

ACCOUNTANCY (Code No. 055)

Rationale

The course in accountancy is introduced at plus two stage of senior second of school education, as the formal commerce education is provided after ten years of schooling. With the fast changing economic scenario, accounting as a source of financial information has carved out a place for itself at the senior secondary stage. Its syllabus content provide students a firm foundation in basic accounting concepts and methodology and also acquaint them with the changes taking place in the preparation and presentation of financial statements in accordance to the applicable accounting standards and the Companies Act 2013.

The course in accounting put emphasis on developing basic understanding about accounting as an information system. The emphasis in Class XI is placed on basic concepts and process of accounting leading to the preparation of accounts for a sole proprietorship firm. The students are also familiarized with basic calculations of Goods and Services Tax (GST) in recording the business transactions. The accounting treatment of GST is confined to the syllabus of class XI.

The increased role of ICT in all walks of life cannot be overemphasized and is becoming an integral part of business operations. The learners of accounting are introduced to Computerized Accounting System at class XI and XII. Computerized Accounting System is a compulsory component which is to be studied by all students of commerce in class XI; whereas in class XII it is offered as an optional subject to Company Accounts and Analysis of Financial Statements. This course is developed to impart skills for designing need based accounting database for maintaining book of accounts.

The complete course of Accountancy at the senior secondary stage introduces the learners to the world of business and emphasize on strengthening the fundamentals of the subject.

Objectives:

1. To familiarize students with new and emerging areas in the preparation and presentation of financial statements.
2. To acquaint students with basic accounting concepts and accounting standards.

3. To develop the skills of designing need based accounting database.
4. To appreciate the role of ICT in business operations.
5. To develop an understanding about recording of business transactions and preparation of financial statements.
6. To enable students with accounting for Not-for-Profit organizations, accounting for Partnership Firms and company accounts.

Accountancy (Code No.055)

Course Structure

Class-XI (2021-22)

Theory: 80 Marks

3 Hours

Project: 20 Marks

Units	Periods	Marks
Part A: Financial Accounting-1		
Unit-1: Theoretical Framework	25	12
Unit-2: Accounting Process	105	40
Part B: Financial Accounting-II		
Unit-3: Financial Statements of Sole Proprietorship from Complete and Incomplete Records	55	20
Unit-4: Computers in Accounting	15	08
Part C: Project Work		
	20	20

PART A: FINANCIAL ACCOUNTING - I

Unit-1: Theoretical Frame Work

Units/Topics	Learning Outcomes
Introduction to Accounting <ul style="list-style-type: none">Accounting- concept, objectives, advantages and limitations, types of accounting information; users of accounting information and their needs. Qualitative Characteristics of Accounting Information. Role of Accounting in Business.Basic Accounting Terms- Business Transaction, Capital, Drawings. Liabilities (Non Current and Current). Assets (Non Current, Current); Fixed assets (Tangible and Intangible), Expenditure (Capital and Revenue), Expense, Income, Profit, Gain, Loss, Purchase, Sales, Goods, Stock, Debtor, Creditor, Voucher, Discount (Trade discount and Cash Discount)	After going through this Unit, the students will be able to: <ul style="list-style-type: none">describe the meaning, significance, objectives, advantages and limitations of accounting in the modern economic environment with varied types of business and non-business economic entities.identify / recognise the individual(s) and entities that use accounting information for serving their needs of decision making.explain the various terms used in accounting and differentiate between different related terms like current and non-current, capital and revenue.give examples of terms like business transaction, liabilities, assets, expenditure and purchases.

