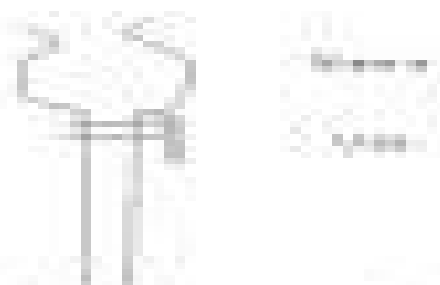


Figure 1: Chemistry: Electrode Potentials and Diagrams

Question 1:

(a) The following are standard conventional half-cells. Label them accordingly (2pts)



(b) What are measures to be taken to ensure accuracy and results of pH?

Answer 1:

There is a standard solution of this solution, consistently measured and 4 conditions

(a) Temperature appropriate method of measurement and correct calibration in use for selected the solution

(b) What is reason for the choice of your method

(c) Describe how the pH is measured and the method of measurement (e.g. pH is measured by the method

Form One 1 Chemistry Revision Questions

Owen Mansfield, Sam Holyman



Form One 1 Chemistry Revision Questions:

Reviewing **Form One 1 Chemistry Revision Questions**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is actually astonishing. Within the pages of "**Form One 1 Chemistry Revision Questions**," an enthralling opus penned by a very acclaimed wordsmith, readers embark on an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve in to the book is central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

https://staging.conocer.cide.edu/About/virtual-library/HomePages/Micros_Materials_Control_User_Guide.pdf

Table of Contents Form One 1 Chemistry Revision Questions

1. Understanding the eBook Form One 1 Chemistry Revision Questions
 - The Rise of Digital Reading Form One 1 Chemistry Revision Questions
 - Advantages of eBooks Over Traditional Books
2. Identifying Form One 1 Chemistry Revision Questions
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Form One 1 Chemistry Revision Questions
 - User-Friendly Interface
4. Exploring eBook Recommendations from Form One 1 Chemistry Revision Questions
 - Personalized Recommendations
 - Form One 1 Chemistry Revision Questions User Reviews and Ratings
 - Form One 1 Chemistry Revision Questions and Bestseller Lists

5. Accessing Form One 1 Chemistry Revision Questions Free and Paid eBooks
 - Form One 1 Chemistry Revision Questions Public Domain eBooks
 - Form One 1 Chemistry Revision Questions eBook Subscription Services
 - Form One 1 Chemistry Revision Questions Budget-Friendly Options
6. Navigating Form One 1 Chemistry Revision Questions eBook Formats
 - ePub, PDF, MOBI, and More
 - Form One 1 Chemistry Revision Questions Compatibility with Devices
 - Form One 1 Chemistry Revision Questions Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Form One 1 Chemistry Revision Questions
 - Highlighting and Note-Taking Form One 1 Chemistry Revision Questions
 - Interactive Elements Form One 1 Chemistry Revision Questions
8. Staying Engaged with Form One 1 Chemistry Revision Questions
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Form One 1 Chemistry Revision Questions
9. Balancing eBooks and Physical Books Form One 1 Chemistry Revision Questions
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Form One 1 Chemistry Revision Questions
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Form One 1 Chemistry Revision Questions
 - Setting Reading Goals Form One 1 Chemistry Revision Questions
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Form One 1 Chemistry Revision Questions
 - Fact-Checking eBook Content of Form One 1 Chemistry Revision Questions
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
- Integration of Multimedia Elements
 - Interactive and Gamified eBooks

