### Subject - English

**Book Prescribed:**
1. Flamingo
2. Vistas
3. The Invisible Man

**Publication**
N.C.E.R.T.

#### Month | Flamingo/The Invisible Man | Vistas | Reading & Writing Skills
---|---|---|---
April | • The Last Lesson  
  • My Mother at Sixty-six  
  • Lost Spring  
  • The Invisible Man (Chapter 1 - 3) |  
  • Deep Water  
  • An Elementary School Classroom in a slum  
  • The Invisible Man (Chapter 4 - 7) | • The Tiger King  
  • The Enemy | • Unseen Passage for Comprehension  
  • Letter to Editor  
  • Speech Writing  
May | • The Rattrap  
  • Keeping Quiet  
  • The Invisible Man (Chapter 8 - 10) |  
  • Indigo  
  • A Thing of Beauty | • Should Wizard Hit Mommy?  
  • On the Face of It | • Advertisements  
  • Articles Writing  
July | • The Invisible Man (Chapter 11 - 17) |  
  • The Rattrap | • Evans Tries an O-Level  
  • Keeping Quiet | • Letters of Complaint  
  • Hit Mommy? | • Posters  
  • Memories of Childhood | • Applications for Job  
Aug | • Going Places  
  • Aunt Jennifer's Tigers  
  • The Invisible Man (Chapter 18 - 20) |  
  • Indigo  
  • A Thing of Beauty | • On the Face of It  
  • Should Wizard Hit Mommy? | • Letters of Enquiry/Business Letters  
  • Letters of Enquiry/Business Letters  
  • Invitations & their Replies  
  • Revision
Nov & Dec | • The Invisible Man (Chapter 21 - 28) |  
  • The Invisible Man (Chapter 21 - 28) | • Revision | • Invitation & their Replies  
  • Revision  
Jan & Feb | • Revision |  
  • Revision | • Revision | • Revision  

**Total Periods : 180**

### Subject - Physics (042)

**Book Prescribed:**
*N.C.E.R.T. Physics*

**Distribution of Marks:**
- **Theory** : 70
- **Practical** : 30
- **Total** : 100

**One Paper** | **Time : 3 Hours** | **Total Periods : 180** |
---|---|---|
Unit I | Electrostatics | 08 |
Unit II | Current Electricity | 07 |
Unit III | Magnetic effect of current & Magnetism | 08 |
Unit IV | Electromagnetic Induction and Alternating current | 08 |
Unit V | Electromagnetic Waves | 03 |
Unit VI | Optics | 14 |
Unit VII | Dual Nature of Matter | 04 |
Unit VIII | Atoms and Nuclei | 06 |
Unit XI | Electronic Devices | 07 |
Unit X | Communication Systems | 05 |

**Total** | | 70 |
April Unit I: Electrostatics:  (Periods 22)
- Electric Charges; Conservation of charge, Coulomb's law-force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.
- Electric field, electric field due to a point charge, electric field lines; electric dipole, electric field due to a dipole; torque on a dipole in uniform electric field.
- Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).
- Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two point charges and of electric dipole in an electrostatic field.
- Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, every charge stored in a capacitor.

May Unit II: Current Electricity  (Periods 20)
- Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, electrical resistance, V-I Characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance.
- Potentiometer - principle and its applications to measure potential difference and for comparing emf of two cells. Measurement of internal resistance of a cell.

July Unit III: Magnetic Effects of Current and Magnetism  (Periods 22)
- Concept of magnetic field, Oersted's experiment.

August Unit IV: Electromagnetic Induction and Alternating Currents   (Periods 20)
- Electromagnetic induction; Faraday's laws, Induced emf and current, Lenz's law, Eddy currents Self and mutual inductance.
- Alternating currents, peak and rms value of alternating current/voltage, reactance and impedance; LC oscillations, (Qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattless current.
- AC generator and transformer.

Sept. Unit V: Electromagnetic waves  (Periods 4)
- Need for displacement current, Electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves.
- Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Unit VI: Optics  (Periods 25)
- Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula.
Magnification, power of a lens, combination of thin lenses in contact, combination of a lens and a mirror. Refraction and dispersion of light through a prism.

- Scattering of light - blue colour of sky and reddish appearance of the sun at sunrise and sunset.
- **Optical instruments:** Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

### Oct. Unit VII : Dual Nature of Matter and Radiation (Periods 8)
- Dual nature of radiation. Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light.
- Matter waves-wave nature of particles, de Broglie relation. Davisson-Germer experiment. (experimental details should be omitted; only conclusion should be explained)

### VIII: Atoms & Nuclei (Periods 14)
- Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum
- Composition and size of nucleus. Radioactivity-alpha, beta and gamma particles/rays and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, and Nuclear fusion.

### Nov. Unit IX : Electronic Devices (Periods 15)
- Energy bands in Conductors, semiconductors and insulators (Qualitative ideas only) semiconductor diode - I-V characteristics in forward and reverse bias, diode as a rectifier; Special Purpose p-n Juction diodes; LED, photodiode, solar cell, and Zener diode; and their Characteristics Zener diode as a voltage regulator. Juction

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transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration). Basic idea of Analog and digital Signal Logic gates (OR, AND, NOT, NAND and NOR).

### Unit X : Communication Systems (Periods 10)
- Elements of a communication system (block diagram only); bandwidth of signals (speech, TV and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation. Satellite communication. Need for modulation, Amplitude-modulation and frequency modulation, advantages of frequency modulation over amplitude modulation.
- Basic ideas about internet, mobile telephony and global positioning system (GPS)

### Dec.-Feb. Revision 

**Practicals** (Total Periods 60)

The record, to be submitted by the students, at the time of their annual examination, has to include.

- Record of at least 15 Experiments [with a minimum of 7 from setion A and 8 from section B], to be performed by the students.
- Record of at least 5 Activities [with a minimum of 2 each from section A and section B], to be demonstrated by the teachers.
- The Report of the project, to be carried out by the students.

