

**NATIONAL  
 SENIOR CERTIFICATE**

**GRADE 12**

**SEPTEMBER 2021**

**PHYSICAL SCIENCES P1**

**MARKS:** 150

**TIME:** 3 hours

The question paper consists of 15 pages, including 3 data sheets.

**QUESTION 10: POTENTIAL ENERGIES**

10. The kinetic energy of a car moving at velocity  $v$  is  $K$ . The velocity of the car changes to  $3v$ . What is the new kinetic energy of the car?

- A.  $18K$
- B.  $10K$
- C.  $2K$
- D.  $4K$

(2)

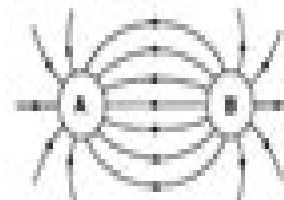
10. A sound source approaches a stationary observer at constant velocity.

Which ONE of the following describes how the observed frequency and wavelength differ from that of the sound source?

|   | Observed wavelength | Observed frequency |
|---|---------------------|--------------------|
| A | Greater than        | Greater than       |
| B | Less than           | Less than          |
| C | Less than           | Greater than       |
| D | Greater than        | Less than          |

(2)

10. The electric field pattern between two charged spheres, A and B, is shown below.



Which ONE of the following statements regarding the charge on spheres A and B is CORRECT?

- A. Sphere A is negatively charged, and sphere B is positively charged.
- B. Sphere A is positively charged, and sphere B is negatively charged.
- C. Spheres A and B are both positively charged.
- D. Spheres A and B are both negatively charged.

(2)

# Physical Science P1 September 2013 Memorandum

**G Orfield**



## Physical Science P1 September 2013 Memorandum:

*The Case for Pandora* James Essig, Steve McCarter, 2016-12-19 This book is about building craft for space travel a space travel that is not in the distant future but in the immediate future There is no question that we have the technology to build and power large craft capable of traversing the galaxy and for now this book will focus on achieving the goal of intragalactic travel We will describe various methods of power generation and propulsion delineate the materials and technology for construction discuss the building of the spacecraft from the outside in and show what is required to sustain life on the craft for extended periods of time While we will go into some detail on each of these pointing out advantages and disadvantages to components and methods this is not nor is it intended to be a highly technical book to be used by specialists Rather it is intended to inform the general readership about what is possible and perhaps what is not in building and operating spacecraft for long distance and long duration travel with current and available means *Weighted Bergman Spaces*

*Induced by Rapidly Increasing Weights* Jose Angel Pelaez, Jouni Rattya, 2014-01-08 This monograph is devoted to the study of the weighted Bergman space  $A_{p,\omega}$  of the unit disc  $\mathbb{D}$  that is induced by a radial continuous weight  $\omega$  satisfying  $\lim_{r \rightarrow 1} \int_r^1 \omega(s) ds = 0$  Every such  $A_{p,\omega}$  lies between the Hardy space  $H_p$  and every classical weighted Bergman space  $A_{p,\alpha}$  Even if it is well known that  $H_p$  is the limit of  $A_{p,\alpha}$  as  $\alpha \rightarrow 1$  in many respects it is shown that  $A_{p,\omega}$  lies closer to  $H_p$  than any  $A_{p,\alpha}$  and that several finer function theoretic properties of  $A_{p,\alpha}$  do not carry over to  $A_{p,\omega}$  Scientific and Technical Aerospace Reports, 1987 Lists citations with abstracts for aerospace related reports obtained from world wide sources and announces documents that have recently been entered into the NASA Scientific and Technical Information Database

GPS Guochang Xu, Yan Xu, 2016-07-29 This reference and handbook describes theory algorithms and applications of the Global Positioning System GPS Glonass Galileo Compass It is primarily based on source code descriptions of the KSGsoft program developed at the GFZ in Potsdam The theory and algorithms are extended and verified for a new development of a multi functional GPS Galileo software Besides the concepts such as the unified GPS data processing method the diagonalisation algorithm the adaptive Kalman filter the general ambiguity search criteria and the algebraic solution of variation equation reported in the first edition the equivalence theorem of the GPS algorithms the independent parameterisation method and the alternative solar radiation model reported in the second edition the modernisation of the GNSS system the new development of the theory and algorithms and research in broad applications are supplemented in this new edition Mathematically rigorous the book begins with the introduction the basics of coordinate and time systems and satellite orbits as well as GPS observables and deals with topics such as physical influences observation equations and their parameterisation adjustment and filtering ambiguity resolution software development and data processing and the determination of perturbed orbits International Tables for Crystallography

Mois I. Aroyo, 2021-07-06 This sixth edition of what was previously known as the Brief Teaching Edition of Volume A provides

an introduction to the basic crystallographic data for space groups found in Volume A for symmetry relations between space groups in Volume A1 and for subperiodic groups in Volume E of International Tables for Crystallography to magnetic space groups and to the symmetry database that forms part of International Tables Online at <https://it.iucr.org> It is designed for graduate students and young researchers who are new to the field of crystallographic symmetry and includes many illustrative examples to help readers to understand and use these different kinds of information Selected tables of symmetry data from the full volumes in the series are also included making this a handy aid for classroom teaching References are also provided to further specialized sources for those who need to go deeper into the subject and to textbooks for those who need more background information

Thin Film Solar Cells K. L. Chopra, S. R. Das, 2013-11-11 You 0 Sun are the eye of the world  
 You are the soul of all embodied beings You are the source of all creatures You are the discipline of all engaged in work  
 Translated from Mahabharata 3rd Century BC Today energy is the lifeline and status symbol of civilized societies All nations have therefore embarked upon Research and Development programs of varying magnitudes to explore and effectively utilize renewable sources of energy Albeit a low grade energy with large temporal and spatial variations solar energy is abundant cheap clean and renewable and thus presents a very attractive alternative source The direct conversion of solar energy to electricity photovoltaic effect via devices called solar cells has already become an established frontier area of science and technology Born out of necessity for remote area applications the first commercially manufactured solar cells single crystal silicon and thin film CdS Cu<sub>2</sub>S were available well over 20 years ago Indeed all space vehicles today are powered by silicon solar cells But large scale terrestrial applications of solar cells still await major breakthroughs in terms of discovering new and radical concepts in solar cell device structures utilizing relatively more abundant cheap and even exotic materials and inventing simpler and less energy intensive fabrication processes No doubt this extraordinary challenge in R D has led to a virtual explosion of activities in the field of photovoltaics in the last several years

**Energy Research Abstracts** ,1978  
Physical Science ,1981 *Macmillan Physical Science* Denise Eby,1986

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