Form One 1 Chemistry Revision Questions Introduction

In today's digital age, the availability of Form One 1 Chemistry Revision Questions books and manuals for download has revolutionized the way we access information. Gone are the days of physically flipping through pages and carrying heavy textbooks or manuals. With just a few clicks, we can now access a wealth of knowledge from the comfort of our own homes or on the go. This article will explore the advantages of Form One 1 Chemistry Revision Questions books and manuals for download, along with some popular platforms that offer these resources. One of the significant advantages of Form One 1 Chemistry Revision Questions books and manuals for download is the cost-saving aspect. Traditional books and manuals can be costly, especially if you need to purchase several of them for educational or professional purposes. By accessing Form One 1 Chemistry Revision Questions versions, you eliminate the need to spend money on physical copies. This not only saves you money but also reduces the environmental impact associated with book production and transportation. Furthermore, Form One 1 Chemistry Revision Questions books and manuals for download are incredibly convenient. With just a computer or smartphone and an internet connection, you can access a vast library of resources on any subject imaginable. Whether you're a student looking for textbooks, a professional seeking industry-specific manuals, or someone interested in self-improvement, these digital resources provide an efficient and accessible means of acquiring knowledge. Moreover, PDF books and manuals offer a range of benefits compared to other digital formats. PDF files are designed to retain their formatting regardless of the device used to open them. This ensures that the content appears exactly as intended by the author, with no loss of formatting or missing graphics. Additionally, PDF files can be easily annotated, bookmarked, and searched for specific terms, making them highly practical for studying or referencing. When it comes to accessing Form One 1 Chemistry Revision Questions books and manuals, several platforms offer an extensive collection of resources. One such platform is Project Gutenberg, a nonprofit organization that provides over 60,000 free eBooks. These books are primarily in the public domain, meaning they can be freely distributed and downloaded. Project Gutenberg offers a wide range of classic literature, making it an excellent resource for literature enthusiasts. Another popular platform for Form One 1 Chemistry Revision Questions books and manuals is Open Library. Open Library is an initiative of the Internet Archive, a non-profit organization dedicated to digitizing cultural artifacts and making them accessible to the public. Open Library hosts millions of books, including both

public domain works and contemporary titles. It also allows users to borrow digital copies of certain books for a limited period, similar to a library lending system. Additionally, many universities and educational institutions have their own digital libraries that provide free access to PDF books and manuals. These libraries often offer academic texts, research papers, and technical manuals, making them invaluable resources for students and researchers. Some notable examples include MIT OpenCourseWare, which offers free access to course materials from the Massachusetts Institute of Technology, and the Digital Public Library of America, which provides a vast collection of digitized books and historical documents. In conclusion, Form One 1 Chemistry Revision Questions books and manuals for download have transformed the way we access information. They provide a cost-effective and convenient means of acquiring knowledge, offering the ability to access a vast library of resources at our fingertips. With platforms like Project Gutenberg, Open Library, and various digital libraries offered by educational institutions, we have access to an ever-expanding collection of books and manuals. Whether for educational, professional, or personal purposes, these digital resources serve as valuable tools for continuous learning and self-improvement. So why not take advantage of the vast world of Form One 1 Chemistry Revision Questions books and manuals for download and embark on your journey of knowledge?

FAQs About Form One 1 Chemistry Revision Questions Books

How do I know which eBook platform is the best for me? Finding the best eBook platform depends on your reading preferences and device compatibility. Research different platforms, read user reviews, and explore their features before making a choice. Are free eBooks of good quality? Yes, many reputable platforms offer high-quality free eBooks, including classics and public domain works. However, make sure to verify the source to ensure the eBook credibility. Can I read eBooks without an eReader? Absolutely! Most eBook platforms offer web-based readers or mobile apps that allow you to read eBooks on your computer, tablet, or smartphone. How do I avoid digital eye strain while reading eBooks? To prevent digital eye strain, take regular breaks, adjust the font size and background color, and ensure proper lighting while reading eBooks. What the advantage of interactive eBooks? Interactive eBooks incorporate multimedia elements, quizzes, and activities, enhancing the reader engagement and providing a more immersive learning experience. Form One 1 Chemistry Revision Questions is one of the best book in our library for free trial. We provide copy of Form One 1 Chemistry Revision Questions in digital format, so the resources that you find are reliable. There are also many Ebooks of related with Form One 1 Chemistry Revision Questions. Where to download Form One 1 Chemistry Revision Questions online for free? Are you looking for Form One 1 Chemistry Revision Questions PDF? This is definitely going to save you time and cash in something you should think about.

