



basic education

Department
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 11

PHYSICAL SCIENCES: PHYSICS (P1)

NOVEMBER 2017

MARKS: 100

TIME: 1 hour

This question paper consists of 10 pages, 3 data sheets and 1 answer sheet

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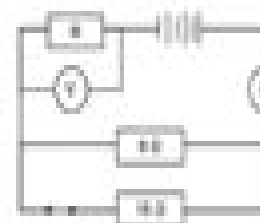
Physical Sciences/P1

10
CAPS – Grade 11

100 Marks (P1)

QUESTION 10 (Start on a new page.)

- 10.1 The circuit below consists of a 4 Ω and 16 Ω resistor connected in parallel and an unknown resistor R_x in series. An ammeter, a high-resistance voltmeter, a closed switch and battery are connected, as shown. The resistance of the battery and wires can be ignored.



The total power dissipated in the parallel part of the circuit is 32 W.

- 10.1.1 Define the term power. (2)
10.1.2 Calculate the effective resistance of the parallel combination. (2)
10.1.3 Calculate the potential difference across the resistors in parallel. (2)
10.1.4 Calculate the current through resistor R_x. (2)

The switch in the circuit is now OPENED.

- 10.1.5 How will the reading on the voltmeter (V) be affected?
Choose from INCREASE, DECREASE or REMAIN THE SAME. (1)
10.1.6 Refer the answer to QUESTION 10.1.5. (2)

- 10.2 A geyser, labeled 2000 W, is used for an average of 5 hours per day. The cost of electricity is 30 cents per kWh.

- 10.2.1 Calculate the energy used by the geyser for 5 hours per day. (2)
10.2.2 Calculate the cost of electricity to operate the geyser for a month with 30 days. (2)

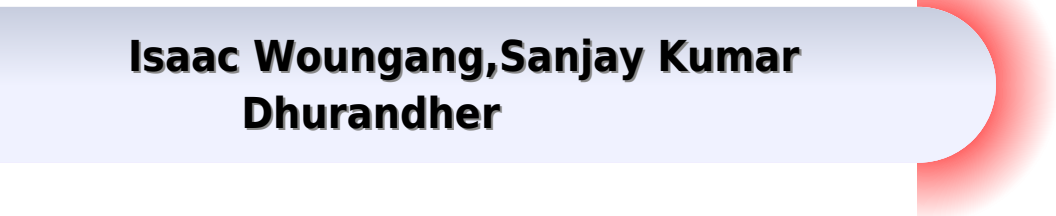
(2)

TOTAL: 100

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Grade 11 November 2014 Electrical Technology

**Isaac Woungang, Sanjay Kumar
Dhurandher**



Grade 11 November 2014 Electrical Technology:

GENERAL HINDI, GENERAL KNOWLEDGE & REASONING YCT EXPERT TEAM, 2020 21 UPPCL GENERAL HINDI GENERAL KNOWLEDGE REASONING SOLVED PAPERS *Energy-Efficient Driving of Road Vehicles* Antonio

Sciarretta,Ardalan Vahidi,2019-08-01 This book elaborates the science and engineering basis for energy efficient driving in conventional and autonomous cars After covering the physics of energy efficient motion in conventional hybrid and electric powertrains the book chiefly focuses on the energy saving potential of connected and automated vehicles It reveals how being connected to other vehicles and the infrastructure enables the anticipation of upcoming driving relevant factors e g hills curves slow traffic state of traffic signals and movements of nearby vehicles In turn automation allows vehicles to adjust their motion more precisely in anticipation of upcoming events and to save energy Lastly the energy efficient motion of connected and automated vehicles could have a harmonizing effect on mixed traffic leading to additional energy savings for neighboring vehicles Building on classical methods of powertrain modeling optimization and optimal control the book further develops the theory of energy efficient driving In addition it presents numerous theoretical and applied case studies that highlight the real world implications of the theory developed The book is chiefly intended for undergraduate and graduate engineering students and industry practitioners with a background in mechanical electrical or automotive engineering computer science or robotics **Surface Engineering** R.S. Walia,Qasim Murtaza,Shailesh Mani Pandey,Ankit

Tyagi,2022-12-19 Surface engineering is considered an important aspect in the reduction of friction and wear This reference text discusses a wide range of surface engineering technologies along with applications in a comprehensive manner The book describes various methods in surface engineering technology with a thorough explanation of various aspects of each process that comes under this domain Apart from an enhanced explanation of the process and its attributes this book also gives insight into the types of materials applications and optimization of surface engineering techniques It discusses important topics including surface engineering of the functionality of graded materials materials characterization processing of biomaterials design surface modification technologies and process control smart manufacturing artificial intelligence and machine learning applications The book discusses computational and simulation analyses for better selection of process parameters covers optimizations of processes with state of the art technologies discusses applications of surface engineering in medical agricultural architecture engineering and allied sectors covers processing techniques of biomaterials in surface engineering The text is useful for senior undergraduate graduate students and academic researchers working in diverse areas such as industrial and production engineering mechanical engineering materials science and manufacturing science It covers a hybrid process for surface modification modeling techniques and issues in surface engineering **Lithium-Ion**

