



ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Ordinary Level

MATHEMATICS

PAPER 2

4004/2

NOVEMBER 2022 SESSION

2 hours 30 minutes

Additional materials:

Mathematical Instruments

Mathematical Tables

Non-programmable Electronic Calculator

Plain Paper (1 sheet)

Graph Paper (4 sheets)

Answer Paper

Time 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your Name, Centre number and Candidate number in the spaces provided on the answer paper/answer booklet.

Answer all questions in Section A and any four questions from Section B.

Write your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

All working must be clearly shown on the same sheet as the rest of the answer.

Omission of essential working will result in loss of marks.

If the degree of accuracy is not specified in the question and if the answer is not exact, the answer should be given correct to three significant figures. Answers in degrees should be given correct to one decimal place.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question or part question. Mathematical tables and Non-programmable electronic calculators may be used to evaluate explicit numerical expressions.

This question paper consists of 9 printed pages and 3 blank pages.

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ML Morrison

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High Performance Computing in Clouds Edson Borin, Lúcia Maria A. Drummond, Jean-Luc Gaudiot, Alba Melo, Maicon Melo Alves, Philippe Olivier Alexandre Navaux, 2023-07-05 This book brings a thorough explanation on the path needed to use cloud computing technologies to run High Performance Computing (HPC) applications. Besides presenting the motivation behind moving HPC applications to the cloud, it covers both essential and advanced issues on this topic such as deploying HPC applications and infrastructures, designing cloud friendly HPC applications, and optimizing a provisioned cloud infrastructure to run this family of applications. Additionally, this book also describes the best practices to maintain and keep running HPC applications in the cloud by employing fault tolerance techniques and avoiding resource wastage. To give practical meaning to topics covered in this book, it brings some case studies where HPC applications used in relevant scientific areas like Bioinformatics and Oil and Gas industry were moved to the cloud. Moreover, it also discusses how to train deep learning models in the cloud, elucidating the key components and aspects necessary to train these models via different types of services offered by cloud providers. Despite the vast bibliography about cloud computing and HPC to the best of our knowledge, no existing manuscript has comprehensively covered these topics and discussed the steps, methods, and strategies to execute HPC applications in clouds. Therefore, we believe this title is useful for IT professionals and students, and researchers interested in cutting edge technologies, concepts, and insights focusing on the use of cloud technologies to run HPC applications.

CAA2015. Keep The Revolution Going Stefano Campana, Roberto Scopigno, Gabriella Carpentiero, 2016-03-31 This volume brings together all the successful peer-reviewed papers submitted for the proceedings of the 43rd conference on Computer Applications and Quantitative Methods in Archaeology that took place in Siena, Italy, from March 31st to April 2nd 2015.

Novel Immunotherapeutic Approaches to the Treatment of Cancer Paul D. Rennert, 2016-05-30 Cancer care is undergoing a radical transformation as novel technologies are directed toward new treatments and personalized medicine. The most dramatic advances in the treatment of cancer have come from therapeutics that augment the immune response to tumors. The immune checkpoint inhibitors are the best known and most highly advanced examples of Immune Therapeutics targeting tumor cells and include approved antibody drugs directed at the cell surface proteins CTLA4 and PD-1. These are now considered foundational treatments for several solid tumor indications and that list of indications is growing quickly. More broadly, antibodies have become workhorse molecules across the entire immunotherapy landscape. Antibodies to novel targets modulate the activity of diverse immune cell regulatory proteins. Engineered antibodies can induce tumor cell death or expose tumor cells to poisonous toxins ADCC and ADC respectively. Bi-specific antibodies can engage multiple tumor targets simultaneously or can redirect lymphocytes to attack tumor cells. The antigen binding domains within antibodies can be spliced onto cell stimulatory domains and transduced into T cells or NK cells, creating remarkable tumor specific cellular therapeutics CAR-T, CAR-NK. Beyond antibody-based therapies, there are

highly diverse and differentiated technology tool kits being applied to immunotherapy Small molecule drugs are being developed to attack the tumor microenvironment novel tumor vaccine approaches are showing great promise patient lymphocytes are being isolated expanded and reintroduced to patients gene editing techniques are becoming widely deployed and a vast number of new tumor targets and mutated tumor proteins neoantigens are being discovered The past decade has seen unprecedented success in the treatment of diverse cancers The authors of this volume have been asked to not only review progress to date but importantly to look ahead and anticipate the evolution of cancer treatment across diverse Immune Therapeutic approaches Our hypothesis is that the advances we are seeing across the immunotherapy landscape will further evolve and synergize leading us finally to outright cures for many cancers