<p>Theory Base of Accounting</p> <ul style="list-style-type: none"> • Fundamental accounting assumptions: GAAP: Concept • Business Entity, Money Measurement, Going Concern, Accounting Period, Cost Concept, Dual Aspect, Revenue Recognition, Matching, Full Disclosure, Consistency, Conservatism, Materiality and Objectivity • System of Accounting. Basis of Accounting: cash basis and accrual basis • Accounting Standards: Applicability in IndAS • Goods and Services Tax (GST): Characteristics and Objective. 	<ul style="list-style-type: none"> • explain that sales/purchases include both cash and credit sales/purchases relating to the accounting year. • differentiate among income, profits and gains. • state the meaning of fundamental accounting assumptions and their relevance in accounting. • describe the meaning of accounting assumptions and the situation in which an assumption is applied during the accounting process. • explain the meaning and objectives of accounting standards. • appreciate that various accounting standards developed nationally and globally are in practice for bringing parity in the accounting treatment of different items. • acknowledge the fact that recording of accounting transactions follows double entry system. • explain the bases of recording accounting transaction and to appreciate that accrual basis is a better basis for depicting the correct financial position of an enterprise. • Understand the need of IFRS • Explain the meaning, objective and characteristic of GST.
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Unit-2: Accounting Process

Units/Topics	Learning Outcomes
<p>Recording of Business Transactions</p> <ul style="list-style-type: none"> • Voucher and Transactions: Source documents and Vouchers, Preparation of Vouchers, Accounting Equation Approach: Meaning and Analysis, Rules of Debit and Credit. • Recording of Transactions: Books of Original 	<p>After going through this Unit, the students will be able to:</p> <ul style="list-style-type: none"> • explain the concept of accounting equation and appreciate that every transaction affects either both the sides of the equation or a positive effect on one item and a negative effect on another item on the same side of

<p>Entry- Journal</p> <ul style="list-style-type: none"> • Special Purpose books: • Cash Book: Simple, cash book with bank column and petty cashbook • Purchases book • Sales book • Purchases return book • Sales return book <p>Note: Including trade discount, freight and cartage expenses for simple GST calculation.</p> <ul style="list-style-type: none"> • Ledger: Format, Posting from journal and subsidiary books, Balancing of accounts <p>Bank Reconciliation Statement:</p> <ul style="list-style-type: none"> • Need and preparation, Bank Reconciliation Statement with Adjusted Cash Book <p>Depreciation, Provisions and Reserves</p> <ul style="list-style-type: none"> • Depreciation: Concept, Features, Causes, factors • Other similar terms: Depletion and Amortisation • Methods of Depreciation: <ul style="list-style-type: none"> i. Straight Line Method (SLM) ii. Written Down Value Method (WDV) <p>Note: Excluding change of method</p> <ul style="list-style-type: none"> • Difference between SLM and WDV; Advantages of SLM and WDV • Accounting treatment of depreciation <ul style="list-style-type: none"> i. Charging to asset account ii. Creating provision for depreciation/accumulated depreciation account iii. Treatment for disposal of asset • Provisions and Reserves: Difference • Types of Reserves: <ul style="list-style-type: none"> i. Revenue reserve ii. Capital reserve iii. General reserve iv. Specific reserve 	<p>accounting equation.</p> <ul style="list-style-type: none"> • explain the effect of a transaction (increase or decrease) on the assets, liabilities, capital, revenue and expenses. • appreciate that on the basis of source documents, accounting vouchers are prepared for recording transaction in the books of accounts. • develop the understanding of recording of transactions in journal and the skill of calculating GST. • explain the purpose of maintaining a Cash Book and develop the skill of preparing the format of different types of cash books and the method of recording cash transactions in Cash book. • describe the method of recording transactions other than cash transactions as per their nature in different subsidiary books . • appreciate that at times bank balance as indicated by cash book is different from the bank balance as shown by the pass book / bank statement and to reconcile both the balances, bank reconciliation statement is prepared. • develop understanding of preparing bank reconciliation statement. • appreciate that for ascertaining the position of individual accounts, transactions are posted from subsidiary books and journal proper into the concerned accounts in the ledger and develop the skill of ledger posting. • explain the necessity of providing depreciation and develop the skill of using different methods for computing depreciation. • understand the accounting treatment of providing depreciation directly to the concerned asset account or by creating provision for depreciation account.
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<p>v. Secret Reserve</p> <ul style="list-style-type: none"> • Difference between capital and revenue reserve <p>Accounting for Bills of Exchange</p> <ul style="list-style-type: none"> • Bill of exchange and Promissory Note: Definition, Specimen, Features, Parties. • Difference between Bill of Exchange and Promissory Note • Terms in Bill of Exchange: <ul style="list-style-type: none"> i. Term of Bill ii. Accommodation bill (concept) iii. Days of Grace iv. Date of maturity v. Discounting of bill vi. Endorsement of bill vii. Bill after due date viii. Negotiation ix. Bill sent for collection x. Dishonour of bill xi. Retirement of bill xii. Renewal of bill • Accounting Treatment <p>Note: excluding accounting treatment for accommodation bill</p> <p>Trial balance and Rectification of Errors</p> <ul style="list-style-type: none"> • Trial balance: objectives and preparation <p>(Scope: Trial balance with balance method only)</p> <ul style="list-style-type: none"> • Errors: types-errors of omission, commission, principles, and compensating; their effect on Trial Balance. • Detection and rectification of errors; preparation of suspense account. 	<ul style="list-style-type: none"> • appreciate the method of asset disposal through the concerned asset account or by preparing asset disposal account. • appreciate the need for creating reserves and also making provisions for events which may belong to the current year but may happen in next year. • appreciate the difference between reserve and reserve fund. • acquire the knowledge of using bills of exchange and promissory notes for financing business transactions; • understand the meaning and distinctive features of these instruments and develop the skills of their preparation. • state the meaning of different terms used in bills of exchange and their implication in accounting. • explain the method of recording of bill transactions. • state the need and objectives of preparing trial balance and develop the skill of preparing trial balance. • appreciate that errors may be committed during the process of accounting. • understand the meaning of different types of errors and their effect on trial balance. • develop the skill of identification and location of errors and their rectification and preparation of suspense account.
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Part B: Financial Accounting - II

