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**K'sagar's  
General Science**

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**By - Ravi Bhushan**



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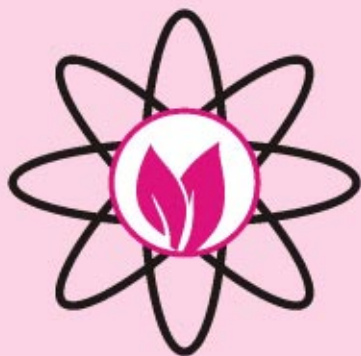
**Excellent quality of source material,  
up to mark and updated as per the  
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# K'Sagar's

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# General Science

| **Ravi Bhushan** |

**Comprehensive, Extensive and fully-updated  
for Aspirants of Almost all Competitive exams  
like UPSC, MPSC, CSAT-IAS, NDA, CDS,  
State PCS, SSC, Railway, NRA-CET etc.**



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## PREFACE

Dear friends,

This book of General Science is being remained very popular among the aspirants of various Competitive Exams by the name of Lucent's General Science which has been published now as K'Sagar's General Science. The book has been prepared/composed on the basis of a comprehensive and rigorous observations of the trends of previous years' papers of various competitive exams like UPSC, MPSC, CSAT-IAS, NDA, CDS, State PCS, SSC, Railway etc. in a very lucid, concise and updated manners. According to the recent trends of the competitive exams General Science has become a problematic section of asking the questions because of no prescribed syllabus and an extensive coverage area. This is the reason why the aspirants of Science background also suffer and do mistakes in the science segments during the exams. This book has been compiled on the basis of NCERT books and some other standard references, manual of Science. I have tried to compose this book in such a way that even the desired aspirants of non-science background have no problems in conceptualize the book.

This book consists of five segments– (1) Physics, (2) Astronomy and Space Science, (3) Computer and Its Applications, (4) Chemistry and (5) Biology/Life Science. At the end of the contents of every segment important objective questions relevant to the corresponding topic and some previous years' questions of the Competitive Exams have been incorporated.

Every precautionary measure has been taken to compile the book error-free, however if any mistake/discrepancy is to be found then I would be regretful.

Every valuable suggestion/view/opinion of the readers/academicians/teachers would be highly appreciated.

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# C O N T E N T S

## 1. PHYSICS

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### General Physics (Mechanics)

- Quantity, Measurement and Errors
- Scalars and Vectors
- Dimensions of Physical Quantities
- Motion and Its Nature
- Free Falling Motion
- Graphical Representation of Motion
- One, Two and Three Dimensional Motion – Circular Motion, Projectile Motion
- Laws of Motion and Concept of Force- Newton's Laws of Motion
- Linear Momentum and Impulse
- Elastic and Inelastic Collision
- Rocket Motion (A System of variable mass)
- Types of Forces (Interactions)
- Frictional Force
- Centripetal and Centrifugal Forces
- Torque (Moment of Force) and Couple
- Lever
- Centre of Mass and Centre of Gravity
- Rotational Motion and Moment of Inertia
- Angular Momentum
- Equilibrium of Bodies
- Work, Power and Energy
- Gravitation and Gravity- Orbital and Escape velocity
- Geostationary Satellite
- Properties of Matter- Elasticity, Thrust and Pressure
- Law of Floatation

- Surface Tension
- Viscosity
- Simple Harmonic Motion (SHM)
- Free and Forced Oscillations.

### Sound(Acoustics)/Oscillations and Waves

- Waves Motion
- Infrasonic & Ultrasonic Waves
- SONAR, Speed of Sound
- Characteristics of Musical Sound- Loudness, Pitch, Quality & Timber
- Reflection, Refraction & Interference of Sound
- Stationary waves
- Doppler's Effect
- Sonic Booms and Shock Waves.

### Thermal Physics (Heat & Thermodynamics)

- Heat & Temperature
- Thermometry- Liquid, Gas and Clinical Thermometer
- Thermo-Couple & Pyrometer
- Thermal Expansion of Solids, Liquids & Gases
- Calorimetry
- Transmission of Heat- Conduction, Convection and Radiation
- Black body
- Kinetic Theory of gases
- Thermodynamics & Its Laws
- Entropy
- Isothermal and Adiabatic processes
- Heat Engine and Air-Conditioners.



