FINAL

This question paper consists of 18 pages and 3 data sheets.

(QUESTION 5 (Start on a new page.)

A 12 kg block is initially at rest at point A at the bottom of a ROUGH inclined plane. The block is pulled up the incline by a constant force F acting parallel to the incline. The block reaches point B, which is at a vertical height of 4.0 m above the horizontal, with a speed of 2.0 m/s. See the diagram below.



- 5.1 Define the term non-conservative force.
- 5.2 Draw a labelled free-body diagram for the block when it is pulled up the incline.
- 5.3 Calculate the total work done on the block by the NON-CONSERVATIVE forces when the block moves from point A to point B. (4)

The same constant force F now moves the block at a CONSTANT VELOCITY across a rough horizontal surface from point B to point C, as shown below. Force F acts parallel to the horizontal surface.



The magnitude of the constant frictional force acting on the block while moving from point B to point C is 40 N, 40% greater than the magnitude of the constant frictional force acting on the block when it moves from point A to point B.

- 5.4 Calculate the distance from point A to point B. (5)

(10)

Physical Science Memorandum November 2013

**National Academies of Sciences,
Engineering, and Medicine, Division on
Engineering and Physical Sciences, Air
Force Studies Board, Committee on
Owning the Technical Baseline for
Acquisition Programs in the U.S. Air
Force: A Study**

Physical Science Memorandum November 2013:

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

Crime, Violence, and Global Warming John Crank, Linda Jacoby, 2015-05-20 Crime Violence and Global Warming introduces the many connections between climate change and criminal activity Conflict over natural resources can escalate to state and non state actors resulting in wars asymmetrical warfare and terrorism Crank and Jacoby apply criminological theory to each aspect of this complicated web helping readers to evaluate conflicting claims about global warming and to analyze evidence of the current and potential impact of climate change on conflict and crime Beginning with an overview of the science of global warming the authors move on to the links between climate change scarce resources and crime Their approach takes in the full scope of causes and consequences present and future in the United States and throughout the world The book concludes by looking ahead at the problem of forecasting future security implications if global warming continues or accelerates This fresh approach to the criminology of climate change challenges readers to examine all sides of this controversial question and to formulate their own analysis of our planet's future

Navigating the Clean Water Act United States. Congress. House. Committee on Science, Space, and Technology (2011), United States. Congress. House. Committee on Science, Space, and Technology (2011-), 2015

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

Force Multiplying Technologies for Logistics Support to Military Operations National Research Council, Division on Engineering and Physical Sciences, Board on Army Science and Technology, Committee on Force Multiplying Technologies for Logistics Support to Military Operations, 2014-12-15 The mission of the United States Army is to fight and win our nation's wars by providing prompt sustained land dominance across the full range of military operations and spectrum of conflict in support of combatant commanders Accomplishing this mission rests on the ability of the Army to equip and move its forces to the battle and sustain them while they are engaged Logistics provides the backbone for Army combat operations Without fuel ammunition rations and other supplies the Army would grind to a halt The U S military must be prepared to fight anywhere on the globe and in an era of coalition warfare to logistically support its allies While aircraft can move large amounts of supplies the vast majority must be carried on ocean going vessels and unloaded at ports that may be at a great distance from the battlefield As the wars in Afghanistan and Iraq have shown the costs of conveying vast quantities of supplies is tallied not only in economic terms but also in terms of lives lost in the movement of the materiel As the ability of potential enemies to interdict movement to the battlefield and interdict movements in the battlespace increases the challenge of logistics grows even larger No matter how the nature of battle develops logistics will remain a key factor Force Multiplying Technologies for Logistics Support to Military Operations explores Army logistics in a global complex environment that includes the increasing use of antiaccess and area denial tactics and technologies by potential adversaries This report describes new technologies and systems that would reduce the demand for logistics and meet the demand at the point of need make maintenance more efficient improve inter and intratheater mobility and improve near real time in transit visibility Force Multiplying Technologies also explores options for the Army to operate with the other services and improve its support of Special Operations Forces This report provides a logistics centric research and development investment strategy and illustrative examples of how improved logistics could look in the future