Unit 3: Financial Statements of Sole Proprietorship

Units/Topics	Learning Outcomes
<p>Financial Statements Meaning, objectives and importance; Revenue and Capital Receipts; Revenue and Capital Expenditure; Deferred Revenue expenditure. Trading and Profit and Loss Account: Gross Profit, Operating profit and Net profit. Preparation. Balance Sheet: need, grouping and marshalling of assets and liabilities. Preparation. Adjustments in preparation of financial statements with respect to closing stock, outstanding expenses, prepaid expenses, accrued income, income received in advance, depreciation, bad debts, provision for doubtful debts, provision for discount on debtors, Abnormal loss, Goods taken for personal use/staff welfare, interest on capital and managers commission. Preparation of Trading and Profit and Loss account and Balance Sheet of a sole proprietorship with adjustments.</p> <p>Incomplete Records Features, reasons and limitations. Ascertainment of Profit/Loss by Statement of Affairs method. Difference between accounts from incomplete records and Statement of Affairs. Preparation of Trading, Profit and Loss account and Balance Sheet.</p>	<p>After going through this Unit, the students will be able to:</p> <ul style="list-style-type: none"> • state the meaning of financial statements the purpose of preparing financial statements. • state the meaning of gross profit, operating profit and net profit and develop the skill of preparing trading and profit and loss account. • explain the need for preparing balance sheet. • understand the technique of grouping and marshalling of assets and liabilities. • appreciate that there may be certain items other than those shown in trial balance which may need adjustments while preparing financial statements. • develop the understanding and skill to do adjustments for items and their presentation in financial statements like depreciation, closing stock, provisions, abnormal loss etc. • develop the skill of preparation of trading and profit and loss account and balance sheet. • state the meaning of incomplete records and their uses and limitations. • develop the understanding and skill of computation of profit / loss using the statement of affairs method.

