

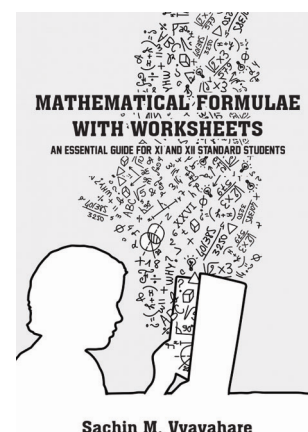
is proved by several studies that application of consortia of AMF and PGPR is far more effective in protecting the plant and increasing the yields. Oilseed crops are of considerable agricultural importance and amongst them peanut is the fourth most significant crop of the world. However, every year a significant portion of this important oilseed crop is damaged by various phytopathogens. Chapter 9 describes the use of pseudomonads and *Trichoderma* as biopesticides in controlling the fungal pests of peanut in an ecofriendly manner. Chapter 10 provides an overview of submerged cultivation methodologies for mass scale production of pseudomonads, which can be used in multi-dimensional ways to enhance the crop quality and yields. The chapter outlines the fed batch cultivation techniques for obtaining higher population and metabolite concentrations. Chapter 11 provides an overview of the diverse microbes being used as biofertilizers and biopesticides. This chapter also reports the mechanisms and working of PGPM. Chapter 12 deals with the importance and efficacy of using PGPM as biopriming agents for abating biotic and abiotic stresses. Biopriming helps the plant at the initial stage and can be useful in controlling phytopathogens, including fungi and nematodes. The chapter stresses on the use of diverse PGPM as biopriming agents according to the requirement of plant and the conditions. *Azotobacter* is a well-known free living nitrogen fixer being used as a biofertilizer. Chapter 13 describes the diverse roles that *Azotobacter* can play, if used as bioinoculant. An interesting input is the ability of *Azotobacter* strains in degrading pesticides. Chapter 14 provides an update on beneficial effects and molecular diversity of endophytic bacteria of legumes and non-legumes. It is mentioned that endophytes can be far more effective in comparison to other rhizospheric bacteria. However, there is lot more to be explored in the endophytic world. Chapter 15 is focused on multi-dimensional utility of an important PGPR, *Pseudomonas fluorescence*. The chapter provides in detail the mechanism of action of *P. fluorescence* in plant growth promotion and biocontrol of phytopathogens. Plant pathogenic nematodes such as *Meloidogyne* spp. are one of the most economically destructive pests of a wide variety of crops and are pandemic. Chapter 16 discusses the use of bacterial

and fungal antagonists in management of nematode infestation. It is highlighted that use of local or indigenous biocontrol strains will be more suitable to manage the nematode infections. Chapters 17, 18 and 19 provide an overview of the use of PGPM for sustainable agriculture. Shortcomings due to which the bioinoculants are lagging behind are also discussed. These chapters also mention the improvements that need to be made to develop confidence amongst the farmers for the use of bioinoculants. Authors also give an insight for future research in the field.

Largely, the book is an admirable work in the field of agricultural sustainability. The topics covered present a multidisciplinary approach in solving various agricultural problems related to yields, quality of produce, phytopathogens, bioremediation and stress management in an ecofriendly manner. The only blemish is that the chapters may have been better organized and repetition could have been avoided. Overall we would recommend this book as a valuable reference for researchers working in the field of plant-microbe interactions and development of bioinoculants. The book can also be useful for the industry people and education institutes related to agriculture, soil microbiology and biotechnology.

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Sachin M. Vyavahare

**Mathematical Formulae with Worksheets: An Essential Guide for XI and XII Standard Students.** Sachin M. Vyavahare. Notion Press, Chennai. 2016, xx + 184 pp. Price: Rs 225, ISBN: 9789386009876

*The Times of India* carried an article on 9 May 2015, bearing the caption 'Delhi students weak in maths: NCERT survey'. On 14 March 2016, it carried an article 'Very lengthy CBSE mathematics paper stumps students'. A number of students find mathematics to be a difficult subject. Nonetheless, it may not be an exaggeration to say that basic knowledge of mathematics is essential for survival in the present technology-driven world. In fact, mathematics invades, pervades and integrates subjects such as physics, chemistry, economics, accounting, finance, research, management and analytics. The Italian astronomer-physicist-mathematician-philosopher Galileo Galilei once said, 'Mathematics is the language in which God has written the universe'.

