

# Foreword

*“Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.”*

— *author unknown*

Every one of the **guide** series is a *fisherman* book – *i.e.*, they teach *concepts*. Each step in the *concept* is thoroughly explained and illustrated further by *worked examples*.

The **effective guide** series is best suited for beginners. Once, the students are more familiar with the subject matter; they can then progress to the **critical guide** series and prepare for the actual exams. For certain schools, teachers like to broaden their students’ minds by teaching further and going beyond the actual exam syllabus *per se*. For this, students are best advised to use the **complete guide** series.

Once the exams draw near, students will find the *guides* a little too cumbersome to refer. They should then now use the *quick reference fisherman* books, *i.e.*, books that are specially *distilled* to help prepare students taking the actual exams (quickly). These books provide the **focus** to *all* exam concepts. For students working on *complete guides* previously, they will need the equivalent **essence** extended series.

Knowing how to use the fishing rod, line, hook and bait to fish is not enough; one still needs the *encyclopedia of fish*, *i.e.*, the **learn-by-example (LBE)** series – **MCQ** and **Questions**. Out there, there will be many kinds of fish; each requires slightly different method to catch, *i.e.*, capturing a shark definitely demands a different technique from that of catching a salmon or for that matter, a catfish. In the same way, one must get used to the various question-types so that one can confidently score. The *LBE* series provides training up to ordinary exam-standards. Again, for students going beyond, the **challenging LBE** series is a must-have.

*“Using the right tool at each appropriate stage of exams preparation saves time. No point trying to pretend that a simple screwdriver would suffice at all situations.”*

# Table of Contents

## SECTION I: GENERAL PHYSICS

<b>1</b>	<b>Physical quantities and units</b>	<b>1-1</b>
1.1	Measurement of length and time	
<b>2</b>	<b>Kinematics</b>	<b>2-1</b>
2.1	Speed, velocity and acceleration	
2.2	Graphical Analysis of Motion	
2.3	Free-fall	
<b>3</b>	<b>Dynamics</b>	<b>3-1</b>
3.1	Motion	
3.2	Friction	
<b>4</b>	<b>Mass, weight and density</b>	<b>4-1</b>
4.1	Mass and weight	
4.2	Density	
<b>5</b>	<b>Turning effect of forces</b>	<b>5-1</b>
5.1	Moments	
5.2	Centre of gravity	
5.3	Stability	
<b>6</b>	<b>Energy, work and power</b>	<b>6-1</b>
6.1	Energy conversion and conservation	
6.2	Work	
6.3	Power	

## SECTION II: THERMAL PHYSICS

<b>7</b>	<b>Transfer of thermal energy</b>	<b>7-1</b>
7.1	Conduction	
7.2	Convection	
7.3	Radiation	
<b>8</b>	<b>Temperature</b>	<b>8-1</b>
8.1	Principles of thermometry	
8.2	Liquid-in-glass thermometers	
<b>9</b>	<b>Thermal properties of matter</b>	<b>9-1</b>
9.1	Melting, boiling and evaporation	

## SECTION III: WAVES

<b>10</b>	<b>General wave properties</b>	<b>10-1</b>
10.1	Describing wave motion	
10.2	Wave terms	
10.3	Transverse and longitudinal waves	
<b>11</b>	<b>Light</b>	<b>11-1</b>
11.1	Reflection of light	
11.2	Refraction of light	
11.3	Thin converging lenses	
<b>12</b>	<b>Electromagnetic spectrum</b>	<b>12-1</b>
12.1	Properties of electromagnetic waves	
<b>13</b>	<b>Sound</b>	<b>13-1</b>
13.1	Sound waves	
13.2	Speed of sound	

## SECTION IV: ELECTRICITY AND MAGNETISM

<b>14</b>	<b>Static electricity</b>	<b>14-1</b>
14.1	Principles of electrostatics	
<b>15</b>	<b>Current electricity</b>	<b>15-1</b>
15.1	Electric current	
15.2	Electromotive force	
15.3	Potential difference	
15.4	Resistance	
<b>16</b>	<b>D.C. circuits</b>	<b>16-1</b>
16.1	Current and potential difference in circuits	
16.2	Series and parallel circuits	
<b>17</b>	<b>Practical Electricity</b>	<b>17-1</b>
17.1	Electric power and energy	
17.2	Dangers of electricity	
17.3	Safe use of electricity in the home	
<b>18</b>	<b>Magnetism</b>	<b>18-1</b>
18.1	Laws of magnetism	
18.2	Magnetic properties of matter	
<b>19</b>	<b>Electromagnetic Induction</b>	<b>19-1</b>
19.1	Principles of electromagnetic induction	
19.2	The a.c. generator	
19.3	The transformer	

## SECTION V: NUCLEAR PHYSICS

<b>20</b>	<b>Nucleus</b>	<b>20-1</b>
20.1	Composition of a nucleus	
20.2	Proton number and nucleon number	
20.3	Nuclide notation	
<b>21</b>	<b>Radioactivity</b>	<b>21-1</b>
21.1	Detection of radioactivity	
21.2	Characteristics of the three types of emission	
21.3	Nuclear reactions	
21.4	Half-life	
21.5	Uses of radioactive isotopes including safety precautions	
<b>22</b>	<b>Prepare for exams</b>	<b>22-1</b>
22.1	Summary of key quantities, symbols and units	
22.2	Glossary of terms used in physics papers	