Unit 4: Computers in Accounting

Units/Topics	Learning Outcomes
<ul style="list-style-type: none"> • Introduction to computer and accounting information system {AIS}: Introduction to computers (elements, capabilities, limitations of computer system) • Introduction to operating software, utility software and application software. 	<p>After going through this Unit, the students will be able to:</p> <ul style="list-style-type: none"> • state the meaning of a computer, describe its components, capabilities and limitations. • state the meaning of accounting information system.

<p>Introduction to accounting information system (AIS) as a part of Management Information System.</p> <ul style="list-style-type: none"> Automation of accounting process: meaning Stages in automation: (a) Accounting process in a computerised environment; comparison between manual accounting process and computerised accounting process, (b) Sourcing of accounting software; kinds of software: readymade software; customised software and tailor-made software; generic considerations before sourcing accounting software (c) creation of account groups and hierarchy (d) generation of reports - trial balance, profit and loss account and balance sheet <p>Scope:</p> <p><i>(i) The scope of the unit is to understand accounting as an information system for the generation of accounting information and preparation of accounting reports.</i></p> <p><i>(ii) It is presumed that the working knowledge of any appropriate accounting software will be given to the students to help them learn basic accounting operations on computers.</i></p>	<ul style="list-style-type: none"> appreciate the need for use of computers in accounting for preparing accounting reports. develop the understanding of comparing the manual and computerized accounting process and appreciate the advantages and limitations of automation. understand the different kinds of accounting software.
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Part C: Project Work (Any One)

1. Collection of source documents, preparation of vouchers, recording of transactions with the help of vouchers.
2. Comprehensive project of any sole proprietorship business. This may state with journal entries and their ledgering, preparation of Trial balance. Trading and Profit and Loss Account and Balance Sheet. Expenses, incomes and profit (loss), assets and liabilities are to be depicted using pie chart / bar diagram.

PROJECT WORK

It is suggested to undertake this project after completing the unit on preparation of financial statements. The student(s) will be allowed to select any business of their choice or develop the transaction of imaginary business. The project is to run through the chapters and make the project an interesting process. The amounts should emerge as more realistic and closer to reality.

Specific Guidelines for Teachers

Give a list of options to the students to select a business form. You can add to the given list:

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|-------------------------|-------------------------------|--------------------------|
| 1. A beauty parlour | 10. Men's wear | 19. A coffee shop |
| 2. Men's saloon | 11. Ladies wear | 20. A music shop |
| 3. A tailoring shop | 12. Kiddies wear | 21. A juice shop |
| 4. A canteen | 13. A Saree shop | 22. A school canteen |
| 5. A cake shop | 14. Artificial jewellery shop | 23. An ice cream parlour |
| 6. A confectionery shop | 15. A small restaurant | 24. A sandwich shop |
| 7. A chocolate shop | 16. A sweet shop | 25. A flower shop |
| 8. A dry cleaner | 17. A grocery shop | |
| 9. A stationery shop | 18. A shoe shop | |

After selection, advise the student(s) to visit a shop in the locality (this will help them to settle on a realistic amounts different items. The student(s) would be able to see the things as they need to invest in furniture, decor, lights, machines, computers etc.

A suggested list of different item is given below.

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|--|---|
| 1. Rent | 19. Wages and Salary |
| 2. Advance rent [approximately three months] | 20. Newspaper and magazines |
| 3. Electricity deposit | 21. Petty expenses |
| 4. Electricity bill | 22. Tea expenses |
| 5. Electricity fitting | 23. Packaging expenses |
| 6. Water bill | 24. Transport |
| 7. Water connection security deposit | 25. Delivery cycle or a vehicle purchased |
| 8. Water fittings | 26. Registration |
| 9. Telephone bill | 27. Insurance |
| 10. Telephone security deposit | 28. Auditors fee |
| 11. Telephone instrument | 29. Repairs & Maintenance |
| 12. Furniture | 30. Depreciations |
| 13. Computers | 31. Air conditioners |
| 14. Internet connection | 32. Fans and lights |
| 15. Stationery | 33. Interior decorations |
| 16. Advertisements | 34. Refrigerators |
| 17. Glow sign | 35. Purchase and sales |
| 18. Rates and Taxes | |

At this stage, performas of bulk of originality and ledger may be provided to the students and they may be asked to complete the same.

