## FORCE AND MOTION

### SUBJECTIVE QUESTIONS AND ANSWERS

Q.1. What are scalar and vector quantities? Give graphical representation of a vector.

Ans. Scalar Quantities: Those physical quantities which have magnitude only but have no direction are called the scalar quantities or scalars. For example, length, mass, time, work, power etc.

Vector Quantities: Those physical quantities which are having magnitudes as well as directions both, are called vector quantities or vectors. For example, displacement, force, velocity, acceleration, torque etc.

Graphical Representation of Vector: Graphically, a vector is represented by an arrow drawn to a chosen scale, parallel to the direction of the vector. The length and the direction of the arrow thus represent the magnitude and the direction of the vector respectively. Thus, the arrow in fig.2.1 represent a vector A in XY-plane making an angle θ with Xauxis.

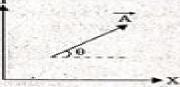


Fig. 2.1

Q.2. Write the difference between scalar and vector quantities.

Ans. The main differences between scalar and vector quantities are as follows:

S.No.	Domain	Scalar Quantity	Vector Quantity
(i)	Definition	A physical quantity which has only magnitude is kn- own as scalar quantity.	A physical quantity which has magnitude as well as direction is known as vector quantity.
(ia)	Division	A scalar can divide anoth- er scalar.	Two vectors can never divide each other.
(iii)	Algebraic rule	Scalars obey algebraic rul- es for the operations like addition and multiplica- tion.	Vectors obey vector algebra for the operations like addi- tion and multiplication.
(iv)	Example	For example, mass, length, time, work etc.	For example, velocity, displa- cement, acceleration etc.

# Jan 2014 Unit 2 Physics

**George Musser** 

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Novel Trends in Production Devices and Systems II Daynier Rolando Delgado Sobrino, Karol Velíšek, Peter Košťál, 2014-12-01 Special topic volume with invited peer reviewed papers only A Concise Guide to Communication in Science and Engineering David H. Foster, 2017 This guide offers a comprehensive but concise resource based on extensive carefully analysed examples from the published literature It enables students and researchers in science and engineering to write and present material to a professional modern standard efficiently and painlessly and with maximum impact Putting Ourselves Back in the Equation George Musser, 2023-11-07 This is a delightful account of one of the deepest and most fascinating explorations going on today at the frontier of our knowledge Carlo Rovelli bestselling author of The Order of Time and Seven Brief Lessons on Physics Musser knows that the point of popular science is to get a sense of what s at stake what kinds of answers are being offered to difficult guestions and why it all matters One could not ask more of Putting Ourselves Back in the Equation on all three counts it delivers Julian Baggini The Wall Street Journal A revelatory exploration of how a theory of everything depends upon our understanding of the human mind The whole goal of physics is to explain what we observe For centuries physicists believed that observations yielded faithful representations of what is out there But when they began to study the subatomic realm they found that observation often interferes with what is being observed that the act of seeing changes what we see The same is true of cosmology our view of the universe is inevitably distorted by observation bias And so whether they re studying subatomic particles or galaxies physicists must first explain consciousness and for that they must turn to neuroscientists and philosophers of mind Neuroscientists have painstakingly built up an understanding of the structure of the brain Could this help physicists understand the levels of self organization they observe in other systems. These same physicists meanwhile are trying to explain how particles organize themselves into the objects around us Could their discoveries help explain how neurons produce our conscious experience Exploring these questions and more George Musser tackles the extraordinary interconnections between quantum mechanics cosmology human consciousness and artificial intelligence Combining vivid descriptive writing with portraits of scientists working on the cutting edge Putting Ourselves Back in the Equation shows how theories of everything depend on theories of mind and how they might be one and the same Water and Energy Gustaf Olsson, 2015-06-14 Rapid and important developments in the area of energy water nexus over the last two to three years have been significant This new edition of Water and Energy Threats and Opportunities is timely and continues to highlight the inextricable link between water and energy providing an up to date overview of the subject with helpful detailed summaries of the technical literature Water and Energy has been up dated throughout and major changes are new chapters on global warming and fossil fuels including shale gas and fracking the consequences of the Deepwater Horizon accident in the Mexican Gulf and the Niger Delta oil spills new developments in hydropower and continued competition between food water and energy Water and Energy Threats and Opportunities 2e