Trade Perspectives in the Context of Safety, Security, Privacy and Loyalty Blaženka Knežević, Sanda Renko, 2019-01-23 This book represents

the work of a team of theorists and practitioners from various Central and Eastern European countries who offer a multidisciplinary approach to security and safety issues which companies in international and domestic trade as well as consumers are facing nowadays Contributions range from the topics of terrorism and piracy various aspects of theft and theft prevention to the challenges of security and privacy in electronic and mobile commerce Therefore the book is a powerful resource in solving problems because it not only considers security privacy and ethical issues among others but also discusses how to prevent them before they occur

Policing and Boundaries in a Violent Society Guy Lamb, 2022-01-31

This book explores how social and territorial boundaries have influenced the approaches and practices of the South Africa Police Service SAPS By means of a historical analysis of South Africa this book introduces a new concept police frontierism which illuminates the nature of the relationships between the police policing and boundaries and can potentially be used for future case study research Drawing on a wealth of research this book examines how social and territorial boundaries strongly influenced police practices and behaviour in South Africa and how social delineations amplify and distort existing police prejudices against those communities on the other side of the boundary Focusing on cases of high density police operations public order policing and the recent policing of the COVID 19 lockdown this book argues that poor economic conditions combined with an increased militarisation of the SAPS and a decline in public trust in the police will result in boundaries continuing to fundamentally inform police work in South Africa This book will be of interest to scholars and students interested in policing in post colonial societies characterised by high levels of violence as well as police work and police militarization

Preprints of Papers to be Presented at the Annual Meeting Canadian Pulp and Paper Association. Technical Section, 1985

Unauthorized Marisol Clark-Ibáñez, Richelle S. Swan, 2019-06-21 Unauthorized Portraits of Latino Immigrants takes readers inside the diverse contemporary worlds of undocumented Latino immigrants in the United States exploring the myths and realities of education health care work deportation and more This book aims to dispel common misconceptions while introducing readers to real people behind the headlines Chapters explore the myths and realities of

topics including education health care work deportation and more As immigration remains a controversial topic in the United States this book aims to dispel common misconceptions about immigration while introducing readers to the real people behind the headlines The topic of undocumented immigration has received tremendous attention from the debate on immigration reform to the Executive Actions of President Obama to the growing numbers of unaccompanied minors from Central America and more In addition the Syrian refugee crisis and the anti immigrant discourse of presidential candidate Donald Trump have enraged many observers and emboldened others This book provides factual information to readers who are interested in learning more about these issues and the people who are labeled illegal Each chapter draws on both existing and original research to provide an accessible overview of key themes and case studies bring issues to life

Defense White Paper ,2016 **Immunotherapy in Multiple Myeloma** Nicola Giuliani, Fabio Malavasi, Vito Pistoia, 2019-11-26 1999 Pacific Rim International Symposium on Dependable Computing ,1999 Proceedings ,2001

Financing and Risk Management Richard A. Brealey, Stewart C. Myers, Stewart Myers, 2003 The features of this text include the six lessons of market efficiency patterns of corporate financing stockholders rights convertible securities duration and volatility of debt hedging with futures debt borrowing issues and risk management both domestic and international

The Advertising Red Books ,2010 **Principles of Corporate Finance** Richard A. Brealey, Stewart C. Myers, 1999-07
Proceedings IEEE Computer Society, Association for Computing Machinery,1983 **The Value Line Investment**

Survey ,2000 **Pollution Abstracts** ,1981 Indexes material from conference proceedings and hard to find documents in addition to journal articles Over 1 000 journals are indexed and literature published from 1981 to the present is covered Topics in pollution and its management are extensively covered from the standpoints of atmosphere emissions mathematical models effects on people and animals and environmental action Major areas of coverage include air pollution marine pollution freshwater pollution sewage and wastewater treatment waste management land pollution toxicology and health noise and radiation *Trade Marks Journal* ,1993-12 The Berlin Crisis, 1958-1962 ,1992 **Aviation Week & Space Technology** ,2009

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