Find Form One 1 Chemistry Revision Questions :

micros materials control user guide

mhayes manual for a citreon nemo

micheline guide france

microeconomics 8th ch4 appendix

~~micom areva relay manual~~

michele mww02k000013 watches owners manual

microbiology willey sherwood woolverton mcgraw hill

michele mww06j000007 watches owners manual

micros 3700 interface manual

michigan real estate license exam study guide

microline 421 manual

michael brother of jerry

~~microelectronic circuit design 4th edition international~~

microbiology talaro lab manual

~~microphone amplifier circuit diagram~~

Form One 1 Chemistry Revision Questions :

theatre the lively art rent 9780073514208 chegg com - Sep 10 2022

web jan 10 2012 coupon rent theatre the lively art 8th edition 9780073514208 and save up to 80 on textbook rentals and 90 on used textbooks get free 7 day instant etextbook access

theatre the lively art wilson edwin free download borrow - Dec 13 2022

web theatre the lively art wilson edwin free download borrow and streaming internet archive

the lively art 8th edition 9780073514208 textbooks com - Mar 16 2023

web theatre the lively art 9th edition theater the lively art 7th edition buy theatre the lively art 8th edition 9780073514208 by edwin wilson for up to 90 off at textbooks com

theatre the lively art by edwin wilson mr alvin goldfarb alibris - Aug 09 2022

web buy theatre the lively art by edwin wilson mr alvin goldfarb online at alibris we have new and used copies available in 5 editions starting at 1 49 shop now

theatre the lively art mcgraw hill - Apr 17 2023

web lively art allows instructors to focus on both the elements of the theatre and the history of the theatre it also focuses on today s diverse and global theatre in addition to serving as an ideal text for nonmajors theatre the lively art will prepare students who wish to continue studies in theatre as majors minors or students from other disciplines who take

theatre the lively art 10e mcgraw hill - Jan 14 2023

web theatre the lively art 10e edwin wilson and alvin goldfarb 2019 isbn 1259916863 chapter by chapter changes chapter 1 theatre is everywhere updated examples of the relationship between theatre and popular entertainments a new discussion of the theatrical qualities of cosplay chapter 2 the audience

the eighth lively art conversations with painters poets - Apr 05 2022

web apr 1 2001 the eighth lively art conversations with painters poets musicians and the wicked witch of the west paperback april 1 2001 as a young artist and musician wesley wehr became a friend and often a confidant of many of the painters poets and musicians who lived or worked in the northwest in the 1950s and 1960s

amazon com theatre the lively art 9780073514307 wilson - Oct 11 2022

web jan 14 2015 in its ninth edition theatre the lively art remains the best selling program for theatre appreciation courses with its hallmark focus on preparing future audience members students will learn how theatre functions how it should be viewed and judged and the tradition behind any performance they may attend

theatre the lively art 8th edition by edwin wilson goodreads - Aug 21 2023

web sep 28 1995 theatre the lively art 8th edition edwin wilson 3 30 113 ratings11 reviews in its outstanding eighth edition the lively art remains the best selling introductory theatre text for theatre appreciation courses it incorporates a number of elements in one genres nonfiction 448 pages kindle edition first published september

amazon com theatre the lively art ebook wilson edwin books - Nov 12 2022

web jan 5 2021 lively art allows instructors to focus on both the elements of the theatre and the history of the theatre it also focuses on today s diverse and global theatre in addition to serving as an ideal text for nonmajors theatre the lively art will prepare students who wish to continue studies in theatre as majors minors or students

theatre the lively art edwin wilson alvin goldfarb president - Jul 08 2022

web jan 14 2015 in its ninth edition theatre the lively art remains the best selling program for theatre appreciation courses with its hallmark focus on preparing future audience members students will learn how theatre functions how it should be viewed and judged and the tradition behind any performance they may attend

theatre the lively art biggerbooks - Feb 15 2023

web jan 10 2012 in its outstanding eighth edition theatre the lively artremains the best selling introductory theatre text for

theatre appreciation courses

theatre the lively art eighth edition google books - Jul 20 2023

web jan 10 2012 bibliographic information title theatre the lively art eighth edition authors edwin wilson alvin goldfarb publisher mcgraw hill higher education 2012

theatre the lively art 8th edition yakibooki - May 06 2022

web book description theatre the lively art 8th edition authored by edwin wilson and alvin goldfarb is an engaging and comprehensive exploration of the world of theatre this edition continues the tradition of being an invaluable resource for students theatre enthusiasts and anyone interested in the performing arts