In the next step the students are expected to prepare the trial balance and the financial statements.

Suggested Question Paper Design
Accountancy (Code No. 055)
Class XI (2021-22)

Theory: 80 Marks
Project: 20 Marks

3 hrs.

S N	Typology of Questions	Marks	Percentage
1	<p>Remembering and Understanding: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas</p>	44	55%
3	<p>Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.</p>	19	23.75%
4	<p>Analysing, Evaluating and Creating: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.</p>	17	21.25%
TOTAL		80	100%

Accountancy (Code No. 055)

Class-XII (2021-22)

Theory: 80 Marks

3 Hours

Project: 20 Marks

Units		Periods	Marks
Part A	Accounting for Not-for-Profit Organizations, Partnership Firms and Companies		
	Unit 1. Financial Statements of Not-for-Profit Organizations	25	10
	Unit 2. Accounting for Partnership Firms	90	30
	Unit 3. Accounting for Companies	35	20
		150	60
Part B	Financial Statement Analysis		
	Unit 4. Analysis of Financial Statements	30	12
	Unit 5. Cash Flow Statement	20	8
		50	20
Part C	Project Work	20	20
	Project work will include:		
	Project File	4 Marks	
	Written Test	12 Marks (One Hour)	
	Viva Voce	4 Marks	
Or			
Part B	Computerized Accounting		
	Unit 4. Computerized Accounting	50	20
Part C	Practical Work	20	20
	Practical work will include:		
	Practical File 4 Marks		
	Practical Examination 12 Marks (One Hour)		
	Viva Voce 4 Marks		

Part A: Accounting for Not-for-Profit Organizations, Partnership Firms and Companies

Unit 1: Financial Statements of Not-for-Profit Organizations

Units/Topics	Learning Outcomes
<ul style="list-style-type: none"> Not-for-profit organizations: concept. Receipts and Payments Account: features and preparation. Income and Expenditure Account: features, preparation of income and expenditure account and balance sheet from the given receipts and payments account with additional information. <p>Scope:</p> <p><i>(i) Adjustments in a question should not exceed 3 or 4 in number and restricted to subscriptions, consumption of consumables and sale of assets/ old material.</i></p> <p><i>(ii) Entrance/admission fees and general donations are to be treated as revenue receipts.</i></p> <p><i>(iii) Trading Account of incidental activities is not to be prepared.</i></p>	<p>After going through this Unit, the students will be able to:</p> <ul style="list-style-type: none"> state the meaning of a Not-for-profit organisation and its distinction from a profit making entity. state the meaning of receipts and payments account, and understanding its features. develop the understanding and skill of preparing receipts and payments account. state the meaning of income and expenditure account and understand its features. develop the understanding and skill of preparing income and expenditure account and balance sheet of a not-for-profit organisation with the help of given receipts and payments account and additional information.