Formulae are the cornerstone of mathematics. The book under review dwells on scientific methods which will help the learner in comprehending, learning and recalling several formulae in mathematics. In the initial pages of the book, Sachin Vyavahare has explained that there are *three* basic formulae in trigonometry and *all* the other formulae in trigonometry (for instance, double-angle formulae, triple-angle formulae, half-angle formulae, factorization formulae, de-factorization formulae) can be derived from the *three* basic formulae only! The book explains that there are some formulae in mathematics which have to be applied from left-hand-side to right-hand-side, some have to be applied from

right-hand-side to left-hand-side and others which have to be applied using either of the aforesaid methods. He has classified formulae into groups and focused on the root formula in each group from which several other formulae can be derived. The book thus helps the reader in establishing connections between formulae which appear to be different and not-related to each other. After a careful reading of the magnum opus under review, the reader will be able to join the formulae in the different branches of mathematics, viz. arithmetic, trigonometry, algebra, geometry, coordinate geometry, conics, plane, probability, vectors, complex numbers, boolean algebra, calculus and statistics. The book contains several mnemonics (such as, the derivatives of all c's are negative, i.e. the derivatives of cos, cot, cosec, and their inverse are negative) which will prove to be very helpful in remembering and recalling formulae in mathematics. The book begins from the basics and gradually moves to higher levels of mathematics.

The book has been effectively divided into four parts. The first part contains twenty-seven chapters. The second part contains twenty-one worksheets which help the reader in gauging his/her understanding of the concepts covered in the first part. The third part contains nineteen chapters and the fourth part contains nineteen worksheets. The book explains concepts such as conterminal angles, quadrantal angles, sexagesimal system, radian measure (also known as circular system), root mean square deviation, Napier's analogies, probability mass function, cumulative density function, contrapositive statements and inverse statements.

The book attempts to drive some basic points into the mind of its reader. For instance, the second chapter contains a fundamental point:  $\cos \theta$  is the horizontal distance and  $\sin \theta$  is the vertical distance of the point on the unit circle. The chapter contains a method which will help the students learn the values of  $\sin \theta$  and  $\cos \theta$  (for  $\theta = 0^\circ, 30^\circ, 45^\circ, \dots$ ). The sixth chapter dissects the two point form, slope point form, slope intercept form, double intercept form, normal form and the general form equations of the straight

line. The seventh chapter contains a comparative study of parabola, ellipse and hyperbola. The sixth, seventh and the eighth chapter of the third part of the book focus on three-dimensional geometry. In the seventeenth chapter (in part three) differential equations have been explained in great detail.

The beauty of the work under review is the fact that its author has been able to convert mathematics into a highly engaging, interesting and eye-opening game. The book is reader friendly because it is visual in nature and will undoubtedly help the reader in developing his/her cognitive skills. The book will be helpful to students enrolled in the eleventh and twelfth standards.

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**The Marvel Plant of Meghalaya: *Zanthoxylum acanthopodium* DC.** H. K. Sharma and K. Zaman (eds). LAP Lambert Academic Publishing, Bahnhofstraße 28,66111 Saarbrücken, Deutschland/Germany. 2016. 104 pp. Price: €49,90. ISBN: 978-3-659-88413-9

Nature is the most diversified hub for various kinds of biochemicals as phytoconstituents. Nature also carries out the various reactions between these constituents with maximum degree of accuracy.

The practice of aboriginal medicine is facing threats due to urbanization and colonization. In spite of all these, the resource of traditional medicine and their utility is still prevailing. To bring out more specificity with less adverse effect, various studies are carried out at different academic, research and industrial levels with innovations.

The book *The Marvel Plant of Meghalaya: Zanthoxylum acanthopodium* DC is comprised of a total of ten chapters and each chapter is written by different author(s). This book highlights various information regarding the plant *Zanthoxylum acanthopodium* DC, its prospective uses as antibacterial, antifungal, antioxidant, hepatoprotective, insecticidal, anticancer, muscle relaxant, and pain reliever. This book is written in a very simple manner with scientific explanation. It serves as a concise informative reference book. Each chapter of the book describes the various pharmacological activities. It emphasizes on the various parts of the plant used for extraction, methods of extraction and solvents used for the extraction. The various analytical techniques such as TLC, HPTLC, FTIR are performed for the different extracts. This book also highlights the significance of the plant *Zanthoxylum acanthopodium* DC in relevance to its ethnobotany, photochemistry and biological activity.

The knowledge regarding the various uses of this plant explained in this book can be used by the postgraduate students, researchers of pharmacy and photochemistry background. The educators and teachers can also use this book for reference purpose and for guiding the students.

The book under review would also serve as a resource for the researchers to further elucidate and target the main compounds and their optimization.

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