### Evaluation Scheme

<table>
<thead>
<tr>
<th>Practical Record</th>
<th>Marks</th>
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<tbody>
<tr>
<td>Two experiments one from each section</td>
<td>8 + 8 Marks</td>
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<tr>
<td>Practical record [experiments &amp; activities]</td>
<td>6 Marks</td>
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<tr>
<td>Project</td>
<td>3 Marks</td>
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<tr>
<td>Viva on experiments &amp; project</td>
<td>5 Marks</td>
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<td>Total 30 Marks</td>
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**Total Periods : 60**
Subject - Physics Practical (Section A)

Experiments
(Any 7 experiments out of the following to be performed by the students)

April
1. To find resistance of a given wire using metre bridge.
2. To determine resistance of a given wire by plotting a graph of potential difference versus current.
3. To verify the laws of combination (series/parallel) of resistance using a metre bridge.
4. To compare the emf of two given primary cells using potentiometer.
5. To determine the internal resistance of given primary cell using potentiometer.
6. To determine resistance of a galvanometer by half-deflection method.
7. To find the frequency of the a. c. mains with a sonometer.

May
8. To find resistance of a given wire using metre bridge.
9. To determine resistance of a given wire by plotting a graph of potential difference versus current.
10. To verify the laws of combination (series/parallel) of resistance using a metre bridge.
11. To compare the emf of two given primary cells using potentiometer.
12. To determine the internal resistance of given primary cell using potentiometer.
13. To determine resistance of a galvanometer by half-deflection method.
14. To find the frequency of the a. c. mains with a sonometer.

Activities
April
1. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.

Subject - Physics (Section B)

Experiments
(Any 8 experiments out of the following to be performed by the students)

Aug
1. To find the value of v for different values of u in case of a concave mirror and to find the focal length.
2. To find the focal length of a convex mirror, using a convex lens.
3. To find the focal length of a convex lens by plotting graphs between u and v.

Sept
4. To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.

Oct
5. To draw the I-V characteristic curve of a p-n junction in forward bias.
6. To draw the characteristic curve of a p-n junction diode in reverse bias.
7. To study the Input characteristic of a common-emitter pnp transistor and to find out the values of current and voltage gains.
8. To study the output characteristic of a common emitter pnp transistor and to find out the values of current and voltage gains.

Activities (For the purpose of demonstration only)
April
1. To identify a diode, an LED, a transistor, and IC, a resistor and a capacitor from mixed collection of such items.

Sept.
2. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
3. To observe diffraction of light due to a thin slit.
**Subject - Chemistry (Theory)**

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Title</th>
<th>Time: 3 Hours</th>
<th>Total Periods: 180</th>
<th>Marks: 70</th>
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<tbody>
<tr>
<td>Unit I</td>
<td>Solid State</td>
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<td>Unit II</td>
<td>Solutions</td>
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<td>Unit III</td>
<td>Electrochemistry</td>
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<td>Unit IV</td>
<td>Chemical Kinetics</td>
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<td>Unit V</td>
<td>Surface Chemistry</td>
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<td>Unit VI</td>
<td>General Principles and Processes of Isolation of Elements</td>
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<td>Unit VII</td>
<td>p-Block Elements</td>
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<td>Unit VIII</td>
<td>d-and f-Block Elements</td>
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<td>Unit IX</td>
<td>Coordination Compounds</td>
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<td>Unit X</td>
<td>Haloalkanes and Haloarenes</td>
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<td>Unit XI</td>
<td>Alcohols, Phenols and Eithes</td>
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<td>Unit XII</td>
<td>Aldehydes, Ketons and Carboxylic Acids</td>
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<td>Unit XIII</td>
<td>Organic Compounds containing Nitrogen</td>
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<td>Unit XIV</td>
<td>Biomolecules</td>
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<td>Unit XV</td>
<td>Polymers</td>
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<td>Unit XVI</td>
<td>Chemistry in Every day Life</td>
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<td><strong>Total</strong></td>
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<td><strong>70</strong></td>
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**Month** | **Unit** | **Chapter** | 
|-----------|----------|-------------|

**April, May**

**I Solutions**
Types of solutions expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties - relative lowering of vapour pressure, Raoult's law, evaporation elevation in boiling point, depression in freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, van't Hoff factor.

**II Electrochemistry**
Rodox reaction, conductance in electrolytic solution, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and law of electrolysis (elementary idea), dry cell-electrolytic cells and Galvanic cells, lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and emf of a cell, fuel cells, corrosion.

**III Chemical Kineties**
Rate of a reaction (Average and instantaneous), factors affecting rate of reaction: concentration, temperature, catalyst, order and molecularity of a reaction, rate law and specific rate constant, integrated rate equations and half life (only for zero and first order reactions), concept of collision theory (elementary idea, no mathematical treatment). Activation energy. Arrhenious equation.

**IV Polymers**
Classification - natural and synthetic, methods of poly merization (addition and condensation), co-poly merization, some important polymers: natural and synthetic likey polythene, nylon polyesters, bakelite, rubber. Biodegradable and non-biodegradable polymers.

**July, August**

**V Solid State**
Classification of solids based on different binding forces: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea). Unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, packing efficiency, voids, number of atmos per unit cell in a cubic unit cell, point defect, electrical and magnetic properties.
Band theory of metals, conductors, semiconductors and insulators and n & p type semiconductors.

**VI Surface Chemistry** *(Periods 8)*

Adsortion - physisorption and chemisorption, factors affecting adsorption of gases on solids, catalysis, homogenous and heterogeneous activity and selectivity: enzyme catalysis colloidal state distinction between true solutions, colloids and suspension: lyophilic, lyophobic multimolecular and macromolecular colloids, properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation, emulsion - types of emulsions.

**VII General Principles and Processes of Isolation of Elements** *(Periods 8)*

Principles and methods of extraction - concentration, oxidation, reduction - electrolytic method and refining, occurrence and principles of extraction of aluminium, copper, zinc and iron.