Unit 2: Accounting for Partnership Firms

Units/Topics	Learning Outcomes
<ul style="list-style-type: none"> Partnership: features, Partnership Deed. Provisions of the Indian Partnership Act 1932 in the absence of partnership deed. Fixed v/s fluctuating capital accounts. Preparation of Profit and Loss Appropriation account- division of profit among partners, guarantee of profits. Past adjustments (relating to interest on capital, interest on drawing, salary and profit sharing ratio). Goodwill: nature, factors affecting and methods of valuation - average profit, super profit and capitalization. <p>Note: Interest on partner's loan is to be treated as a</p>	<p>After going through this Unit, the students will be able to:</p> <ul style="list-style-type: none"> state the meaning of partnership, partnership firm and partnership deed. describe the characteristic features of partnership and the contents of partnership deed. discuss the significance of provision of Partnership Act in the absence of partnership deed. differentiate between fixed and fluctuating capital, outline the process and develop the understanding and skill of preparation of Profit and Loss Appropriation Account. develop the understanding and skill of

charge against profits.

Goodwill to be adjusted through partners capital/
current account.

Note: Raising and writing off goodwill is excluded.

Accounting for Partnership firms - Reconstitution and Dissolution.

- **Change in the Profit Sharing Ratio** among the existing partners - sacrificing ratio, gaining ratio, accounting for revaluation of assets and reassessment of liabilities and treatment of reserves and accumulated profits. Preparation of revaluation account and balance sheet.
- **Admission of a partner** - effect of admission of a partner on change in the profit sharing ratio, treatment of goodwill, treatment for revaluation of assets and re- assessment of liabilities, treatment of reserves and accumulated profits, adjustment of capital accounts and preparation of balance sheet.
- **Retirement and death of a partner:** effect of retirement / death of a partner on change in profit sharing ratio, treatment of goodwill, treatment for revaluation of assets and reassessment of liabilities, adjustment of accumulated profits and reserves, adjustment of capital accounts and preparation of balance sheet. Preparation of loan account of the retiring partner.
- Calculation of deceased partner's share of profit till the date of death. Preparation of deceased partner's capital account and his executor's account.
- **Dissolution of a partnership firm:** meaning of dissolution of partnership and partnership firm, types of dissolution of a firm. Settlement of accounts - preparation of realization

preparation profit and loss appropriation
account involving guarantee of profits.

- develop the understanding and skill of making past adjustments.
- state the meaning, nature and factors affecting goodwill
- develop the understanding and skill of valuation of goodwill using different methods.
- state the meaning of sacrificing ratio, gaining ratio and the change in profit sharing ratio among existing partners.
- develop the understanding of accounting treatment of revaluation assets and reassessment of liabilities and treatment of reserves and accumulated profits by preparing revaluation account and balance sheet.
- explain the effect of change in profit sharing ratio on admission of a new partner.
- develop the understanding and skill of treatment of goodwill, treatment of revaluation of assets and re-assessment of liabilities, treatment of reserves and accumulated profits, adjustment of capital accounts and preparation of balance sheet of the new firm.
- explain the effect of retirement / death of a partner on change in profit sharing ratio.
- develop the understanding of accounting treatment of goodwill, revaluation of assets and re-assessment of liabilities and adjustment of accumulated profits and reserves on retirement / death of a partner and capital adjustment.
- develop the skill of calculation of deceased partner's share till the time of his death and prepare deceased partner's executor's account.
- discuss the preparation of the capital

<p>account, and other related accounts: capital accounts of partners and cash/bank a/c (excluding piecemeal distribution, sale to a company and insolvency of partner(s)).</p> <p>Note:</p> <p>(i) If realized value of an asset is not given, it is to be presumed that it has not realised any amount.</p> <p>(ii) If a partner has borne and/ or paid the realisation expenses, it should be stated.</p>	<p>accounts of the remaining partners and the balance sheet of the firm after retirement / death of a partner.</p> <ul style="list-style-type: none"> • understand the situations under which a partnership firm can be dissolved. • develop the understanding of preparation of realisation account and other related accounts.
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Unit-3 Accounting for Companies

