



basic education

Department
Basic Education
REPUBLIC OF SOUTH AFRICA

FULL MEMORANDUM GRADE 12 PHYSICS 2022 FINAL

This question paper consists of 18 pages and 3 data sheets.

(QUESTION 5 (Start on a new page.)

A 12 kg block is initially at rest at point A at the bottom of a ROUGH inclined plane. The block is pulled up the incline by a constant force F acting parallel to the incline. The block reaches point B, which is at a vertical height of 4.0 m above the horizontal, with a speed of 2.0 m/s. See the diagram below.



- 5.1 Define the term non-conservative force.
- 5.2 Draw a labelled free-body diagram for the block when it is pulled up the incline.
- 5.3 Calculate the total work done on the block by the NON-CONSERVATIVE forces when the block moves from point A to point B. (4)

The same constant force F now moves the block at a CONSTANT VELOCITY across a rough horizontal surface from point B to point C, as shown below. Force F acts parallel to the horizontal surface.



The magnitude of the constant frictional force acting on the block while moving from point B to point C is 40 N, 40% greater than the magnitude of the constant frictional force acting on the block when it moves from point A to point B.

- 5.4 Calculate the distance from point A to point B. (5)

(10)

Physical Science P1 November Memo 2014

Ian F. Putnam



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A Homology Theory for Smale Spaces Ian F. Putnam, 2014-09-29 The author develops a homology theory for Smale spaces which include the basic sets for an Axiom A diffeomorphism. It is based on two ingredients. The first is an improved version of Bowen's result that every such system is the image of a shift of finite type under a finite-to-one factor map. The second is Krieger's dimension group invariant for shifts of finite type. He proves a Lefschetz formula which relates the number of periodic points of the system for a given period to trace data from the action of the dynamics on the homology groups. The existence of such a theory was proposed by Bowen in the 1970s.

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Table of Contents Physical Science P1 November Memo 2014

1. Understanding the eBook Physical Science P1 November Memo 2014
 - The Rise of Digital Reading Physical Science P1 November Memo 2014
 - Advantages of eBooks Over Traditional Books
2. Identifying Physical Science P1 November Memo 2014
 - 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 Physical Science P1 November Memo 2014
 - User-Friendly Interface
4. Exploring eBook Recommendations from Physical Science P1 November Memo 2014
 - Personalized Recommendations
 - Physical Science P1 November Memo 2014 User Reviews and Ratings
 - Physical Science P1 November Memo 2014 and Bestseller Lists
5. Accessing Physical Science P1 November Memo 2014 Free and Paid eBooks

- Physical Science P1 November Memo 2014 Public Domain eBooks
- Physical Science P1 November Memo 2014 eBook Subscription Services
- Physical Science P1 November Memo 2014 Budget-Friendly Options
- 6. Navigating Physical Science P1 November Memo 2014 eBook Formats
 - ePub, PDF, MOBI, and More
 - Physical Science P1 November Memo 2014 Compatibility with Devices
 - Physical Science P1 November Memo 2014 Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Physical Science P1 November Memo 2014
 - Highlighting and Note-Taking Physical Science P1 November Memo 2014
 - Interactive Elements Physical Science P1 November Memo 2014
- 8. Staying Engaged with Physical Science P1 November Memo 2014
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Physical Science P1 November Memo 2014
- 9. Balancing eBooks and Physical Books Physical Science P1 November Memo 2014
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Physical Science P1 November Memo 2014
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Physical Science P1 November Memo 2014
 - Setting Reading Goals Physical Science P1 November Memo 2014
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Physical Science P1 November Memo 2014
 - Fact-Checking eBook Content of Physical Science P1 November Memo 2014
 - 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

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