**VIII Biomolecules** *(Period 12)*

Carbohdrates - Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D-L configuration oligosaccharids (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen) importance.

Proteins: Elementary idea of amino acids, Peptide bond, Polypeptides, Proteins, structure of Proteins, Primary, Secondary, tertiary Structure and quaternary structure (qualitative idea only), denaturation of Proteins, enzyme, Hormones - Elementary idea excluding Structure.

Vitamins - Classification and Functions. Nucleic - Acids: DNA and RNA

**IX Chemistry in Every day life** *(Period 8)*

Chemicals in medicines - analgesics, tranquilizers antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotic, antacids, antihistamines.

Chemicals in food - preservation, artificial sweetening agents, elementary idea of antioxidants.

Cleansing agents - soaps and detergents, cleansing action.

**Sept & Oct X Halooalkanes and Haloarenes.** *(Period 12)*

**XI Alcohols, Phenols and Ethers** *(Period 12)*

**XII Aldehydes, Ketones and Carboxylic Acids** *(Periods 12)*

**XIII Organic compounds containing Nitrogen** *(Periods 10)*

**XIV p -Block Elements** *(Period 14)*

**Halooalkanes**: Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions, optical rotation.

**Alcohols**: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehy dration, uses with special reference to methanol and ethanol.

**Phenols**: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophillic substitution reactions, uses of phenols.

**Ether**: Nomenclature, methods of Preparation, Physical and Chemical Properties, user.

**Aldehydes and Ketones**: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophillic addition, reactivity of aldehydes: uses.

**Carboxylic Acids**: Nomenclature, acidic nature, methods of preparation, physical and chemical properties: uses.

**Amines**: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.

**Cyanides and Isocyanides** - will be mentioned at relevant places in context.

**Diazonium salts**: Preparation, chemical reactions and importance in synthetic organic chemistry.

**Group - 15 Elements**: General introduction, electronic configuration, occurrence, oxidation sates, trends in physical and chemical properties: nitrogen preparation properties & uses; compounds of nitrogen, preparation and properties of ammonia and nitric acid, oxides of nitrogen (Structure only).
XIII

: Phosphorus - allotropic forms, compounds of phosphorus: preparation and Properties of phosphine, halides PCl₃, PCl₅ and oxoacids (elementary idea only).

**Group 16 Elements**: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties, dioxygen: Preparation, Properties and uses, classification of oxides, Ozone, Sulphure-allotropic forms: compounds of sulphure: Preparation properties and uses of sulphur-dioxide, sulphuric acid: industrial process of manufacture, properties and uses, oxoacids of sulphur (Structures only).

**Group 17 Elements**: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens, Preparation properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structures only).

**Group 18 Elements**: General introduction, electronic configuration, occurrence, trends in physical and chemical properties, uses.

XV  
**d and f Block Elements**  
(Periods 14)

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals - metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation, preparation and properties of K₂Cr₂O₇ and KMnO₄.

**Lanthanoids** - Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences.

**Actinoids** - Electronic configuration, oxidation states and comparison with lanthanoids.

XVI  
**Coordination Compounds**  
(Periods 12)

Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes. IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT, structure and stereo isomerism, importance of coordination compounds (in qualitative inclusion. extraction of metals and biological system).

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**Subject - Chemistry Practicals**

<table>
<thead>
<tr>
<th>Evaluation scheme for Examination</th>
<th>Marks</th>
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<tbody>
<tr>
<td>Volumetric Analysis</td>
<td>10</td>
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<tr>
<td>Salt Analysis</td>
<td>8</td>
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<tr>
<td>Content Based Experiment</td>
<td>6</td>
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<td>Calss Record project work and Viva</td>
<td>6</td>
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<tr>
<td>Total</td>
<td>30</td>
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Micro-chemical methods are available for several of the practical experiments. Wherever possible, such techniques should be used:

**April, May**  
**A. Surface Chemistry**  
(Period 5)

(a) Preparation of one lyophilic and one lyophobic sol
   - Lyophilic sol: starch, egg albumin and gum
   - Lyophobic sol: aluminium dioxride, ferric hydroxide, aanssenous sulphide

(a) Dialysis of sol-prepared in (a) above.

(c) Study of the role of emulsifying agents in stabilizing the emulsion of different oils.

**B. Chemical Kinetics**  
(Periods 4)

(a) Effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.

(b) Study of reaction rates of any one of the following.

(i) Reaction of iodide ion with hydrogen peroxide at room temperature using different concentration of iodide ions.

(ii) Reaction between potassium iodate, (KIO₃) and sodium sulphite: (Na₂SO₃) using starch solution as indicator (clock reaction).
C. **Thermochemistry** *(Periods 4)*

Any one of the following experiments,

(i) Enthalpy of dissolution of copper sulphate or potassium nitrate.
(ii) Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH).
(iii) Determination of enthalpy change during interaction (Hydrogen bond formation) between acetone and chloroform.

D. **Electrochemistry** *(Periods 2)*

Variation of cell potential in Zn/Zn\(^{2+}\) || Cu\(^{2+}\)/Cu with change in concentration of electrolytes (CuSO\(_4\) or ZnSO\(_4\)) at room temperature.

**E. Chromatography** *(Periods 2)*

(i) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of Rf values.
(ii) Separation of constituents present in an inorganic mixture containing two cations only (constituents having large difference in Rf values to be provided).

F. **Preparation of Inorganic Compounds** *(Periods 4)*

(i) Preparation of double salt of ferrous ammonium sulphate or potash alum.
(ii) Preparation of potassium ferric oxalate.

G. **Preparation of Inorganic Compounds** *(Periods 4)*

Preparation of any one of the following compounds

(i) Acetanilide
(ii) Di-benzal acetone
(iii) p-Nitroacetanilide
(iv) Aniline yellow of 2-Naphthol aniline dye.

H. **Tests for the functional groups present in organic compounds:** *(Periods 6)*

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (Primary) Groups

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**PROJECT**

Scientific investigations involving laboratory testing and collecting information from other sources.