Units/Topics	Learning Outcomes
<p>Accounting for Share Capital</p> <ul style="list-style-type: none"> • Share and share capital: nature and types. • Accounting for share capital: issue and allotment of equity and preference shares. Public subscription of shares - over subscription and under subscription of shares; issue at par and at premium, calls in advance and arrears (excluding interest), issue of shares for consideration other than cash. • Concept of Private Placement and Employee Stock Option Plan (ESOP). • Accounting treatment of forfeiture and re-issue of shares. • Disclosure of share capital in the Balance Sheet of a company. <p>Accounting for Debentures</p> <ul style="list-style-type: none"> • Debentures: Issue of debentures at par, at a premium and at a discount. Issue of debentures for consideration other than cash; Issue of debentures with terms of redemption; debentures as collateral security-concept, interest on debentures. Writing off discount / loss on issue of debentures. <p>Note: Discount or loss on issue of debentures to be</p>	<p>After going through this Unit, the students will be able to:</p> <ul style="list-style-type: none"> • state the meaning of share and share capital and differentiate between equity shares and preference shares and different types of share capital. • understand the meaning of private placement of shares and Employee Stock Option Plan. • explain the accounting treatment of share capital transactions regarding issue of shares. • develop the understanding of accounting treatment of forfeiture and re-issue of forfeited shares. • describe the presentation of share capital in the balance sheet of the company as per schedule III part I of the Companies Act 2013. • explain the accounting treatment of different categories of transactions related to issue of debentures. • develop the understanding and skill of writing off discount / loss on issue of debentures. • understand the concept of collateral security and its presentation in balance sheet. • develop the skill of calculating interest on debentures and its accounting treatment.

<p>written off in the year debentures are allotted from Security Premium Reserve/ Capital Reserve/ Statement of Profit and Loss as Financial Cost (AS 16) in that order.</p> <ul style="list-style-type: none"> • Redemption of debentures-Methods: Lump sum, draw of lots. • Creation of Debenture Redemption Reserve. • Investment in Debenture Redemption Investment <p><i>Note: Related sections of the Companies Act, 2013 will apply.</i></p> <p><i>Concept of Tax Deducted at Source (TDS) is excluded.</i></p>	<ul style="list-style-type: none"> • state the meaning of redemption of debentures. • develop the understanding of accounting treatment of transactions related to redemption of debentures by lump sum, draw of lots and Creation of Debenture Redemption Reserve.
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Part B: Financial Statement Analysis

Unit 4: Analysis of Financial Statements

Units/Topics	Learning Outcomes
<p>Financial statements of a Company: Statement of Profit and Loss and Balance Sheet in prescribed form with major headings and sub headings (as per Schedule III to the Companies Act, 2013)</p> <p>Note: <i>Exceptional items, extraordinary items and profit (loss) from discontinued operations are excluded.</i></p> <ul style="list-style-type: none"> • Financial Statement Analysis: Objectives, importance and limitations. • Tools for Financial Statement Analysis: Comparative statements, common size statements, cash flow analysis, ratio analysis. • Accounting Ratios: Meaning, Objectives, classification and computation. • Liquidity Ratios: Current ratio and Quick ratio. • Solvency Ratios: Debt to Equity Ratio, Total Asset to Debt Ratio, Proprietary Ratio and 	<p>After going through this Unit, the students will be able to:</p> <ul style="list-style-type: none"> • develop the understanding of major headings and sub-headings (as per Schedule III to the Companies Act, 2013) of balance sheet as per the prescribed norms / formats. • state the meaning, objectives and limitations of financial statement analysis. • discuss the meaning of different tools of 'financial statements analysis'. • develop the understanding and skill of preparation of comparative and common size financial statements. • state the meaning, objectives and significance of different types of ratios. • develop the understanding of computation of current ratio and quick ratio. • develop the skill of computation of debt equity ratio, total asset to debt ratio, proprietary ratio and interest coverage ratio.

