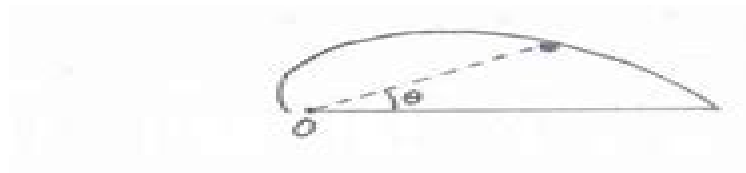


Roll No.

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Q1.a A particle of mass m slides along a frictionless track, fixed in the horizontal plane, of the form $r = a \exp(-a\theta)$ where a is a positive constant. Its initial speed at $r = a$ is v_0 when $\theta = 0$. Recall that in polar coordinates $\mathbf{r} = r\hat{r}$, $\frac{d\mathbf{r}}{dt} = \dot{r}\hat{r} + r\frac{d\hat{r}}{dt}$, $\hat{r}$ and $\hat{\theta}$ are unit vectors in the radial direction and a direction perpendicular to $\hat{r}$ respectively.



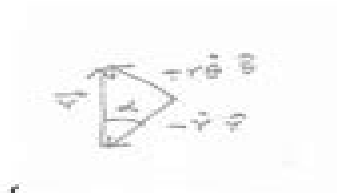
(i) Find the θ dependence of both the speed and the angle α that the velocity vector makes with the radial line connecting origin O with the particle. (2 + 2)

Only force acting on the particle is the Normal force N which does no work.

(1)

Thus $v = v_0$ throughout.

(1)



Let α be the angle made by the velocity vector with the radial $\hat{r}$

$\tan \alpha = \frac{r \frac{d\theta}{dt}}{\frac{dr}{dt}} = 1/a$ and hence is a constant.

(2)

$v(\theta) = \text{constant}$ and independent of θ

$\alpha(\theta) = \text{constant} = \tan^{-1}(1/a)$ and independent of θ

Physics Olympiad Question And Solution

Bin Xiong



Physics Olympiad Question And Solution:

Asian Physics Olympiad (1st - 8th) Yongling Zheng, 2010 This book compiles all of the test problems and solutions from the 1st through the 8th Asian Physics Olympiad Test questions of every paper consist of two parts a theory section and an experiment section before which minutes of teams and results of each competition are introduced It is a rather desirable reference book for both students and teachers of international competition training as well as middle school student contestants *Physics Olympiad Stage 1 - NSEP 9 year solved papers by Career Point Kota* Career Point Kota, 2020-08-07

Whenever a student decides to prepare for any examination her his first and foremost curiosity is about the type of questions that he she has to face We feel great pleasure to present this book *Physics Olympiad Stage 1 NSEP 9 year solved papers* before you Wherein we have made an attempt to provide year wise collection of questions asked in NSEP with answers and solutions to the majority of questions Solutions to the questions have been written in such a manner that the students will be able to understand the application of the concepts and can answer some other related questions too We firmly believe that the book in this form will definitely help a genuine hardworking student We have tried our best to keep errors out of this book however comments and suggestions from the readers will be highly appreciated and incorporated in the subsequent editions We wish to utilize the opportunity to place on record our special thanks to all members of the Content Development team for their efforts to make this wonderful book *Solving Physics Problems* Yipeng Gu, 2022-08-18 This book provides a

complete consistent and open system for studying physics problems which not only provides high quality teaching materials for the field of physics education especially for Physics Olympiad training but also points out a new direction for physics education In this book a form of methodology which can comprehensively present cogitation discipline is built up for analyzing and solving complex physics problems The text analyzes plenty of physics problems classical mechanics from both theoretical and philosophical points of view to reveal the way of exerting this form As a set of methodology reflecting the cogitation discipline the thinking paradigm proposed in this book called the MLQ ST C paradigm is a theoretical tool to develop people s acquisition of this ability The paradigm successfully deconstructs the elements and the structure in physical thinking and then eliminates the obstacles of people s underlying thinking so that all the thinking built on it can be clear and ordered The physics problems included in this book are significantly more difficult than similar books within the same theoretical domains involved leading to better teaching and learning value *Physics Olympiad - Basic To Advanced Exercises* The Committee Of Japan Physics Olympiad Japan, 2014-01-15 This book contains some of the problems and solutions in the past domestic theoretical and experimental competitions in Japan for the International Physics Olympiad Through the exercises we aim at introducing the appeal and interest of modern physics to high school students In particular the problems for the second round of competition are like long journey of physics beginning with fundamental physics of junior high school level and ending with the forefronts of updated physics and technology **Mathematical Olympiad In**

China (2017-2018): Problems And Solutions Bin Xiong, 2022-08-29 In China lots of excellent maths students take an active part in various maths contests and the best six senior high school students will be selected to form the IMO National Team to compete in the International Mathematical Olympiad In the past ten years China's IMO Team has achieved outstanding results they won the first place almost every year The authors of this book are coaches of the China national team They are Xiong Bin Yao Yijun Qu Zhenhua et al Those who took part in the translation work are Wang Shanping and Chen Haoran The materials of this book come from a series of two books in Chinese on Forward to IMO A Collection of Mathematical Olympiad Problems 2017 2018 It is a collection of problems and solutions of the major mathematical competitions in China It provides a glimpse of how the China national team is selected and formed Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium, Blue Sky, and WideAIED Alexandra I. Cristea, Erin Walker, Yu Lu, Olga C. Santos, Seiji