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 Oxford Handbook of International Climate Change Law* Cinnamon Piñon Carlarne, Kevin R. Gray, Richard Tarasofsky, 2016 As the threats posed by changing weather patterns are becoming more apparent climate change law has emerged as an important area of law in its own right This Handbook provides a comprehensive understanding of this growing subject setting out the key institutions and processes and featuring interdisciplinary insights from leading experts **Exploring the Northern Rocky Mountains** Colin Arthur Shaw, Basil Tikoff, 2014-05-01 The field trips in this guidebook are associated with the GSA Rocky Mountain Cordilleran Joint Section Meeting which will take place in Bozeman Montana in May 2014 *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 Plutonium Frank von Hippel, Masafumi Takubo, Jungmin Kang, 2019-12-23 This book provides a readable and thought provoking analysis of the issues surrounding nuclear fuel reprocessing and fast neutron reactors including discussion of resources economics radiological risk and resistance to nuclear proliferation It describes the history and science behind reprocessing and gives an overview of the status of reprocessing programmes around the world It concludes that such programs should be discontinued While nuclear power is seen by many as the only realistic solution to the carbon emission problem some national nuclear establishments have been pursuing development and deployment of sodium cooled plutonium breeder reactors and plutonium recycling Its proponents argue that this system would offer significant advantages relative to current light water reactor technology in terms of greater uranium utilization efficiency and that separating out the long lived plutonium and other transuranics from spent fuel and fissioning them in fast reactors would greatly reduce the duration of the toxicity of

radioactive waste However the history of efforts to deploy this system commercially in a number of countries over the last six decades has been one of economic and technical failure and in some cases was used to mask clandestine nuclear weapon development programs Covering topics of significant public interest including nuclear safety fuel storage environmental impact and the spectre of nuclear terrorism this book presents a comprehensive analysis of the issue for nuclear engineers policy analysts government officials and the general public Frank von Hippel Jungmin Kang and Masafumi Takubo three internationally renowned nuclear experts have done a valuable service to the global community in putting together this book which both historically and comprehensively covers the plutonium age as we know it today They articulate in a succinct and clear manner their views on the dangers of a plutonium economy and advocate a ban on the separation of plutonium for use in the civilian fuel cycle in view of the high proliferation and nuclear security risks and lack of economic justification Mohamed ElBaradei Director General International Atomic Energy Agency 1997 2009 Nobel Peace Prize 2005 The 1960s dream of a plutonium economy has not delivered abundant low cost energy but instead has left the world a radioactive legacy of nuclear weapons proliferation and the real potential for nuclear terrorism Kang Takubo and von Hippel explain with power and clarity what can be done to reduce these dangers The governments of the remaining countries whose nuclear research and development establishments are still pursuing the plutonium dream should pay attention Senator Edward Markey a leader in the US nuclear disarmament movement as a member of Congress since 1976 The authors have done an invaluable service by putting together in one place the most coherent analysis of the risks associated with plutonium and the most compelling argument for ending the practice of separating plutonium from spent fuel for any purpose They have given us an easily accessible history of the evolution of thinking about the nuclear fuel cycle the current realities of nuclear power around the world and arguably most important a clear alternative path to deal with the spent fuel arising from nuclear reactors for decades to centuries to come Robert Gallucci Chief US negotiator with North Korea 1994 Dean Georgetown University School of Foreign Service 1996 2009 President MacArthur Foundation 2009 2014