theatre the lively art edwin wilson alvin goldfarb president - Sep 22 2023

web jan 10 2012 the eighth edition of his text theater the lively art co authored with alvin goldfarb has just been released the sixth edition of living theatre history of theatre also co authored with

theatre the lively art edwin wilson alvin goldfarb google - May 18 2023

web jul 3 2009 theatre the lively art is designed both to prepare and inspire students to become lifelong audience members if not actual participants in theatre with its clear narrative concise

theatre the lively art 8th direct textbook - Jun 19 2023

web used find 9780073514208 theatre the lively art 8th edition by edwin wilson et al at over 30 bookstores buy rent or sell

lively arts an internet cultural magazine - Mar 04 2022

web lively arts a monthly internet magazine of the arts written and published by willard manus he is a member of the los angeles film critics association and the american theatre critics association may june 2023 updated may 08th 2023 a

theatre the lively art 8th edition amazon com - Oct 23 2023

web jan 10 2012 in its outstanding eighth edition theatre the lively art remains the best selling introductory theatre text for theatre appreciation courses it incorporates a number of elements in one volume an introduction to the audience s experience of theatre

theatre the lively art pdf 2121lc7uai8g e book library - Jun 07 2022

web e book overview theatre the lively art remains the best selling program for theatre appreciation courses with its hallmark focus on preparing future audience members students will learn how theatre functions how it should be viewed and judged and the transition behind any performance they may attend

electronic communications systems by wayne tomasi open - Feb 08 2023

web november 18 2022 history edit an edition of electronic communications systems fundamentals through advanced 1988 electronic communications systems fundamentals through advanced 3rd ed by wayne tomasi 0 ratings 111 want to read 10

currently reading 0 have read about am fm pm publish date 1998 publisher

electronic communication systems by wayne tomasi 5th edition - Aug 02 2022

web electronic communication systems by wayne tomasi 5th edition 1 2 downloaded from studentportal solusi ac zw on november 10 2023 by guest electronic communication systems by wayne tomasi 5th edition recognizing the quirk ways to get this ebook electronic communication systems by wayne tomasi 5th edition is

electronic communications systems google books - Aug 14 2023

web electronic communications systems fundamentals through advanced wayne tomasi google books wayne tomasi pearson prentice hall 2004 digital communications 1163 pages for

advanced electronic communications systems wayne tomasi - Jan 07 2023

web wayne tomasi prentice hall 1998 data transmission systems 413 pages comprehensive in scope and contemporary in coverage this text explores modern digital and data communications

electronic communication system wayne tomasi free - Apr 29 2022

web jan 11 2023 electronic communication system by wayne tomasi publication date 2009 collection inlibrary printdisabled internetarchivebooks contributor internet archive

tomasi reviewer in electronic communications system ece - Sep 03 2022

web mar 17 2020 electronic communications system by wayne tomasi chapter 1 introduction to electronic communications chapter 2 signal analysis and mixing chapter 3 oscillators phase locked loops and frequency synthesizers chapter 4 amplitude modulation transmission chapter 5

electronic communications system fundamentals through - Mar 09 2023

web electronic communications system fundamentals through advanced 5 e wayne tomasi pearson education 2009 telecommunication systems 1115 pages

electronic communications systems fundamentals through - Sep 15 2023

web electronic communications systems fundamentals through advanced tomasi wayne free download borrow and streaming internet archive by tomasi wayne publication date 2004 topics telecommunication systems publisher upper saddle river n j pearson prentice hall collection

advanced electronic communications systems by wayne tomasi goodreads - May 11 2023

web jan 1 1987 wayne tomasi 4 27 245 ratings18 reviews comprehensive in scope and contemporary in coverage this book extends and updates the knowledge of the reader to the most modern topics in electronic communications systems

electronic communications systems google books - May 31 2022

web wayne tomasi prentice hall 1998 telecommunication systems 880 pages comprehensive in scope and contemporary in