A Few suggested Projects.

- Study of the presence of oxalate ions in guava fruit at different stages of ripening.
- Study of quantity of casein present in different samples of milk.
- Preparation of soybean milk and its comparison with the natural milk with respect to curd formation effect of temperature, etc.
- Study of the effect of potassium bismuthate as food preservative under various conditions (temperature, concentration, time etc.
- Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
- Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice etc.
- Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper. **Note:** Any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

**Recommended Textbooks:**
1. Chemistry Part-I, Published by NCERT.
2. Chemistry Part-II, Published by NCERT
Subject - Biology (044)

Book Prescribed:
1. N.C.E.R.T

Weightage

1. Reproduction - 14 marks
2. Genetic & Evolution - 18 marks
3. Biology in Human Welfare - 14 marks
4. Biotechnology - 10 marks
5. Ecology - 14 marks
6. Practical - 30 marks

Practicals

April

1. Study of flowers adapted to pollination
2. Study of pollen germination on a slide.
3. Study & identify stages of gamete development i.e. t.s. of testis & t.s. of ovary through permanent slide.
4. Study of t.s. of blastula through permanent slide.

May

5. Study meiosis in onion bud cell or grass hopper testis through permanent slide.
6. Exercise on controlled pollination-Emasculation, tagging and bagging.

July

7. Study Mendalian inheritance using seeds of different colour/size of any plant.
8. Study prepared predigree charts of genetic traits such as rolling of tongue, blood groups, widow's peak, colour blindness.
9. Study analogous & homologous organs in various plants & animals.

Aug.

10. To identify common diseases causing organism like Ascaries, Entamoeba, Plasmodium. ringworm, comment on symptoms of diseases that they cause through permanent slides or specimens.
11. Study plants & animals found in xerophytic condition, comment upon their adaptation/ ecosystem.
12. Study plants & animals formed in aquatic conditions. comment on their adaptation/ ecosystem.

Practicals

1.
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6.
• Microbes in Human Welfare: Microbes in Household products. Microbes in Industrial Products. Microbes in sewage Treatment. Microbes in Production of Biogas, Microbes as Biocontrol Agents, Microbes as Biofertilizers

Unit-IX Biotechnology

Oct. Unit X Ecology

• Organism and Populations: Organism and its Environment, Populations

Nov.
• Biodiversity and Conservation.
• Biodiversity, Biodiversity conservation
• Environmental Issues: Air Pollution, its control, water pollution and its control, solid wastes, Agro-chemicals and their effects, Radioactive waste, Green house effect and Global Warming, Ozone Depletion in the Stratosphere, Degradation by Improper Resource utilisation and Maintenance, Deforestation.

Dec/Jan /Feb Revision

13. Collect & study soil from sites & study them for texture & moisture content.
14. Study the pH & water holding capacity of soil. Correlate with the kinds of plants found in them.
15. Collect water from different water bodies around you and study then for pH clarity & presence of any living organisms.
16. Study the presence of suspended particulate matter in air at the two widely different sites.
17. Study of plant population density by quadrat method.
18. Study of plant population frequency by quadrat method.
(Any fifteen)

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Subject - History (027)

*Book Prescribed :*
1. Themes in Indian History Part - I (NCERT)
2. Themes in Indian History Part - II (NCERT)
3. Themes in Indian History Part - III (NCERT)
4. Modern ABC, Modern Publication (Pro. Manjeet Singh Sodhi)

*Months*  *Topic*
April  Ch -1 Bricks Beads and Bones, The Harappan Civilisation, Mohanjodoro: A planned urban centre, Tracking social Differences, Finding out about craft Production, Procuring Materials reals, script, weight Ancient Authority The End of Civilisation  
Ch - 5 Through the Eyes of Travellers, perceptions of society.  
Bernier And the "Degenerate" East  
Women : slaves, sati and Labourers
May  Ch - 10 Colonialism and The Country-side Bengal and The Zamindars, The Hoe and The Plough, A Revolt in The Countryside, The Deccan Riots Commission
June  Ch -2 Kings Farmers and Town Prinsep and Piyadassi, The Earliest states.
July  An Early Empire, New Notion of Kingship, A Changing Countryside, Towns and Trade, How are inscription Deciphered, The Limitation of Inscription Evidence.  
Ch - 11 Revolts and The Raj The Revolt of 1857 and its Representations, Awadh in Revolt, What the Rebels wanted, Images of The Revolt
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Aug.
Ch - 7 An Imperical Capital Vijaya Nagar, The Discovery of Hampi, Rayas, Nayakas and Sultans, Vijaya Nagar, The Capital and its Environs. The Royal Centre, The Sacred Centre, Plotting Palaces, Temples and Bazaars
Ch - 12 Colonial Cities, Towns and Cities in Pre-Colonial Times, Finding out about Colonial Cities, What were the new Towns, Town Planning and Architecture - Madras Calcutta What Buildings and Architectural style Tell us.

Sept.

Oct.
Ch - 13 Mahatma Gandhi And The Nationalist Movement, A Leader Annouces Himself, The Making and Un-making of Non-Cooperation, The salt satyagraha, Quit India, The Last Heroic Days, Knowing Gandhi

Nov.

