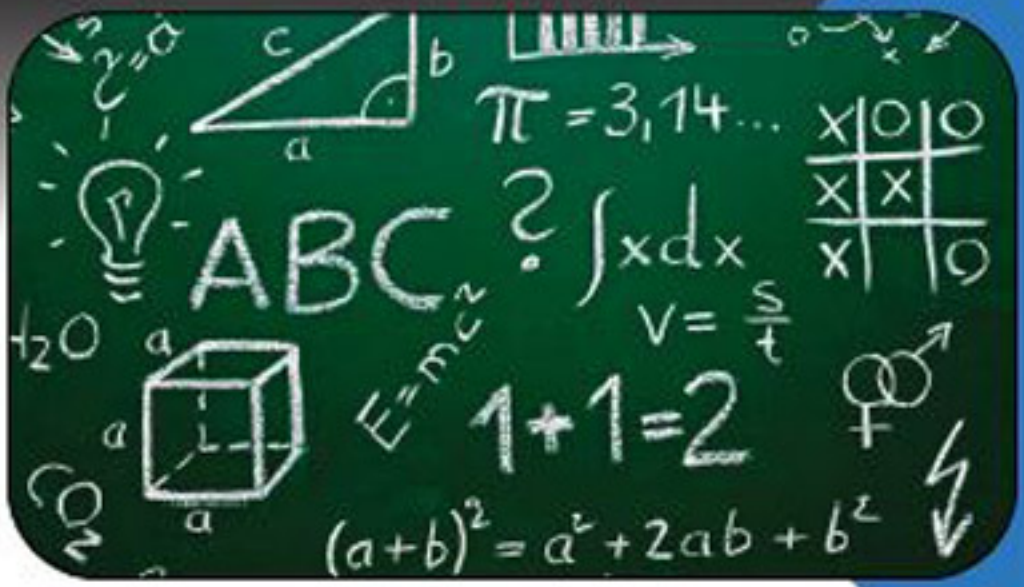
SEMESTER-I

FIRST YEAR DIPLOMA
Engineering and Technology

MSBTE's I SCHEME

BASIC MATHEMATICS



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NIRALI PRAKASHAN
ADVANCEMENT OF KNOWLEDGE

A Text Book of

BASIC MATHEMATICS

Semester - I

First Year Diploma in Engineering and Technology

As Per MSBTE's 'I' Scheme Revised Syllabus 2017 - 18

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Preface

We feel great pleasure in presenting this book on **Basic Mathematics** for Semester – I of Diploma Engineering Covering the latest syllabus prescribed by **MSBTE for I-scheme**.

The book consists of eleven chapters. Each chapter is in accordance to the prescribed syllabus.

Keeping in mind the time limit of the semester and the difficulty level of students, we have included large number of varied solved problems. This will help students to know the trend of the questions asked in real examination. To enhance their learning, every sub-topic is provided with logically arranged exercises. It is our humble request to students that they should solve each and every exercise at least once. This will not only boost your interest in Mathematics but also enhance confidence in your work methodology.

If you wish to get high score on Mathematics, merely buying this book will not help. You have to work hard, smart and regular

Remember, there is no magic formula to become virtuoso overnight. You have to work diligently. "There are no short-cuts to success."

All valuable suggestions for the enrichment of the book will be highly well-comed and gratefully acknowledged.

Special thanks go to Shri Pradeep K. Furia of M/s Nirali Prakashan for his willingness and co-operation in high standard production of a book.

We are indeed thankful to our colleagues Mr. Shashikant Patel, Mr. Raje and Mr. Jayanth Dedhia for carefully reading the entire manuscript and offering constructive suggestions.

Lastly but not least we are also thankful to Mr. Paras Rambhia and Riddhi-Hardik Vira of Decent Typesetters for their excellent computer typesetting and cover designing work.

We shall deeply appreciate your responses in relation to any printing error or any innovative suggestions to improve the quality of the presentation in this book.

Authors

About this book

This book is designed specifically for two purposes :

(1) To cover up the entire latest syllabus prescribed by MSBTE for I-Scheme.

(2) To boost students interest in the Mathematics through careful selection of problems relevant to their mental level of understanding.

Although the mathematics is a difficult, it is at the same time very learnable. There is no magic to master it overnight.

Mathematics can be mastered through hard work, analytical thought and by training yourself to think unlike the Author. Exercises are designed to prompt you to think like the Author.

Practice illustrative problems first by writing steps of solution using pen and paper. Don't just read this book – study it, scrutinize it! In short, for the next four months, this book should be a part of your life.

Knowing how the problems are solved and the author think in the process of solving problems will give you insight into the subject and significantly enhance your confidence in mathematics. The more you practice, the more you understand it. This will enable you enjoy every examination taken by college or board or any agency.

Remember!

- Only way to boost confidence is practice! practice!! and practice!!!
- Each chapter has been carefully designed followed by practice exercises to keep your interest alive.
- Every illustrative example is self-explanatory.
- In each chapter, past years MSBTE Question Papers Problems are provided to make you aware of the nature of problems asked in MSBTE examinations.
- Regular use of this book will reinforce you learning skills, critical thinking skills and organizational skills etc.