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NARAYAN CHANGDER,2023-12-08 Note Anyone can request the PDF version of this practice set workbook by emailing me at cbsenet4u gmail com I will send you a PDF version of this workbook This book has been designed for candidates preparing for various competitive examinations It contains many objective questions specifically designed for different exams Answer keys are provided at the end of each page It will undoubtedly serve as the best preparation material for aspirants This book is an engaging quiz eBook for all and offers something for everyone This book will satisfy the curiosity of most students while also challenging their trivia skills and introducing them to new information Use this invaluable book to test your subject matter expertise Multiple choice exams are a common assessment method that all prospective candidates must be familiar with in today s academic environment Although the majority of students are accustomed to this MCQ format many are not well versed in it To achieve success in MCQ tests quizzes and trivia challenges one requires test taking techniques and skills

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Federal Register ,2013-12 **Owning the Technical Baseline for Acquisition Programs in the U.S. Air Force**

National Academies of Sciences, Engineering, and Medicine,Division on Engineering and Physical Sciences,Air Force Studies Board,Committee on Owning the Technical Baseline for Acquisition Programs in the U.S. Air Force: A Study,2016-10-25

While there are examples of successful weapon systems acquisition programs within the U S Air Force USAF many of the programs are still incurring cost growth schedule delays and performance problems The USAF now faces serious challenges in acquiring and maintaining its weapons systems as it strives to maintain its current programs add new capabilities to counter evolving threats and reduce its overall program expenditures Owning the technical baseline is a critical component of the Air Force s ability to regain and maintain acquisition excellence Owning the technical baseline allows the government acquisition team to manage and respond knowledgeably and effectively to systems development operations and execution thereby avoiding technical and other programmatic barriers to mission success Additionally owning the technical baseline ensures that government personnel understand the user requirements why a particular design and its various features have been selected over competing designs and what the options are to pursue alternative paths to the final product given unanticipated cost schedule and performance challenges Owning the Technical Baseline for Acquisition Programs in the U S Air Force discusses the strategic value to the Air Force of owning the technical baseline and the risk of not owning it and highlights key aspects of how agencies other than the Air Force own the technical baseline for their acquisition programs This report identifies specific barriers to owning the technical baseline for the Air Force and makes recommendations to help guide the Air Force in overcoming those barriers

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

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

United States of America Congressional Record, Proceedings and Debates of the 113th Congress Second Session Volume 160 - Part 6 , **Quality Assurance in LIS Education** Makiko Miwa,Shizuko Miyahara,2014-10-10 This book reviews and examines the quality assurance systems of Library and Information Science LIS education in a variety of countries and regions including Asia North America Latin America and Europe Globalization of education has caused the number of LIS professionals working in every region of the world to increase greatly In order to be qualified as an LIS professional worldwide as well as in a local area it is imperative that there exists a global standard of quality assurance systems for LIS practitioners This book provides such a standard and ranks specific systems and educational programs worldwide With contributions from leading researchers and scholars in a variety of regions across the globe this book will prove an invaluable resource for professionals and educators of LIS education

Disorder and the Disinformation Society Jonathan Paul Marshall,James Goodman,Didar Zowghi,Francesca da Rimini,2015-04-17 This book is the first general social analysis that seriously considers the daily experience of information disruption and software failure within contemporary Western society Through an investigation of informationalism defined as a contemporary form of capitalism it describes the

social processes producing informational disorder While most social theory sees disorder as secondary pathological or uninteresting this book takes disordering processes as central to social life The book engages with theories of information society which privilege information order offering a strong counterpoint centred on disinformation Disorder and the Disinformation Society offers a practical agenda arguing that difficulties in producing software are both inherent to the process of developing software and in the social dynamics of informationalism It outlines the dynamics of software failure as they impinge on information workers and on daily life explores why computerized finance has become inherently self disruptive asks how digital enclosure and intellectual property create conflicts over cultural creativity and disrupt informational accuracy and scholarship and reveals how social media can extend but also distort the development of social movements

Native Games Chris Hallinan, Barry Judd, 2013-07-19 Research on Indigenous participation in sport offers many opportunities to better understand the political issues of equality empowerment self determination and protection of culture and identity This volume compares and conceptualises the sociological significance of Indigenous sports in different international contexts

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

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