Dec.
Revision
Jan.
Revision
Feb.
Revision

22 [XII]

Subject - Physical Education

Max. Marks: 70
No. of Periods: 180

THEORY

1 April 2015
Unit I. Sports Environment and Society
• Meaning and need of sports environment
• Essential elements of positive sports environment
• Role of individual in improvement of sports environment
• Role of Spectators and media in creating positive sports environment
• Women participation - As discourse and Ideology

Unit II. Adventure Sports and Leadership Training
• Meaning and objectives of Adventure Sports
• Types of activities – Camping, Rock Climbing, Tracking, River Rafting and Mountaining
• Material requirement and safety measures
• Identification and use of Natural Resources
• Conservation of environment
• Creating leaders through Physical Education

15 May 2015
Unit III. Sports and Nutrition
• Balanced Diet and Nutrition: Macro and Micro Nutrients
• Nutritive and Non-Nutritive Components of Diet
• Eating Disorders – Anorexia Nervosa and Bulimia
• Effects of Diet on Performance
• Eating for Weight Control - A Healthy weight, The pitfalls of Dieting, food intolerance and food myths
1 July 2015

Unit IV. Planning in Sports

- Meaning and Objectives of Planning
- Various Committees and its responsibilities
- Tournament - Knock-Out, League or Round Robin and Combination
- Procedure to draw Fixtures - Knock-Out (Bye and Seeding) and League (Staircase and Cyclic)
- Intramural and Extramural - Meaning, Objectives and its Significance
- Specific Sports Programme (Sports Day, Health Run, Run for Fun, Run for Specific Cause and Run for Unity)

Unit V. Postures

- Meaning and concept of correct postures - standing and sitting
- Advantages of correct posture
- Common Postural Deformities - Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scolioses
- Physical activities as corrective measures

Unit VI. Children and Sports

- Motor development in children
- Factors affecting motor development
- Physical and Physiological benefits of exercise on children
- Advantages and disadvantages of weight training and food supplement for children
- Activitie and quality of life

15 Aug 2015

Unit VII. Test and Measurement in Sports

- Measurement of Muscular Strength - Kraus Weber Test
- Motor Fitness Test - AAPHER
- Measurement of Cardio Vascular Fitness - Harward Step Test/Rockfort Test
- Measurement of Flexibility - Sit and Reach Test

1 Sept. 2015

Unit VIII. Physiology and Sports

- Physiological factor determining component of Physical Fitness
- Effect of exercise on Cardio Vascular System
- Effect of exercise on Respiratory System
- Effect of exercise on Circulatory System
- Physiological changes due to ageing and role of regular exercise on ageing process

Unit IX. Biomechanics and Sports

- Projectile and factors affecting Projectile Trajectory
- Angular and Linear Movements
- Introduction to Work, Power and Energy
- Friction
- Mechanical Analysis of Walking and Running

Unit X. Psychology and Sports

- Understanding stress, anxiety and its management
- Coping Strategies - Problem Focused and Emotional focused
- Personality, its dimensions and types, Role of sports in personality development
- Motivation, its type and technique
- Self-esteem and Body image
25 [XII]

15 Oct 2015  Unit XI. Training in Sports  10 Periods

- Strength - Definition, types and methods of improving strength - Isometric, Isotonic and Isokinetic
- Endurance - Definition, types and methods to develop Endurance - Continuous Training, Interval Training and Fartlek Training
- Speed - Definition, types and methods to develop speed - Acceleration run and pace run
- Flexibility - Definition, types and methods to improve flexibility
- Coordinative abilities - Definition and types

**PRACTICAL**

Max. Marks - 30
Periods - 60

1. Physical Fitness - AAHPER  05 Marks
2. Athletics - Middle and Long Distance Runs and Throws*  05 Marks
3. Health and Fitness Activities – Asanas/Swiss Ball/Plyometric/Aerobics (Any one)  05 Marks
4. Skill of any one Team Game of choice from the given list***  05 Marks
5. Viva  05 Marks
6. Record File**  05 Marks

* The events being opted must be other than from those administered under Physical Fitness Test.

** 1. Write benefits of Asanas, Swiss Ball and Plyometric.
2. Measure Resting Heart Rate and Respiratory Rate of ten members from family or neighbourhood for three weeks and show graphical representation of the data.
3. Draw a neat diagram of the Field/Court of any one Game of choice. Write its history, Rules and Regulations, Terminologies and Important Tournaments.

*** Athletics, Basketball, Football, Handball, Hockey, Kho Kho and Volleyball.

26 [XII]

Subject - Business Studies (054)

**Book Prescribed : NCERT Part-I, II**

| COURSE STRUCTURE | Reference Books — V Wason  
|                  | — Sandeep Garg  
|                  | — R.K. Singla  
|                  | 80 Marks |

<table>
<thead>
<tr>
<th>Units</th>
<th>Periods</th>
<th>Marks</th>
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<tbody>
<tr>
<td>Part A : Principles and Functions of Management</td>
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<tr>
<td>1. Nature and Significance of Management</td>
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<td>2. Principles of Management</td>
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<td>3. Business Environment</td>
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<td>16</td>
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<td>4. Planning</td>
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<td>5. Organising</td>
<td>18</td>
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<td>6. Staffing</td>
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<td>7. Directing</td>
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<td>8. Controlling</td>
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<td><strong>120</strong></td>
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<tr>
<td>Part B : Business Finance and Marketing</td>
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<tr>
<td>10. Financial Markets</td>
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<td>15</td>
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<tr>
<td>11. Marketing Management</td>
<td>32</td>
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<td>12. Consumer Protection</td>
<td>16</td>
<td>15</td>
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<tr>
<td>Part C : Project Work (Two Project)</td>
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<td><strong>30</strong></td>
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<td><strong>120</strong></td>
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</tbody>
</table>
Part - A  Principles & Functions of Management

April

Unit 1  Nature and Significance of Management
- Management - concept, objective, importance
- Management as Science, Art, Profession
- Levels of Management
- Management function - planning, organising, staffing, directing and controlling
- Coordination - concept and importance

Concept includes meaning and characteristics/features.

Management as art-features of art and the existence of these features in management.
Management as science-Features of science and the existence of these features in management. Management as profession-features of profession and the existence of these features in management.
Levels of management-functions of management at top, middle and supervisory levels with names of job positions.