## **Light(Optics)**

- Nature and Speed of Light
- Reflection of Light
- Plane & Spherical Mirrors
- Refraction & Total Internal Reflection of Light
- Dispersion and Interference of Light
- Diffraction and Polarisation of Light
- Nicol's Prism & Polaroid
- Human Eyes, Eye Defects (Defects of Vision)
- Optical Instruments- Camera, Microscopes & Telescopes.

## **Electricity & Magnetism**

### **Electrostatics**

- Electric charges and Fields
- Coulomb's Law & Gauss's Law
- Electric Dipole & Potential
- Capacitor/ Condenser

### **Current Electricity**

- Electric Current & Electric Cell
- Ohm's Law
- Resistance & Its Combination
- Electric Power
- Lorentz Force
- Electromagnet
- Magnetic Flux & Magnetic Fields
- Galvanometer
- Shunt
- Ammeter
- Voltmeter
- Electromagnetic Induction
- Chemical & Thermal Effect

- Alternating Current- Power factor & Wattless Current, Transformer.

## **Magnetism**

- Magnetic Field & Field Intensity (Induction)
- Magnetic Susceptibility
- Magnetic Substances- Paramagnetic, Diamagnetic & Ferromagnetic Substances
- Earth's Magnetic field.

## **Modern Physics(Atomic & Nuclear Physics)**

- Composition of Matter
- Plank's Quantum Theory
- Photoelectric Effect
- X-ray
- de-Broglie hypothesis
- Atomic Models
- Radioactivity- Nuclear Fission & Fusion
- Nuclear Reactors
- Superconductivity
- Communication System
- Modulation & Demodulation
- Antenna
- Satellite Communication.

## **Electronics (Semiconductor Physics)**

- Thermionic emission- Diode & Triode valve
- Semi-conductor- p-type & n-type
- pn-junction
- Bipolar/ Junction Transistor – pnp & npn
- Unipolar Transistor/Field Effect Transistor (FET)
- Logic Gate- OR, AND & NOT Gate
- Modern Electronic Devices

- LASER & Holography
- MASER
- Nanotechnology
- Appendix & Glossary
- Objective Questions.

## 02: ASTRONOMY AND SPACE SCIENCE

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- Development of Astronomy
- Ptolemy's Geocentric Theory
- Copernicus's Heliocentric Theory
- Kepler's Laws of Planetary Motion
- Sir Issac Newton, Herschel
- Hubble's law of Recession of Galaxies
- Doppler's Shifts
- Lemaitre's Big Bang Theory (Origin of Universe)
- Pulsating/Oscillating Theory of Universe
- Celestial Bodies- Galaxy (Including Milky Way)
- Constellation
- Stars- Their Origin and Evolution
- Neutron stars (Nova or Supernova)
- Black Holes and Chandrasekhar Limit
- Solar System- Planets and Satellites
- Sun and Celestial Bodies- Asteroids, Comets, Meteor etc
- Natural Satellite of the Earth- Moon
- Space Science and Its Development in India
- Objective Questions.

## 03 : COMPUTER AND ITS APPLICATIONS

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- Computer and Its Origin
- Development of Computer

- Various Generations of Computer
- Micro, Mini, Mainframe and Super Computers, Digital, Analogue, Hybrid, Optical and Atomic Computers
- Functions and Units of Computers
- Computer System- Hardware and Software
- Languages of Computer- Machine Code, Assembly and High Level Languages- FORTRAN, COBOL, BASIC, PASCAL, PROLOG and FORTH
- Computer Virus
- Computer Networking
- Computer Terminology- Chip, Computer Program, Compiler, CPU, Curser key, File, Data Base, Floppy Disc, Giga Byte, Hard Disc, Memory System, Operating System, Pixel, RAM, ROM, Reboot, Scanner, Touch Screen etc.
- Internet
- INTRANET
- Multimedia
- Electronic Mail (e-mail)
- Gee-mail
- Server
- Browser
- USB Port
- Hybrid Mail
- Modern Personal Communication and Computing Technologies- Mobile Device, SIM Card, Smart Phone, Black Berry, iPhone, Mobile Operating System, Mobile Charger, Storage Media, Optical disc, Bluetooth
- Global Positioning System (GPS)
- Global System for Mobile (GSM)
- Code Division Multiple Access (CDMA) Technology
- Electronic Devices/Equipments and



Services- Transmitter, Desktop, Pen-drive, Dongle, Internet banking, Mobile banking, Paytm etc.

