

# CONTENTS

---

Author's foreword .....	5
<b>1 INTRODUCTION .....</b>	<b>6</b>
<b>2 MECHANICS OF SOLID BODIES .....</b>	<b>7</b>
2.1 Fundamentals of Kinematics .....	7
2.2 Fundamentals of Dynamics .....	9
Newton's laws, Torque, Friction, Uniform circular motion, Work, Power, Energy, Efficiency, Elasticity	
<b>3 HARMONIC MOTION, WAVE MOTION AND SOUND .....</b>	<b>13</b>
<b>4 NEWTON'S LAW OF UNIVERSAL GRAVITATION.....</b>	<b>16</b>
<b>5 MECHANICS OF FLUIDS .....</b>	<b>17</b>
Pressure, Pascal's Principle, Archimedes' Principle, Internal friction and viscosity, Liquid flowing in a tube, Surface tension and related phenomena	
<b>6 PRINCIPLES OF THERMODYNAMICS .....</b>	<b>21</b>
Temperature, Pressure, Ideal gas law and thermodynamic processes, Thermal expansion, Heat and heat capacity, First and Second law of thermodynamics, Air humidity	
<b>7 THEORY OF ELECTRICITY.....</b>	<b>27</b>
Coulomb's law, Properties of an electric field, Capacitance and capacitor, Electric current and Kirchhoff's laws, Ohm's law, conductivity and resistance, Electrical work and power, Thermoelectric phenomena, Electric currents in electrolytes, Semiconductors,	
<b>8 MAGNETISM AND ELECTROMAGNETISM.....</b>	<b>34</b>
Force acting between two magnetic poles, Magnetic flux and magnetic flux density, Magnetising force, Magnetic field due to a straight wire or coil, Magnetic force exerted on a conductor, Magnetic force between two parallel conductors, Magnetic deflection of a moving electron, Voltage induced in a straight wire, Voltage induced by change of current in a solenoid, Alternating current, Effective current and voltage, Reactance and impedance, AC transformer, Measuring instruments,	
<b>9 OPTICS .....</b>	<b>41</b>
9.1 Basic terms .....	41
Optical medium (basic statements), Speed of light, Reflection and refraction of light,	
9.2 Optical imaging by lenses and mirrors .....	43
The human eye and simple optical instruments.	
9.4 Wave properties of light.....	49
Interference of light, Diffraction of light, Polarised light,	
9.5 An introduction to photometry .....	51
<b>10 THEORY OF RELATIVITY.....</b>	<b>53</b>

<b>11 PRINCIPLES OF QUANTUM, ATOMIC AND NUCLEAR PHYSICS.....</b>	5
11.1 Introduction .....	5
Basic properties of atoms, Wave properties of particles, Wave function	
11.2 Properties of electron shells .....	5
Quantum mechanics model of the hydrogen atom, Spectral analysis, Origin of X-rays,	
Photoelectric effect, Compton scatter, Momentum of a photon	
11.3 The atomic nucleus.....	6
Atomic nucleus, Nuclear binding energy, Nuclear reactor, Radioactivity, Radioactive transmutation law,	
Main applications of ionising radiation and radionuclides, Accelerators	
11.4 Detection and measurement of ionizing radiation .....	6
<b>12 APPENDICES.....</b>	6
12.1 Solutions of problems .....	6
12.2 Multiple-choice test questions .....	6
12.3 Reading numerical expressions .....	7
12.4 Mathematical operators and symbols .....	7
12.5 Mathematical expressions .....	7
12.6 Reading some formulas.....	7