Isotani, 2025-07-23 This three volume set CCIS 2590 2592 constitutes poster papers and late breaking results workshops and tutorials practitioners industry and policy track doctoral consortium blue sky and wideAIED papers presented at the 26th International Conference on Artificial Intelligence in Education AIED 2025 held in Palermo Italy during July 22 26 2025 The 72 full papers and 73 short papers 72 of them presented as posters presented in this book were carefully reviewed and selected from 296 submissions They are organized in topical sections as follows Part I BlueSky Practitioners Industry and Policy WideAIED Doctoral Consortium Part II Late Breaking Results Part III Late Breaking Results Workshops and Tutorials

Concepts of Mechanics Vol. 2 for JEE Advanced & Main 7th Edition Er. D. C. Gupta, Er. Harsh Gupta, 2019-06-20 The 2nd book in the new Physics Concepts Series by D C Gupta of books for IIT JEE Advanced Mains Concepts of Mechanics 1 Vol 2 for JEE Advanced Main 7th Edition The series aims at helping the students with Tricks Techniques to Master Concepts and Problem Solving Skills in Physics for IIT JEE The books are empowered with Problem Solving Videos by the author himself where he has tried to demonstrate the best practices while attempting IIT JEE Physics Problems The Most User Friendly Series of Books The book comprises of Comprehensive Theory and Miscellaneous Solved Examples for a better understanding of the concepts The theory not only discusses the concept at length but also discusses the various permutations and combinations in which problems can be asked in JEE Advanced Gyan Booster Concept points are given in various places in each chapter To make the book more pertinent and relevant selected NCERT EXEMPLAR Previous years JEE Advanced Mains KVPY and Physics Olympiad Problems are also included The questions in each exercise are arranged TOPIC WISE Concept Boosting Questions are marked with a Star CBQ and High Order Thinking Skills questions as HOTS 15 25 Problem Solving Videos of TYPICAL PROBLEMS demonstrating the best approach to solve Problems A lot of unique and new Questions similar to the ones being asked in JEE Advanced have been added in the exercises Hints and solutions for all the problems of the exercises are provided The book also contains Chapter wise all important formulae and summarised

theory at the end of each chapter for last minute Revisions

Chatgpt and Other Generative AI Tools Jochen

Kuhn, Stefan Küchemann, Knut Neumann, Martina Rau, 2025-02-17 In the past ten years applications of generative artificial intelligence GAI have found rapidly growing use in medicine science and daily life Large language models LLMs opened up new avenues in particular for education LLMs have been used to create interactive educational content for students stimulate their curiosity generate code explanations and develop assessment questions Additionally LLMs been applied for language practice anxiety alleviation and feedback provision In higher education LLMs have shown potential for assisting in medical exam preparation and clinical decision making In school education LLMs can help teachers with automated evaluation of student responses and respective adaptive feedback More recently LLM based applications such as chatGPT have been used to generate teaching materials or assessment tasks across different subjects The fields understanding of the effects of the use of LLM based applications in classroom teaching however is still in its infancy GAI tools may help solving a range of tasks in education in particular with respect to teachers and students and teachers efforts to generate content However it is critical that teachers and students do not overly rely on GAI generated solutions but instead critically assess each solution Students should furthermore not use GAI tools to avoid investing relevant mental effort to create mental models or more broadly build up competencies

Mathematical Olympiad In China (2023): Problems And Solutions Bin Xiong, 2025-05-27 In China many excellent mathematics students take an active part in various mathematical contests and each year the best six senior high school students are selected to form the IMO National Team to compete in the International Mathematical Olympiad In the past ten years China's IMO Team has achieved outstanding results they won the first place almost every year The authors of this book are esteemed coaches of the China national team including Xiao Liang Qu Zhenhua Xiong Bin Yu Hongbing Yao Yijun Wang Xinmao Li Ting Ai Yinghua Fu Yunhao Wang Bin He Yijie and Zhang Sihui Contributing to the translation efforts were Chen Haoran and Zhao Wei The materials of this book come from a book in Chinese on Forward to IMO A Collection of Mathematical Olympiad Problems 2023 It is a collection of problems and solutions of the major mathematical competitions in China It provides a glimpse of how the China national team is selected and formed

Mathematical Olympiad In China (2021-2022): Problems And Solutions, 2024-03-19 In China many excellent students in mathematics take an active part in various mathematical contests and each year the best six senior high school students are selected to form the IMO National Team to compete in the International Mathematical Olympiad In the past ten years China's IMO Team has achieved outstanding results they won first place almost every year The authors of this book are coaches of the China national team They are Xiong Bin Xiao Liang Yu Hongbing Yao Yijun Qu Zhenhua Li Ting Ai Yinghua Wang Bin Fu Yunhao He Yijie Zhang Sihui Wang Xinmao Lin Tianqi Xu Disheng et al Those who took part in the translation work are Chen Haoran and Zhao Wei The materials of this book come from a series of two books in Chinese on Forward to IMO a collection of mathematical Olympiad problems 2021 2022 It is a collection of problems and solutions of the major

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