- Objective Questions.

## 04 : CHEMISTRY

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### Physical Chemistry

- States of Matter
- Chemical Composition of Matter- Element, Compound, Mixture
- Atomic Mass Unit and Mole Concept
- Atomic Structure
- Atom & Molecule
- Fundamental & Non-Fundamental Particles, Electron, Proton, Neutron, Positron, Neutrino & pi-mesons
- Quarks & Bosons
- Atomic Model- Rutherford & Bohr's Atomic Models
- Orbit (Shell), Sub orbit (Sub shell) & Orbitals
- Electronic Configuration
- Aufbau Principle
- Quantum Numbers
- Pauli's Exclusion Principle
- Hund's Rule- Valence and Core Electrons
- Isotopes, Isobars, Isotones & Isodiaphers
- Radioactivity- alpha, beta & gamma rays
- Half Life & Mean Life Periods
- Radioactive Series
- Nuclear Energy- Nuclear Fission & Fusion
- Electronic Theory of Valency & Chemical Bonding
- Oxidation- Reduction

- Acid, Base and Salt, pH values & Buffer Solution
- Chemical Symbol, Formula & Equation
- Chemical Reaction- Change in Energy
- Metallic Corrosion
- Fermentation & Rancidity
- Galvanization
- Solution- Suspension & Colloid
- Gases Law- Boyle's Law, Charle's Law & Graham's Law
- Chemical Kinetics & Chemical Equilibrium
- Electro chemistry
- Fuels.

### Inorganic Chemistry

- Periodic Classification
- Metallurgical Operations
- Elements, Ores and their Composition
- Metals, Ores, Extraction & their Chemical Compounds
- Non-metals and their Chemical Compounds
- Man- made Substances- Cement, Mortar & Concrete, Fertilizers

### Organic Chemistry

- Hydrocarbons & Organic Compounds
- Alcoholic Beverages
- Petroleum
- Soap & Detergents
- Dyes & Polymers
- Oils, Fats & Waxes
- Plastic & Rubber
- Thermoplastic
- Fibres & Ceramics
- Explosives & Cosmetics
- Drugs & Chemicals
- Appendix & Glossary
- Objective Questions.

- Classification of Organisms
- Cytology (Cell, Its Structure and Functions)
- Cell Theory
- Chromosomes
- Structure of DNA and RNA
- Theory of Cell Division- Amitosis, Mitosis & Meiosis
- Virus and its General Characteristics
- Viral Diseases in Plants, Animals & Human beings
- Kingdom Monera- Bacteria, Its General Features, Shape and Structure
- Bacterial Diseases in Plants, Animals and Human beings
- Kingdom of Protista
- Kingdom Fungi- Useful Fungi
- Fungal Diseases in Plants, Animals and Human beings
- Lichens
- Kingdom of Plant
- Thallophyta-Algae, Its Utilities
- Bryophyta
- Tracheophyta- Pteridophyta
- Gymnosperm and Angiosperm
- Morphology of Angiosperms
- Pollination & Fertilization
- Plant Tissue
- Nutrition in Plant

- Denitrification & Photosynthesis
- Plant Hormones
- Plant Diseases- Viral, Bacterial and Fungal
- Abiotic Diseases
- Ecology & Ecosystem
- Pollution- Air Pollution, Water Pollution, Sound Pollution, Soil Pollution and Radiative Pollution
- Classification of Kingdom Animals- Oviparous and Viviparous
- Animal Tissue- Epithelium Tissue and Connective Tissue
- Blood Groups in Human beings and Rh factor
- Nutrition of Animals – Holozoic Nutrition, Parasitic Nutrition and Saprozoic Nutrition
- System of Human Body-
  - Digestive System
  - Respiratory System
  - Excretory System
  - Blood Circulatory System
  - Skeletal System
  - Endocrine System and Reproductive System
- Genetics & Organic Evolution
- Mendel's Laws and Variation in Biology
- Main Human Diseases, Symptoms and Treatment (Remedial Measures)
- Appendix & Glossary
- Objective Questions

