MECHANICS

[For B.Sc. Students of Mathematics, Physics and Engineering Courses of All Indian Universities]

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PREFACE TO THE SIXTH REVISED EDITION

The work has been revised completely without changing its inherent character that was received well by the students and professors so long. A special feature of revision is an elaboration of solutions of the illustrative examples to make the book for self-study.

Constructive criticism is most welcome.

P. DURAIPANDIAN

PREFACE TO THE FIRST EDITION

The book treats the subject systematically, using vectors in accordance with the present requirement. It is essential that the reader should have a proper knowledge of the fundamentals of vector algebra. The book caters to the needs of undergraduates of Mathematics, Physics and Engineering courses of all Indian Universities.

A particular feature of the book is that the important results of the subject are pulled out and presented as independent pieces under the caption BOOK WORKS. The REMARKS appended to them play an essential role in that they provide incidental additional facts aiming at a near perfection. The book includes an abundance of examples and pictures, as well as a good selection of exercises most of which are provided with hints.

Lack of proper understanding of the fundamental concepts of Mechanics, makes many students dislike Mechanics. Bearing this in mind, the fundamental concepts are presented, comparatively with more possible details, in such a manner that even of first reading of them will give the reader sufficient mastery over them. This feature will commend the book to the students.

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CONTENTS

INTRODUCTION

1. MECHANICS

Mechanics is the science which deals with the effects of forces on material bodies. Under the influence of forces, a body may be in motion or in rest.

Dynamics. Dynamics is the science which deals with the motion of particles or bodies under the influence of forces. *Kinematics* is that aspect of dynamics which deals with the motion without reference to the forces producing it.

Statics. Statics is the science which deals with the conditions for lack of motion under given forces.

The way in which statics and dynamics coalesce into mechanics, it suggests one to learn mechanics in the coalesced form. However, some universities prescribe statics and dynamics separately for studies under semester system. For such syllabi, the following classification will meet with their requirement.

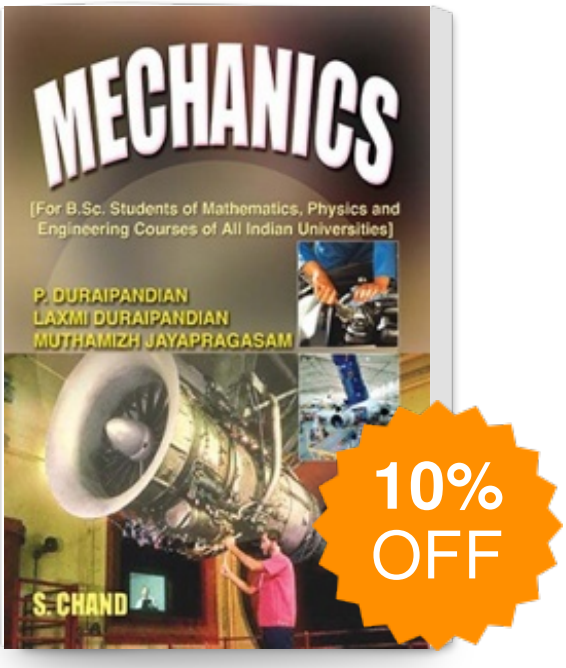
STATICS

Chapter 2 : Forces
Chapter 3 : Equilibrium of a particle
Chapter 4 : Forces on a rigid body
Chapter 5 : Reduction of forces on a rigid body
Chapter 6 : Centre of mass
Chapter 7 : Stability of equilibrium
Chapter 8 : Virtual work
Chapter 9 : Hanging strings

DYNAMICS

Chapter 1 : Kinematics
Chapter 2 : Forces (sections 2.1, 2.1.1, 2.2)
Chapter 10 : Rectilinear motion under constant forces
Chapter 11 : Work, energy and power
Chapter 12 : Rectilinear motion under varying forces
Chapter 13 : Projectiles
Chapter 14 : Impact
Chapter 15 : Circular motion
Chapter 16 : Central orbits
Chapter 17 : Moment of inertia
Chapter 18 : Two dimensional motion of a rigid body
Chapter 19 : Theory of dimensions

Mechanics



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