

$$\begin{aligned} & \frac{1}{x^2} \left(\frac{1}{x} - \frac{1}{x^2} \right) = \frac{1}{x^3} - \frac{1}{x^4} \\ & \frac{1}{x^2} \left(\frac{1}{x} - \frac{1}{x^2} \right) = \frac{1}{x^3} - \frac{1}{x^4} \end{aligned}$$

Series Editor

$$\frac{1}{x^2} \left(\frac{1}{x} - \frac{1}{x^2} \right) = \frac{1}{x^3} - \frac{1}{x^4} + \frac{1}{x^5} - \frac{1}{x^6} + \frac{1}{x^7} - \frac{1}{x^8} + \dots$$

$$\frac{1}{x^2} \left(\frac{1}{x} - \frac{1}{x^2} \right) = \frac{1}{x^3} - \frac{1}{x^4} + \frac{1}{x^5} - \frac{1}{x^6} + \frac{1}{x^7} - \frac{1}{x^8} + \dots$$

ring

ring

ring



ringer

Preface

The first part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The second part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The third part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The fourth part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The fifth part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The sixth part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The seventh part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The eighth part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The ninth part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$. The tenth part of the book is devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. It is shown that the function $f(x)$ is continuous and differentiable at the point $x = 1$.

$$\frac{1}{x^2} + \frac{1}{x^3} + \frac{1}{x^4} + \dots + \frac{1}{x^k} + \frac{1}{x^{k+1}} + \frac{1}{x^{k+2}} + \dots + \frac{1}{x^{k+n}} + \dots$$

$$\frac{1}{x^k} \left(1 + \frac{1}{x} + \frac{1}{x^2} + \dots \right)$$

$$\frac{1}{x^k} \cdot \frac{1}{1 - \frac{1}{x}}$$

Series Preface

The series consists of 10 volumes, each containing a different set of problems. The problems are arranged in increasing order of difficulty. The first volume contains the easiest problems, and the tenth volume contains the most difficult. The problems are designed to be challenging but solvable. The solutions are provided at the end of each volume. The series is intended for students who are interested in mathematics and want to challenge themselves. The problems cover a wide range of topics, including algebra, geometry, trigonometry, and calculus. The series is a valuable resource for students who want to improve their problem-solving skills and prepare for advanced mathematics courses.

Contents

1	Fundamental Characteristics of Moisture Transport, Diffusion, and the Moisture-Induced Damages in Polymeric Materials in Electronic Packaging - - - - -	1
2	Mechanism of Moisture Diffusion, Hygroscopic Swelling, and Adhesion Degradation in Epoxy Molding Compounds - - - - -	17
3	Real-Time Characterization of Moisture Absorption and Desorption - - - - -	31
4	Modeling of Moisture Diffusion and Whole-Field Vapor Pressure in Plastic Packages of IC Devices - - - - -	47
5	Characterization of Hygroscopic Deformations by Moiré Interferometry - - - - -	61
6	Characterization of Interfacial Hydrothermal Strength of Sandwiched Assembly Using Photomechanics Measurement Techniques - - - - -	71
7	Hygroscopic Swelling of Polymeric Materials in Electronic Packaging: Characterization and Analysis - - - - -	81
8	Modeling of Moisture Diffusion and Moisture-Induced Stresses in Semiconductor and MEMS Packages - - - - -	97
9	Methodology for Integrated Vapor Pressure, Hygroswelling, and Thermo-mechanical Stress Modeling of IC Packages - - - - -	111

10	Failure Criterion for Moisture-Sensitive Plastic Packages of Integrated Circuit (IC) Devices: Application and Extension of the Theory of Thin Plates of Large Deflections - - - -	4
11	Continuum Theory in Moisture-Induced Failures of Encapsulated IC Devices - - - - -	10
12	Mechanism-Based Modeling of Thermal- and Moisture-Induced Failure of IC Devices - - - - -	10
13	New Method for Equivalent Acceleration of IPC/JEDEC Moisture Sensitivity Levels - - - - -	10
14	Moisture Sensitivity Level (MSL) Capability of Plastic-Encapsulated Packages - - - - -	4
15	Hygrothermal Delamination Analysis of Quad Flat No-Lead (QFN) Packages - - - - -	7
16	Industrial Applications of Moisture-Related Reliability Problems - - - - -	10
17	Underfill Selection Against Moisture in Flip Chip BGA Packages - - - - -	4

Contributors

E.K.L. Chan

A. Chandra

L. Cheng

H.B. Chew

C.Q. Cui

H. Fan

X.J. Fan

J.K. Fauty

T.F. Guo

B. Han

Y. He

C. Jang

S.W.R. Lee

Y. Liu

B. Michel

M. Pecht

D.G. Yang \triangleright $\frac{1}{2} \frac{d}{dt} \int_{\Omega} |\nabla \phi|^2 dx + \int_{\Omega} \phi \Delta \phi dx = \int_{\Omega} \phi \Delta \phi dx + \int_{\Omega} \phi \Delta \phi dx$

C.A. Yuan \triangleright $\frac{1}{2} \frac{d}{dt} \int_{\Omega} |\nabla \phi|^2 dx + \int_{\Omega} \phi \Delta \phi dx = \int_{\Omega} \phi \Delta \phi dx + \int_{\Omega} \phi \Delta \phi dx$

M.M.F. Yuen \triangleright $\frac{1}{2} \frac{d}{dt} \int_{\Omega} |\nabla \phi|^2 dx + \int_{\Omega} \phi \Delta \phi dx = \int_{\Omega} \phi \Delta \phi dx + \int_{\Omega} \phi \Delta \phi dx$

G.Q. Zhang