Unit 2  Principles of Management
- Principles of Management - concept, nature of significance
- Fayol's principles of management
- Taylor's Scientific Management - principles and techniques

Meaning of principles of management, Nature of principles of management by stating their basic characteristics.
Significance or need of principles of management. Principles of Scientific Management given by Taylor-Science, not rule of thumb; Harmony, not discord; Cooperation, not individualism; Development of each and every person to his or her greatest efficiency and prosperity. Taylor's techniques of Scientific management: Functional Foremanship; Standardisation and Simplification;

May

Unit 3  Management and Business Environment
- Business Environment - concept and importance
- Dimension of Business Environment - Economic, Social, Technological, Political and Legal
- Impact of Government policy changes on business with special reference to liberalisation, privatization and globalisation in India.

Dimensions of Business Environment-meaning and components only.

Unit 4  Planning
- Concept, importance and Limitations
- Planning Process
- Single use and Standing Plans- Objects, Strategy, Policy Procedure, Method, Rule, Budget and Programme

Limitations-internal and external. Meaning of single use and standing plans.

July

Unit 5  Organising
- Concept and importance
- Organizing Process
- Delegation : concept, elements and importance
- Decentralisation : concept and importance.


Unit 6  Staffing
- Concept and importance of staffing
Staffing as a part of Human Resource Management-concept.
Staffing process
Recruitment - sources
Selection - process
Training and Development - Concept and importance. Methods of training: on the job and off
the job - Induction training, vestibule training, apprenticeship training and internship training.
Recruitment Sources - Internal - promotion, transfer; External - Direct recruitment, Casual callers.
Advertisements - newspapers, journal, television, Employment Exchange, Placement Agencies and
Management Consultants, Campus Recruitment, Web Methods of on-the-job training and off-the job
training-meaning.

Unit 7 Directing

- Concept and importance
- Elements of Direction:
  - Supervision - concept, function of a supervisor
  - Motivation - concept, Maslow's hierarchy of needs; Financial and non-financial incentives
  - Leadership - concept, styles - authoritative, democratic and laissez faire
  - Communication - concept, formal and informal communication; barriers to effective com-
munication, how to overcome the barriers.

Motivation-financial incentives-meaning, types-pay and allowances., Productivity linked wage
incentive, bonus, Profit sharing, co-partnership/stock option, Retirement benefits, Perquisites; Non-
financial incentives- meaning, types-Status, Career advancement opportunity, Job enrichment, Job
security, Employee recognition programmes, Job enrichment, Employee participation, Employee
empowerment.

Formal and informal communication-concept; barriers to effective communication-semantic bar-
riers (badly expressed message, symbols with different meanings, faulty translations, unclarified
assumptions, technical jargon), psychological barriers (premature evaluation, lack of attention,
distrust), organisational barriers (organisational policy, rules and regulations, complexity in or-
ganisational structure, organisational facilities), personal barriers (fear of challenge to authority,
lack of confidence of superior on his subordinates, unwillingness to communicate, lack of proper
incentives). How to overcome barriers; Communicate according to the needs of the receiver; clarify
the ideas before communication, be aware of the language, tone and content of the message, com-
municate for present as well for the future, ensure proper feedback and be a good listener.

Unit 8 Controlling

- Concept and importance
- Relationship between planning and controlling
- Steps in the process of control.

Part B Business Finance and Marketing

Unit 9 Financial Management

- Concept and objective of Financial Management
- Financial Decisions ; investment, financing and dividend-Meaning and factors affecting.
- Financial Planning - concept and importance
- Capital Structure - Concept
- Fixed and Working Capital - Concept and factors affecting their requirements.

Factors affecting capital budgeting decisions- cash flows of the project, the rate of return, investment
criteria involved. Factors affecting financing decision-cash flow position of the company, cost, risk,
floatation costs fixed operating costs, control considerations, state of the capital market, Return on
investment, tax rate, flexibility, regulatory framework. Factors affecting dividend decision-amount
of earnings, stability of earnings, stability of dividends, growth opportunities, cash flow position,
shareholder’s preference, taxation policy, stock market reaction, access to capital market, legal con-
Factors affecting fixed capital requirement—nature of business, scale of operations, choice of technique, technology upgradation, growth prospects, diversification, financing alternatives, level of collaboration. Working capital—concept of operating cycle, factors affecting working capital requirement—nature of business, scale of operations, business cycle, seasonal factors, production cycle, credit allowed, credit availed, availability of raw material.

Oct.  
**Unit 10 Financial Markets**
- Financial Markets: Concept functions and types
- Money market and its instruments
- Capital market and its types (primary and secondary)
- Stock Exchange - Functions and trading procedure.
- Securities and Exchange Board of India (SEBI) - objectives and functions.

Types of functional market—money market and capital market—meaning.

Money market instruments—Treasury bill, commercial paper, call money, certificate of deposit, commercial bill.

Capital market—Types—primary and secondary market—concept.

Nov.  
**Unit 11 Marketing Management**
- Selling, Marketing and Societal Marketing management—Concept
- Marketing management—Concept
- Marketing Functions
- Marketing management philosophies
- Marketing Mix—Concept & elements
  - Product—concept, branding, labelling and packaging
  - Price—factors determining price

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- Physical distribution—concept and components, channels of distribution—types, choice of channels
- Promotion—concept and elements; advertising concept, role, objections against advertising, personal selling—concept and qualities of a good salesman, sales promotion—concept and techniques, public relations—concept and role.

Marketing mix elements—Product, price, place, promotion

Branding, labelling, packaging—concept and functions. Choice of channels of distribution—factors affecting choice of channel—product related factors, company characteristics, competitive factors, market factors, environmental factors.

