

Contents

	PAGE
<i>Preface</i>	v
<i>Glossary of Symbols</i>	xi
I <i>Elementary Force Theory</i>	1
Introduction; Force of gravity; Tension in a string; Contact forces; Force diagrams	
II <i>Resultant of Two Forces</i>	14
Parallelogram law; Parallel forces; Step-by-step reduction of forces	
III <i>Components of a Force</i>	28
Components; Multiplication by a trigonometric ratio; Projections; Equivalent force systems; Finding the resultant	
IV <i>Problem Solving (Particles at Rest)</i>	46
The "balancing" of components; Triangle law and Lami's theorem	
V <i>Friction Law and Hooke's Law</i>	55
Friction law; Hooke's law	
VI <i>Moments</i>	68
VII <i>Problem Solving (Bodies at Rest)</i>	75
"Resolving" and "taking moments"; Bodies acted on by three forces	
VIII <i>Theory of Coplanar Forces</i>	81
Reduction of coplanar forces; Reduction of parallel forces; Theory of couples	
IX <i>Introductory Vector Theory</i>	99
Vector Algebra; Vectors and ratio	
X <i>Centre of Gravity</i>	111
Geometric methods; Particles and composite bodies; Use of the calculus	

XI	<i>Constant Acceleration</i> Constant speed motion; Constant acceleration motion	129
XII	<i>Projectiles</i> Introduction; Variables and equations; Problem solving; Envelope of safety; Further projectile theory	146
XIII	<i>Velocity Vector</i> Component of velocity; Crossing a river; Aircraft navigation; Relative velocity; Acceleration vector; Motion in a circle	161
XIV	<i>Variable Acceleration</i> Use of the differential calculus; Use of the integral calculus; Graphical methods	184
XV	<i>Simple Harmonic Motion</i> Introduction; Alternative description of S.H.M.	192
XVI	<i>Newton's Laws of Motion</i> Newton's First Law; Newton's Second Law; Dynamics of S.H.M.	202
XVII	<i>Work, Power and Energy</i> Work and power; Power of vehicles; Energy	213
XVIII	<i>Circular Motion</i> Motion in a horizontal circle; Cornering vehicles; Motion in a vertical circle	226
XIX	<i>Restitution</i> Impact on a fixed plane; Direct impact of two spheres; Oblique impact of two spheres	242
XX	<i>Momentum and Impulses</i> Momentum; Impulses; Conservation of momentum	256
XXI	<i>Theory of Rotating Bodies</i> Moments of inertia; Parallel and perpendicular axes; Conservation of energy; Angular acceleration; The compound pendulum	269

XXII	<i>Cartesian Vectors</i> Introduction; Change of base; Components in any direction	303
XXIII	<i>Vectors and Kinematics</i> Linear motion; Motion in a circle; Projectiles; Differentiation of a vector	317
XXIV	<i>Vectors and Co-ordinate Geometry</i> Lines; Lines in space; Planes	327
	<i>Appendix</i> Examination Technique	342
	<i>Index</i>	345