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NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2022

PHYSICAL SCIENCES: PAPER I

EXAMINATION NUMBER

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Time: 3 hours

200 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 31 pages and a Data Sheet of 2 pages (i–ii). Please check that your question paper is complete.
2. Read the questions carefully.
3. Answer ALL the questions on the question paper and hand it in at the end of the examination. Remember to write your examination number in the space provided above.
4. Use the data and formulae whenever necessary.
5. Show your working in all calculations.
6. Units need not be included in the working of calculations, but appropriate units should be shown in the answer.
7. Answers must be expressed in decimal format, not left as proper fractions.
8. Where appropriate, express answers to TWO decimal places.
9. It is in your own interest to write legibly and to present your work neatly.
10. TWO blank pages (pages 29–30) are included at the end of the paper. If you run out of space for a question, use these pages. Clearly indicate the number of your answer should you use this extra space. There is a spare copy of graph paper on page 31.

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	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total
Mark											
Marker Initial											
Moderated Mark											

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QUESTION 1 MULTIPLE CHOICE

Answer these questions on the multiple-choice answer grid below. Make a clear cross (X) in the box corresponding to the letter that you consider to be correct. Every question has only one correct answer.

A	B	☒	D
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Here the option C has been marked as an example.

Ieb Physical Sciences Papers

**William Crookes, James H.
Gardiner, Gerald Druce, H. W. Blood-
Ryan**

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Physical Science Mr. Rohit Manglik, 2024-07-15 EduGorilla Publication is a trusted name in the education sector committed to empowering learners with high quality study materials and resources Specializing in competitive exams and academic support EduGorilla provides comprehensive and well structured content tailored to meet the needs of students across various streams and levels Historical Studies in the Physical Sciences ,1969 **Physical Science** Franco Giuseppe Dal Bianco,1999 **Niels Bohr's Times** ,1991-10-17 Niel Bohr s life spans times of revolutionary change in science and in its impact on society Along with Einstein Bohr can be considered as this century s major driving force behind the new mathematical and philosophical descriptions of the atom the nucleus and all that resulted from them Abraham Pais the acclaimed biographer of Einstein traces Bohr s progress from his well to do origins in late nineteenth century Denmark to his central position in the world political scene particularly because of the development of nuclear weapons during the Second World War Bohr was one of the great enabling figures in modern science not only because of his direct involvement in the application of quantum theory to our understanding of the structure of the atom but also because he gathered around him in Copenhagen most of the brightest young minds of the period Figures like Pauli Dirac and Heisenberg all required Bohr s imprimatur to varying degrees before they considered their work ready for widespread consumption He had a complex relationship with Einstein both in terms of their fundamental disagreements and their profound though distant mutual respect He owed an important debt to his mentor Rutherford a man who came to serve in many ways as his role model Pais describes the state of physics before Bohr and considers his legacy both theoretical and practical But more than this he captures the essence of Bohr the intensely private family man who despite appalling personal tragedy became one of the best loved cultural figures of recent times **Physical Science** Franco Giuseppe Dal Bianco,2000 **South African national bibliography** ,1999 Classified list with author and title index **Historical Studies in the Physical and Biological Sciences** ,2002 Marking Matric Vijay Reddy,2006 The past ten years in South Africa has seen many changes in education the creation of a single department of education common examinations for all learners in public schools in the country a new outcomes based education curriculum which was introduced to learners in the general education and training phase since 1998 and will be introduced to the further education and training phase from 2006 To evaluate the success of these changes South African researchers still use the indicator of student achievement The matriculation examination is the visible high profile and public performance indicator Every year parents learners teachers researchers government officials policymakers and the general public get involved in the debate around the matric examination with the most frequently asked questions being Did the pass rate go up Are standards dropping Are the results real or have they been manipulated How is our education system doing Are we meeting the development goals What should the matriculation examination of the future look like participants from government national and provincial Chemical News and Journal of Physical Science

William Crookes, James H. Gardiner, Gerald Druce, H. W. Blood-Ryan, 1913 *J. Robert Oppenheimer and the American Century* David C. Cassidy, 2019-07-31 Born into a wealthy secular New York Jewish family a student of the Ethical Culture School in New York later educated in theoretical physics at Harvard Cambridge UK and G ttingen Germany appointed professor at UC Berkeley and Caltech J Robert Oppenheimer 1904 1967 was on the forefront of the rise of theoretical physics in the United States to world class status contributing to the century altering success of the Manhattan Project to build the atomic bomb As the scientific leader of that project Oppenheimer played a key advisory role in government helping to forge the post war military industrial scientific alliance that poured huge resources into post war big science Because of his position Oppenheimer became for the public the heroic cultural icon of American science but he also became a target and a tragic victim of the cold war fear and nuclear war preparations underlying the McCarthy era This biographical study focuses on Oppenheimer s cultural and intellectual rise as a theoretical physicist as well as his role within the trajectory of the nation s rise to scientific leadership and the post war forces that confronted American science This biography is nearly unique in that it includes discussions for general audiences of Oppenheimer s work and contributions to theoretical physics including his famous prediction of black holes sixty years before their confirmed discovery Now David Cassidy brings us the best account of Oppenheimer s life in science with *J Robert Oppenheimer and the American Century* T Powers New York Review of Books Cassidy covers this ground admirably in his thoughtful biography of Oppenheimer *Scientific American* Cassidy s book is probably the best single study of Oppenheimer to date B Bernstein *Physics World* Cassidy s biography of J Robert Oppenheimer is a concise well written book about the life of the famous 20th century scientist A worthwhile read for anyone with an interest in the coming of age of American physics and how the weaknesses and strengths of one of its leaders shaped the relationship between science and the government for decades to come *Physics and Society* This biography is a detailed and beautifully written work Cassidy expands beyond the traditional scope of a biography and expertly explores the surrounding environment that shaped Oppenheimer s life *Atomic Archive* This excellent biography of J Robert Oppenheimer places the eminent physicist in the context of twentieth century America Cassidy provides excellent insights into the life and times of this complex man Unlike many other biographers of Oppenheimer Cassidy assesses his role as a twentieth century theoretical physicist *Alsos Digital Library for Nuclear Issues* A superbly researched biography There is no doubt that Cassidy gives us a valuable perspective on Oppenheimer s life The author is shy neither of editorializing nor of making judgments about the personalities who appear in the story These comments are almost unfailingly fair and justified by the evidence *Times Higher Education* Cassidy has written a book that neither praises Oppenheimer nor buries his reputation but rather puts some tarnish upon the icon G Herken *Science*

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