**Unit 12 Consumer Protection**
- Concept and importance of consumer protection
- Consumer Protection Act 1986
  - Meaning of consumer and consumer protection
  - Rights and responsibilities of consumers
  - Who can file a complaint and against whom?
  - Redressal machinery
  - Remedies available
- Consumer awareness—Role of consumer organizations and Non-Governmental Organizations (NGOs)

**Unit 13 Project Work**
- Please refer to guidelines issued by CBSE.

- Revision
### Subject - Economics

**Text Book:** NCERT I & II  
**Part I - Micro Economics** - 50 Marks (NCERT)  
**Part II - Macro Economics** - 50 Marks (NCERT)

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<td><strong>Part A : Introductory Micro Economics</strong></td>
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<tr>
<td>1. Introduction</td>
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<td>2. Consumer Equilibrium and Demand</td>
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<td>3. Producer Behaviour. and. Supply</td>
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<td>4. Forms of Market &amp; Price determination under Perfect Competition with Simple Tools</td>
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<td><strong>Total</strong></td>
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<tr>
<td><strong>Part B : Introductory Micro Economics</strong></td>
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<tr>
<td>5. National Income and Related Aggregates</td>
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<td>6. Money and Banking</td>
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<td>08</td>
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<td>7. Determination of Income and Employment</td>
<td>27</td>
<td>12</td>
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<tr>
<td>8. Government Budget and Economy</td>
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<td>08</td>
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<td>9. Balance of Payments</td>
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<td><strong>Total</strong></td>
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**Note:** The question paper will include a Section on Open Case studies based-questions on two case studies, each from Part A and Part B of 8 marks, a total 16 marks. The case studies will be supplied to students in advance. These case studies are designed to test the analytical and higher order thinking skills of students.
August
7. Govt. Budget and the economy, Budget and its kind, classification & sources of receipts and expenditure, objectives of budget, Budget deficit its kinds and implication.
8. Forms of market and - Perfect market, monopoly, oligopoly and monopolistic market, price determination under perfect market - equilibrium price, effect of change in demand and supply.

September
9. Balance of payment and foreign exchange rate and its determination
10. Determination of income and employment
   AD & AS - Meaning, components, Propensity to save and consume (APC & MPC), Determination of income output & employment, full employment and unemployment & its types.

October
11. Money - Definition, functions and evolution of money, Demand and Supply of money & money supply and its measures
12. Banking - Commercial and Central bank - their functions and difference and credit creation by commercial banks, Measures of credit central by central bank

November
12.

December

Jan & Feb.
Revision

Subject - Accountancy (055)

Text Books :
( NCERT) Part A & B

Reference Books :
1. Accountancy - D.K. Goel
2. T.S. Grewal

One Paper Theory 80 Marks

<table>
<thead>
<tr>
<th>Parts</th>
<th>Periods</th>
<th>Marks</th>
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<tr>
<td>Part A : Accounting for, Partnership Firms and Companies</td>
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<tr>
<td>Unit-1 : Accounting for Partnership Firms</td>
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<td>Unit-2 : Accounting for Companies</td>
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<td>150</td>
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<tr>
<td>Part B : Financial Statement Analysis</td>
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<tr>
<td>Unit-3 : Analysis of Financial Statements</td>
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<td>Unit-4 : Cash Flow Statement</td>
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<td>08</td>
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<td>Part C : Project Work</td>
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<td>Project File : 4 marks</td>
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<td>Written Test : 12 Marks (One Hour)</td>
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<tr>
<td>Viva Voice : 4 Marks</td>
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</table>
(ii) In case, the realisation expenses are borne by a partner, clear indication should be given regarding the payment thereof.

(iii) Workmen Compensation Found is to be discussed.

Unit 2: Accounting for Companies

Accounting for Share Capital
- Share and Share Capital: Nature and Types.
- Accounting for Share Capital: Issue and Allotment of Equity Shares; Private placement of shares; Public subscription of shares - over subscription and Under subscription of shares; issue at par, and at premium and at discount; calls in advance and arrears (excluding interest), issue of shares for consideration other than cash.
- Accounting treatment of forfeiture and re-issue of shares.
- Disclosure of Share Capital in company's Balance Sheet.

Accounting for Debentures
- Debentures: Issue of debentures at par; at premium and at discount; Issue of debentures for consideration other than cash; Issue of debentures with terms of redemption; Debentures as collateral security-concept, Interest on debentures.
- Redemption of Debentures: Lump sum, draw of lots and purchase in the open market (excluding ex-interest and cum-interest). Creation of Debenture Redemption Reserve.
39 [XII]

- **Financial Statment Analysis**: Objectives and Limitations.
- **Tools for Financial Statment Analysis**: Comparative Statements, Common Size Statements, Cash flow Analysis, Ratio Analysis.
- **Accounting Ratios**: Objectives and Classification and Computation
  - **Liquidity Ratios**: Current Ratio and Quick Ratio
  - **Solvency Ratios**: Debt of Equity Ratio, Total Assets to Debt Ratio, Proprietary Ratio and Interest Coverage Ratio.
- **Activity Ratios**: Inventory Turnover Ratio, Trade Receivables Turnover Ratio, Trade Payable Turnover Ratio, Working Capital Turnover Ratio.
- **Profitability Ratios**: Gross Profit Ratio, Operating Ratio, Operating Profit Ratio, Net Profit Ratio and Return on Investment

**Scope**: As ratio analysis is a managerial tool, for the computation of profitability ratio, relevant information should be specified whether it is part of Statement of Profit and Loss as per Schedule VI or not.

**Unit 4: Cash Flow Statement**: Meaning, Objectives and Preparation (as per AS-3 Revised) (Indirect Method only).

**Scope**: (i) Adjustments relating to depreciation and amortisation, profit, or loss on sale of assets including investments, dividend (both final and interim) and tax.
(ii) Bank overdraft and cash credit to be treated as short term borrowings.
(iii) Current Investments to be taken as Marketable Securities unless otherwise specified.

Part C: Project Work 20 Marks

Kindly refer to the Guidelines published by the CBSE.