creates an awareness of the important couplings between water and energy It shows how energy is used in all the various water cycle operations and demonstrates how water is used and misused in all kinds of energy production and generation Population increase climate change and an increasing competition between food and fuel production create enormous pressures on both water and energy availability Since there is no replacement for water water security looks more crucial than energy security This is true not only in developing countries but also in the most advanced countries For example the western parts of the USA suffer from water scarcity that provides a real security threat Part One of the book describes the water energy nexus the conflicts and competitions and the couplings between water security energy security and food security Part Two captures how climate change population increase and the growing food demand will have major impact on water availability in many countries in the world Part Three describes water for energy and how energy production and conversion depend on water availability As a consequence all planning has to take both water and energy into consideration The environmental including water consequences of oil and coal exploration and refining are huge in North America as well as in the rest of the world Furthermore oil leak accidents have hit America Africa Europe as well as Asia The consequences of hydropower are discussed and the competition between hydropower generation flood control and water storage is illustrated The importance of water for cooling thermal power plants is described as this was so tragically demonstrated at the Fukushima nuclear plants in 2011 Climate change will further emphasize the strong coupling between water availability and the operation of power plants Part Four analyses energy for water how water production and treatment depend on energy The book shows that a lot can be done to improve equipment develop processes and apply advanced monitoring and control to save energy for water operations Significant amounts of energy can be saved by better pumping the reduction of leakages controlled aeration in biological wastewater treatment more efficient biogas production and by improved desalination processes There are 3 PowerPoint presentations available for Water and Energy threats and opportunities 2e About the author Gustaf Olsson Professor Em in Industrial Automation Lund University Sweden Since 2006 Gustaf has been Professor Emeritus at Lund University Sweden Gustaf has devoted his research to control and automation in water systems electrical power systems and process industries From 2006 to 2008 he was part time professor in electrical power systems at Chalmers University of Technology Sweden He is guest professor at the Technical University of Malaysia UTM and at the Tsinghua University in Beijing China and he is an honorary faculty member of the Exeter University in UK Between 2005 and 2010 he was the editor in chief of the journals Water Science and Technology and Water Science and Technology Water Supply IWA Publishing From 2007 to 2010 he was a member of the IWA Board of Directors and in 2010 he received the IWA Publication Award In 2012 he was the awardee of an Honorary Doctor degree at UTM and an Honorary Membership of IWA Gustaf has guided 23 PhDs and a few hundred MSc students through their exams and has received the Lund University pedagogical award for distinguished achievements in the education The Lund University engineering students elected him as the teacher

of the year He has spent extended periods as a guest professor and visiting researcher at universities and companies in the USA Australia and Japan and has been invited as a quest lecturer in 19 countries outside Sweden He has authored nine books published in English Russian German and Chinese and and contributed with chapters in another 19 books as well as more **The Cost of Corrosion in China** Baorong Hou, 2019-09-26 This book comprehensively than 170 scientific publications covers corrosion and corrosion protection in China in the areas including infrastructure transportation energy water environment as well as manufacturing and public utilities Furthermore it presents a major consulting project of Chinese Academy of Engineering which was the largest corrosion investigation project in Chinese history including the corresponding methods processes and corrosion protection strategies and provides valuable information for numerous industries Sharing essential insights into corrosion prediction and decision making this book will help to decrease costs and extend the service life of equipment and facilities accordingly it will benefit scientists and engineers working on corrosion research and protection as well as economists and government employees **Clipped Wings** Deborah Ancell, 2016-10-04 Within the developed world airlines have responded to the advice of advocates for corporate social and environmental responsibility CSER to use the intertwined dimensions of economics society and environment to guide their business activities However disingenuously the advocates and regulators frequently pay insufficient attention to the economics which are critical to airlines sustainability and profits This omission pushes airlines into the unprofitable domain of CSERplus The author identifies alleged market inefficiencies and failures examines CSERplus impacts on international competition and assesses the unintended consequences of the regulations She also provides innovative ideas for future proofing airlines Clipped Wings is a treatise for business professionals featuring academic research as well as industry anecdotes It is written for airlines including their owners employees passengers and suppliers airports trade associations policy makers educators students consultants CSERplus specialists and anyone who is concerned about the future of competitive airlines Canadian Journal of Physics, 2015 Capacity Building for Sustainable Development Valentine Udoh James, 2018-04-02 This book presents over 40 cases of bamboo development across 22 major bamboo industry countries and explores the knowledge gained from their successes and failures It synthesises experiences and exchanges with country experts from international training courses and consultations study tours and seminars Each case includes observations and summaries of discussions related to the development of bamboo based industries in a healthy sustainable way and the facilitation of strategic and balanced development of bamboo in different global regions Industrial and artisanal bamboo growing and processing is expanding worldwide and this book brings together key experiences to help inform future developments This book provides an analysis of bamboo plant features including strong renewability fast growing and high biomass production It also reviews important ecological functions of bamboos such as water and soil conservation carbon sink and storage and adaptation to climate change as well as addressing the diversified culture of bamboo and key issues affecting the sector Highly illustrated

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