We hope you will enjoy this book the way we enjoyed making it.

Good Luck!

Authors

Syllabus

Unit	Major Learning Outcomes (In cognitive domain)	Topics and Sub-topics
Unit - I Algebra	1a. Solve the given simple problem Algebra based on laws of logarithm. 1b. Calculate the area of the given triangle by determinant method. 1c. Solve given system of linear equations using matrix inversion method and by Cramer's rule. 1d. Obtain the proper and improper partial fraction for the given simple rational function.	1.1 Logarithm: Concept and laws of logarithm. 1.2 Determinant and matrices a. Value of determinant of order 3×3 b. Solutions of simultaneous equations in three unknowns by Cramer's rule. c. Matrices, algebra of matrices, transpose adjoint and inverse of matrices. Solution of simultaneous equations by matrix inversion method. d. Types of partial fraction based on nature of factors and related problems.
Unit - II Trigonometry	2a. Apply the concept of Compound angle, allied angle and multiple angles to solve the given simple engineering problem(s). 2b. Apply the concept of Sub-multiple angle to solve the given simple engineering related problem(s). 2c. Employ concept of factorization and de-factorization formulae to solve the given simple engineering problem(s). 2d. Investigate given simple problems utilizing inverse trigonometric ratios.	2.1 Trigonometric ratios of Compound, allied, multiple and sub-multiple angles (without proofs) 2.2 Factorization and de-factorization formulae (without proofs) 2.3 Inverse trigonometric ratios and related problem. 2.4 Principle values and relation between trigonometric and inverse trigonometric ratio.
Unit - III Coordinate Geometry	3a. Calculate angle between given two straight lines. 3b. Formulate equation of straight lines related to given engineering problems. 3c. Identify perpendicular distance from the given point to the line. 3d. Calculate perpendicular distance between the given two parallel lines.	3.1 Straight line and slope of straight line. a. Angle between two lines. b. Condition of parallel and perpendicular lines. 3.2 Various forms of straight lines. a. Slope point form, two point form. b. Two points intercept form. c. General form. d. Perpendicular distance from a point on the line. e. Perpendicular distance between two parallel lines.

Unit - IV Mensuration	4a. Calculate the area of given triangle and circle. 4b. Determine the area of the given square, parallelogram, rhombus and trapezium. 4c. Compute surface area of given cuboids, sphere, cone and cylinder. 4d. Determine volume of given cuboids, sphere, cone and cylinder.	4.1 Area of regular closed figures, Area of triangle, square, parallelogram, rhombus, trapezium and circle. 4.2 Volume of cuboids, cone, cylinders and sphere.
Unit - V Statistics	5a. Obtain the range and coefficient of range of the given grouped and ungrouped data. 5b. Calculate mean and standard deviation of discrete and grouped data related to the given simple engineering problem. 5c. Determine the variance and coefficient of variance of given grouped and ungrouped data. 5d. Justify the consistency of given simple sets of data.	5.1 Range, coefficient of range of discrete and grouped data. 5.2 Mean deviation and standard deviation from mean of grouped and ungrouped data, weighted means. 5.3 Variance and coefficient of variance. 5.4 Comparison of two sets of observation.

Teaching and Examination Scheme :

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	100
4	2	-	6	70	30*	-	-	

(*): Under the theory PA, Out of 30 marks, 10 marks are for micro-project assessment to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for the assessment of the cognitive domain LOs required for the attainment of the COs.

Suggested Specification Table for Question Paper Design :

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
I	Algebra	20	02	08	10	20
II	Trigonometry	18	02	08	10	20
III	Coordinate Geometry	08	02	02	04	08
IV	Mensuration	08	02	02	04	08
V	Statistics	10	02	05	07	14
	Total	**64**	**10**	**25**	**35**	**70**

Legends : R=Remember, U=Understand, A=Apply and above (Bloom's Revised taxonomy)

Note : This specification table provides general guidelines to assist student for their learning and to teachers to teach and assess students with respect to attainment of LOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary from above table.

Contents

UNIT - I : ALGEBRA

UNIT - V : STATISTICS

UNIT - I

ALGEBRA

(20 MARKS)

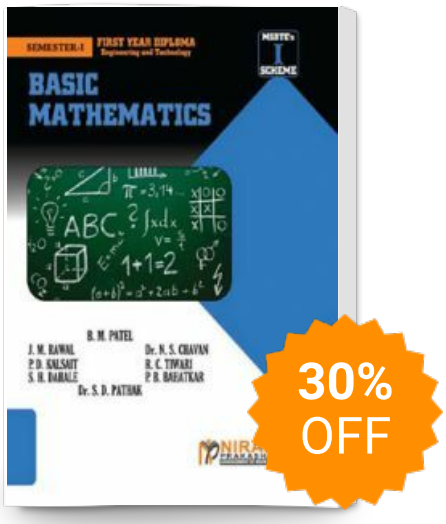
Chapter 1 : Logarithm

Chapter 2 : Determinants

Chapter 3 : Matrices

Chapter 4 : Partial Fractions

Basic Mathematics



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