Dec. / Jan/ Feb. Revision

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**Subject - Informatics Practices**

**Distribution of Marks**

- **Theory**: 70 Marks
- **Practical**: 30 Marks
- **Total**: 100 Marks

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<tr>
<th>Months</th>
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<tr>
<td>April</td>
<td>• Computer Networking</td>
</tr>
<tr>
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<td>• Open Source Concepts</td>
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<td>• My Sql Revision Tour</td>
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<td>• Database Transaction</td>
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<td>May</td>
<td>• Java GUI Programming Revision Tour -I</td>
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<td>• Java GUI Programming Revision Tour -II</td>
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<td>June &amp; July</td>
<td>• Java GUI Programming Revision Tour -III</td>
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<tr>
<td></td>
<td>• Classes &amp; Libraries</td>
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<td>August</td>
<td>• Concepts of Inheritance</td>
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<td>• GUI Dialogs &amp; Tables</td>
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<td>September</td>
<td>• Web Application Development</td>
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<td>• Basic HTML -I</td>
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<td>• HTML-II List, Tables &amp; Forms</td>
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<td>• XML</td>
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<td>October</td>
<td>• Tables &amp; Integrity Constraints</td>
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<td>• Joins</td>
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<td>November</td>
<td>• IT Applications</td>
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<td>• Data base Connectivity of My SqI</td>
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<td>Dec, Jan &amp; Feb</td>
<td>Revision and Sample Paper</td>
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### Subject - Geography

**Book Prescribed:**
1. *Fundamentals of Human Geography* NCERT
2. *India: People and Economy* NCERT
3. *Practical* NCERT

<table>
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<th>Month</th>
<th>Human Geography</th>
<th>India - People and Economy</th>
<th>Practical</th>
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<tbody>
<tr>
<td>April</td>
<td>Nature and Scope</td>
<td>Population: distribution, Density, Growth and composition</td>
<td>Unit-1 Processing of Data and Thematic Mapping</td>
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<tr>
<td>May</td>
<td>The world population: distribution, density and growth, population change, spatial patterns and structure; determinants of population change, Age-Sex ratio, rural-urban composition</td>
<td>Migration: Types, causes and consequences. International and national Human development: selected indicators and regional patterns; population change</td>
<td>• Sources of data.</td>
</tr>
<tr>
<td>June</td>
<td>Summer Break</td>
<td>Human settlements: Rural and urban settlements, types and distribution and functional classifications. Land Resources and Agriculture: General land use agricultural land use, distribution of major crops.</td>
<td>• Tabulating and processing of data. Calculation of averages measures of central tendency, deviation and rank correlation.</td>
</tr>
<tr>
<td>Aug.</td>
<td>Secondary Activities: concept (trade, transport and communication: Services) manufacturing; types- household, small scale, large scale, agro based and mineral based industries</td>
<td></td>
<td>• Use of computers in data processing and mapping.</td>
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</table>

**Month** | **Tertiary and Quaternary Activities** | **Manufacturing Industries** | **Unit-II Field Study or Spatial Information Technology** |
<table>
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<tbody>
<tr>
<td>Sept.</td>
<td>Tertiary and Quaternary Activities: concept, trade, transport and common services, people engaged in tertiary activities, quaternary activities concept, knowledge based industries</td>
<td>Manufacturing Industries: types, Industrial location and Clustering,</td>
<td>• Field visit and study map orientation, observation and preparation of sketch, survey on.</td>
</tr>
<tr>
<td>Oct.</td>
<td>Transport and Communications land: transport-roads, railways, trans-continental railways, water transport-inland waterways; major Ocean routes. Air Transport: Intercontinental air routes</td>
<td>Transport and communications: roads, railways/ Waterways and air ways: oil and gas pipelines, National electric grids.</td>
<td>• Any one of the local concerns, pollution, ground water change, land use and land use changes, poverty, energy issues.</td>
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**Month** | **Revision** | **Revision** | **Revision** |
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<tr>
<td>March</td>
<td>Final Exams.</td>
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Subject - Maths (041)

Book Prescribed : 1. N.C.E.R.T

<table>
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<tr>
<th>Unit</th>
<th>Marks</th>
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<td>I. Relations and Functions</td>
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<tr>
<td>II. Algebra</td>
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<tr>
<td>III. Calculus</td>
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<tr>
<td>IV. Vectors and Three-Dimensional Geometry</td>
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<tr>
<td>V. Linear Programming</td>
<td>06</td>
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<tr>
<td>VI. Probability</td>
<td>10</td>
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<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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Month | Chapters
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April | Relations and Functions
Types of relations: reflexive, symmetric, transitive and equivalence relations. One-one and onto functions, composite functions, inverse of a function. Binary operations.
Inverse Trigonometric Functions
Matrices
Concept, notation, order, equality, types of matrices, zero matrix, transpose of a matrix, symmetric and skew symmetric matrices. Addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations. Invertible matrices and proof of the uniqueness of inverse, if it exists. (Here all matrices will have real entries).

May | Determinants
Determinant of a square matrix (upto 3x3 matrices), properties of determinants, minors, cofactors and application of determinants in finding the area of a triangle.
Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.
Continuity - Continuity at a point, continuity in open and closed interval.

June & July | Differentiability
Differentiability, derivative of composite functions, chain rule, derivative of inverse trigonometric functions.
Derivative of implicit function. Concept of exponential and logarithmic functions and their derivative. Logarithmic differentiation. Derivative of functions expressed in parametric forms. Second order derivatives, Rolle's and Lagrange's Mean Value Theorem (without proof) and their geometrical interpretations.
Applications of Derivatives
Rate of change, increasing/decreasing functions, tangents and normals
Approximation, maxima and minima (first derivative test motivated geometrically and second order derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).

Aug. | Integrals
Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts. Only simple integrals of the type.
Three-dimensional Geometry

Direction cosines/ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian & vector equation of a plane.

Angle between (i) two lines, (ii) two planes, (iii) a line and a plane. Distance of a point from a plane.

Linear Programming

Introduction, definition of related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables. Feasible and infeasible regions, feasible and infeasible solutions, optimum feasible solutions (upto three non-trivial constraints).

Nov.

Probability

Multiplication theorem on probability. Conditional probability, independent events, total probability, Baye's theorem.

Random variable and its probability distribution, mean and variance of haphazard variable. Repeated independent (Bernoulli) trials and Binomial distribution.

Dec., Jan, Feb. Revision