coverage this text introduces basic electronic and data

electronic communications systems by wayne tomasi open - Jul 13 2023

web dec 4 2022 electronic communications systems fundamentals through advanced 5th ed by wayne tomasi 0 ratings 111 want to read 10 currently reading 0 have read about am fm pm publish date 2004 publisher pearson prentice hall language english

electronic communications systems fundamentals through - Jul 01 2022

web electronic communications systems fundamentals through advanced by tomasi wayne publication date 2001 topics telecommunication systems publisher upper saddle river n j prentice hall

advanced electronic communications systems wayne tomasi - Jun 12 2023

web wayne tomasi pearson prentice hall 2004 digital communications 654 pages comprehensive in scope and contemporary in coverage this book extends and updates the knowledge of the reader

electronics communication system tomasi 5th ed doku - Oct 16 2023

web download view electronics communication system tomasi 5th ed as pdf for free more details pages 307 preview full text download view electronics communication system tomasi 5th ed as pdf for free related documents electronics communication system tomasi 5th ed august 2019 33 688

electronic communications system fundamentals through advanced - Apr 10 2023

web mar 28 2003 wayne tomasi electronic communications system fundamentals through advanced fifth edition 5th edition by wayne tomasi author 4 2 16 ratings see all formats and editions hardcover 32 45 10 used from 14 95 for courses in introduction to electronic communications and digital and data communications

electronic communications systems by wayne tomasi open - Feb 25 2022

web feb 3 2023 electronic communications systems fundamentals through advanced by wayne tomasi 0 ratings 111 want to read 10 currently reading 0 have read about am fm pm publish date 1988 publisher prentice hall language english pages 895 *electronic communications system fundamentals through* - Nov 05 2022

web apr 11 2003 by wayne tomasi write a review hardcover view all available formats editions buy new 233 32 buy used 161 20 overview now in its fifth edition this text continues to provide a modern comprehensive coverage of

electronic communication systems by tomasi wayne - Dec 06 2022

web wayne tomasi author 2 ratings see all formats and editions hardcover from 9 163 00 2 used from 9 163 00 2 new from 9 273 00 returns policy for sophomore senior level courses in introduction to electronic communications and digital and data communications

electronic communication wayne tomasi google books - Mar 29 2022

web wayne tomasi prentice hall ptr 1994 electronic systems 192 pages from inside the book contents 19 other sections not shown common terms and phrases

advanced electronic communications systems wayne tomasi - Oct 04 2022

web jan 1 1994 advanced electronic communications systems 6th edition 11 83 2 only 1 left in stock order soon normal wear lightly used over all book is still in great condition there is a ballpen mark on the first page which can be

faraday s electromagnetic lab faraday s law magnetic field - Sep 02 2023

web view the magnetic field lines or use a meter to show the direction and magnitude of the current you can also play with electromagnets generators and transformers play with a bar magnet and coils to learn about faraday s law

fizik bölümü araştırma laboratuvarları İstanbul - May 18 2022

web İÜ bünyesinde fen alanında aktif olarak çalışmalarına devam eden 53 adet araştırma laboratuvarı bulunuyor bu laboratuvarlarda İÜ fen fakültesi astronomi ve uzay bilimleri bölümü fizik bölümü biyoloji bölümü ve moleküler biyoloji ve genetik bölümü insan hastalıklarından çevre ve enstrümental analiz araştırmalarına kadar geniş kapsamda

magnet dan elektromagnet medan magnet magnet elektromagnet phet - Nov 23 2022

web inclusive design phet global deib in stem ed donasi explore the interactions between a compass and bar magnet discover how you can use a battery and wire to make a magnet can you make it a stronger magnet

phet simulation - Jun 30 2023

web phet simulation

electricity magnets circuits phet simulations - Aug 01 2023

web 25 results sort by electricity magnets circuits circuit construction kit ac circuit construction kit ac virtual lab coulomb s law capacitor lab basics circuit construction kit dc virtual lab circuit construction kit dc charges and fields faraday s law john travoltage balloons and static electricity ohm s law resistance in a wire

magnets and electromagnets university of colorado boulder - Mar 28 2023

web magnets and electromagnets explore the interactions between a compass and bar magnet discover how you can use a battery and wire to make a magnet can you make it a stronger magnet can you make the magnetic field reverse the magnets and electromagnets simulation dev