Cells Yury Koshtyal ,Alexander Rummyantsev,2024-12-24 A large quantity of articles and books have been published on the designated topics However most of the literary sources describe the results of scientific articles on the synthesis and study of

perspective materials reveal circuit and design solutions for constructing control systems and manufacturing batteries and are educational materials At the same time a small part of the published sources includes the following descriptions of materials produced industrially and used in the LIC manufacturing process demonstrations of the industrially produced LIC energy and power parameters analysis of the characteristics of manufactured miniature lithium ion cells solid state LICs lithium metal cells and all solid state cells as well as others Considering the popularity of the discussed topics one can hope to find detailed information on the Internet Indeed modern search engines make it possible to locate a sufficiently large number of relevant documents However while conducting such research we encountered the following challenges the data are somewhat fragmented and their systematization and structuring are required search results do not always meet search queries For instance data that were relevant to the topic were found but they did not match the query as accumulated data grow the search time for new information extends the choice of search engine and location different countries affects search results the data are not indexed in search engines although the correct keywords and website were requested the information disappears due to website updates and the found data require additional processing For example many presentations show changes in the shape of the discharge curves depending on the discharge current strength In addition however Ragone plots are necessary for a correct comparison and therefore the mathematical processing of presented results is required Thus this book was written to systematize and structure information on industrially produced materials for LIC manufacturing and industrially produced and promising LICs and lithium metal rechargeable cells for various applications

Automotive Steels Radhakanta Rana, Shiv Brat Singh, 2016-11-26 Automotive Steels Design Metallurgy Processing and Applications explores the design processing metallurgy and applications of automotive steels While some sheet steels are produced routinely in high volume today there have been significant advances in the use of steel in the automotive industry This book presents these metallurgical and application aspects in a way that is not available in the current literature The editors have assembled an international team of experts who discuss recent developments and future prospects for automotive steels compiling essential reading for both academic and industrial metallurgists automotive design engineers and postgraduate students attending courses on the metallurgy of automotive materials Presents recent developments on the design metallurgy processing and applications of automotive steels Discusses automotive steels that are currently in the early stages of research such as low density and high modulus steels that are driving future development Covers traditional steels advanced high strength steels elevated Mn steels and ferrous composite materials **2nd**

International Conference on Wireless Intelligent and Distributed Environment for Communication Isaac Woungang, Sanjay Kumar Dhurandher, 2019-03-27 This book presents the proceedings of the International Conference on Wireless Intelligent and Distributed Environment for Communication WIDECOM 2019 sponsored by the University of Milan Milan Italy February 11 13 2019 The conference deals both with the important core and the specialized issues in the areas of

new dependability paradigms design and performance of dependable network computing and mobile systems as well as issues related to the security of these systems The WIDECOM proceedings features papers addressing issues related to the design analysis and implementation of infrastructures systems architectures algorithms and protocols that deal with network computing mobile ubiquitous systems cloud systems and IoT systems It is a valuable reference for researchers instructors students scientists engineers managers and industry practitioners The book s structure and content is organized in such a manner that makes it useful at a variety of learning levels Presents the proceedings of the International Conference on Wireless Intelligent and Distributed Environment for Communication WIDECOM 2019 Milan Italy February 11 13 2019 Includes an array of topics networking computing mobile ubiquitous systems cloud systems and IoT systems Addresses issues related to protecting information security and establishing trust in the digital space **Advanced Machining and**

Micromachining Processes Sandip Kunar,Norfazillah Binti Talib,Gurudas Mandal,2025-04-08 This book offers a comprehensive overview of the fundamentals principles and latest innovations in advanced machine and micromachining processes Businesses are continually seeking innovative advanced machining and micromachining techniques that optimize efficiency while reducing environmental harm This growing competitive pressure has spurred the development of sophisticated design and production concepts Modern machining and micromachining methods have evolved to accommodate the use of newer materials across diverse applications while ensuring precise machining accuracy The primary aim of this book is to explore and analyze various approaches in modern machining and micromachining processes with a focus on their effectiveness and application in successful product development Consequently the book emphasizes an industrial engineering perspective This book covers a range of advanced machining and micromachining processes that can be utilized by the manufacturing industry to enhance productivity and contribute to socioeconomic development Additionally it highlights ongoing research projects in the field and provides insights into the latest advancements in advanced machining and micromachining techniques The 31 chapters in the book cover the following subjects abrasive jet machining water jet machining principles of electro discharge machining wire electro discharge machining laser beam machining plasma arc machining ion beam machining electrochemical machining ultrasonic machining electron beam machining electrochemical grinding photochemical machining process abrasive assisted micromachining abrasive water jet micromachining electro discharge machining electrochemical micromachining ultrasonic micromachining laser surface modification techniques ion beam processes glass workpiece micromachining using electrochemical discharge machining abrasive water jet machining ultrasonic vibration assisted micromachining laser micromachining s role in improving tool wear resistance stress and surface roughness in high strength alloys abrasive flow finishing process elastic emission machining magnetic abrasive finishing process genetic algorithm for multi objective optimization in machining machining of Titanium Grade 2 and P 20 tool steel and wet bulk micromachining in MEMS fabrication Audience The book is intended for a wide audience including

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Power Electronics in Renewable Energy Systems and Smart Grid Bimal K. Bose, 2019-08-06 The comprehensive and authoritative guide to power electronics in renewable energy systems. Power electronics plays a significant role in modern industrial automation and high efficiency energy systems. With contributions from an international group of noted experts *Power Electronics in Renewable Energy Systems and Smart Grid Technology and Applications* offers a comprehensive review of the technology and applications of power electronics in renewable energy systems and smart grids. The authors cover information on a variety of energy systems including wind solar ocean and geothermal energy systems as well as fuel cell systems and bulk energy storage systems. They also examine smart grid elements modeling simulation control and AI applications. The book's twelve chapters offer an application oriented and tutorial viewpoint and also contain technology status review. In addition the book contains illustrative examples of applications and discussions of future perspectives. This important resource includes descriptions of power semiconductor devices two level and multilevel converters HVDC systems FACTS and more. Offers discussions on various energy systems such as wind solar ocean and geothermal energy systems and

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