İstanbul Üniversitesi fen fakültesi fitopatoloji laboratuvarı - Apr 16 2022

web the main research topics of the laboratory are comparative genomic and proteomic approaches to explain how mollicutes and plant pathogenic bacterial groups are formed the mechanisms of disease evolutionary transitions between different lifestyles and the evolution of pathogenicity in bacteria as well as real time imaging of pathogenic

magnets and electromagnets magnetic field phet interactive - Oct 03 2023

web explore the interactions between a compass and bar magnet discover how you can use a battery and wire to make a magnet can you make it a stronger magnet

faraday s law magnetic field magnets phet - Jan 26 2023

web description investigate faraday s law and how a changing magnetic flux can produce a flow of electricity sample learning goals explain what happens when the magnet moves through the coil at different speeds and how this affects the brightness of the bulb and the magnitude sign of the voltage

İstanbul Üniversitesi fen fakültesi fizik bölümü - Jun 18 2022

web nükleer fizik araştırma laboratuvarında gama spektroskopisi laboratuvarı ve radon Ölçüm laboratuvarı olarak iki alt laboratuvardan oluşmaktadır radon ölçüm laboratuvarı radon renksiz kokusuz tatsız doğal olarak meydana gelen radyoaktif bir gazdır

electricity magnets circuits phet simulations - Feb 24 2023

web electricity magnets circuits phet simulations founded in 2002 by nobel laureate carl wieman the phet interactive simulations project at the university of colorado boulder creates free interactive math and science simulations

phet simulation magnets and electromagnets aapt - Sep 21 2022

web aug 18 2016 in this interactive simulation users explore the interactions between a compass and a bar magnet and investigate characteristics of electromagnets this resource was developed to help students build a foundation to understand electromagnetism and factors affecting magnetic field strength

magnets introduction inquiry based phet contribution - Aug 21 2022

web jul 20 2013 magnets introduction inquiry based introductio to magnets faraday electromagne lab cq pptx 186 kb lesson plan intro to magnets docx 19 kb clicker questions faraday introductio to magnets pdf 357 kb lesson plan intro to magnets pdf 123 kb student directions for intro to magnets pdf

faraday s law magnetic field magnets phet - Apr 28 2023

web investigate faraday s law and how a changing magnetic flux can produce a flow of electricity sample learning goals explain what happens when the magnet moves through the coil at different speeds and how this affects the brightness of the bulb and the magnitude sign of the voltage

magnets and electromagnets magnetic field magnets phet - May 30 2023

web compare and contrast bar magnets and electromagnets identify the characteristics of electromagnets that are variable and what effects each variable has on the magnetic field s strength and direction relate magnetic field strength to distance quantitatively and qualitatively version 2 07

İstanbul Üniversitesi fen fakültesi fitopatoloji laboratuvarı - Mar 16 2022

web istanbul university faculty of science department of botany 34134 kalenderhane mah prof Ömerbesimpaşa cad no 1
vezneciler İstanbul turkey

phet free online physics chemistry biology earth science and - Feb 12 2022

web founded in 2002 by nobel laureate carl wieman the phet interactive simulations project at the university of colorado
boulder creates free interactive math and science simulations phet sims are based on extensive education research and
engage students through an intuitive game like environment where students learn through exploration and

interactive tutorials magnet academy national maglab - Jul 20 2022

web interactive tutorials these demonstrations about laws and tools associated with electricity and magnetism allow you to
adjust variables at and to visualize invisible forces which makes them almost better than the real thing

phet simulation magnets and electromagnets - Oct 23 2022

web in this interactive simulation users explore the interactions between a compass and a bar magnet and investigate
characteristics of electromagnets this resource was developed to help students build a foundation to understand
electromagnetism and factors affecting magnetic field strength

faraday s law magnetic field magnets phet interactive - Dec 25 2022

web investigate faraday s law and how a changing magnetic flux can produce a flow of electricity sample learning goals
explain what happens when the magnet moves through the coil at different speeds and how this affects the brightness of the
bulb and the magnitude sign of the voltage