<p>Interest Coverage Ratio.</p> <ul style="list-style-type: none"> • Activity Ratios: Inventory Turnover Ratio, Trade Receivables Turnover Ratio, Trade Payables Turnover Ratio and Working Capital Turnover Ratio. • Profitability Ratios: Gross Profit Ratio, Operating Ratio, Operating Profit Ratio, Net Profit Ratio and Return on Investment. 	<ul style="list-style-type: none"> • develop the skill of computation of inventory turnover ratio, trade receivables and trade payables ratio and working capital turnover ratio. • develop the skill of computation of gross profit ratio, operating ratio, operating profit ratio, net profit ratio and return on investment.
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Note: Net Profit Ratio is to be calculated on the basis of profit before and after tax.

Unit 5: Cash Flow Statement

Units/Topics	Learning Outcomes
<ul style="list-style-type: none"> • Meaning, objectives and preparation (as per AS 3 (Revised) (Indirect Method only) <p>Note:</p> <p><i>(i) Adjustments relating to depreciation and amortization, profit or loss on sale of assets including investments, dividend (both final and interim) and tax.</i></p> <p><i>(ii) Bank overdraft and cash credit to be treated as short term borrowings.</i></p> <p><i>(iii) Current Investments to be taken as Marketable securities unless otherwise specified.</i></p>	<p>After going through this Unit, the students will be able to:</p> <ul style="list-style-type: none"> • state the meaning and objectives of cash flow statement. • develop the understanding of preparation of Cash Flow Statement using indirect method as per AS 3 with given adjustments.

Note: Previous years' Proposed Dividend to be given effect, as prescribed in AS-4, Events occurring after the Balance Sheet date. Current years' Proposed Dividend will be accounted for in the next year after it is declared by the shareholders.

Project Work : One specific project as per Guidelines published by the CBSE.

OR

Part B: Computerised Accounting

Unit 4: Computerised Accounting

Overview of Computerised Accounting System

- Introduction: Application in Accounting.
- Features of Computerised Accounting System.
- Structure of CAS.
- Software Packages: Generic; Specific; Tailored.

Accounting Application of Electronic Spreadsheet.

- Concept of electronic spreadsheet.
- Features offered by electronic spreadsheet.
- Application in generating accounting information - bank reconciliation statement; asset accounting; loan repayment of loan schedule, ratio analysis
- Data representation- graphs, charts and diagrams.

Using Computerized Accounting System.

- Steps in installation of CAS, codification and Hierarchy of account heads, creation of accounts.
- Data: Entry, validation and verification.
- Adjusting entries, preparation of balance sheet, profit and loss account with closing entries and opening entries.
- Need and security features of the system.

Database Management System (DBMS)

- Concept and Features of DBMS.
- DBMS in Business Application.
- Generating Accounting Information - Payroll.

Part C: Practical Work

Please refer to the guidelines published by CBSE.

Prescribed Books:

Financial Accounting -I	Class XI	NCERT Publication
Accountancy -II	Class XI	NCERT Publication
Accountancy -I	Class XII	NCERT Publication
Accountancy -II	Class XII	NCERT Publication
Accountancy – Computerised Accounting System	Class XII	NCERT Publication

Guidelines for Project Work in Accounting and Practical work in computerised Accounting Class XII CBSE Publication

**Suggested Question Paper Design
Accountancy (Code No. 055)
Class XII (2021-22)**

**Theory: 80 Marks
Project: 20 Marks**

3 hrs.

S N	Typology of Questions	Marks	Percentage
1	<p>Remembering and Understanding: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas</p>	44	55%
3	<p>Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.</p>	19	23.75%
4	<p>Analysing, Evaluating and Creating: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.</p>	17	21.25%
TOTAL		80	100%

BIOLOGY (Code No. 044)

2021-22

The present curriculum provides the students with updated concepts along with an extended exposure to contemporary areas of the subject. The curriculum also aims at emphasizing the underlying principles that are common to animals, plants and microorganisms as well as highlighting the relationship of Biology with other areas of knowledge. The format of the curriculum allows a simple, clear, sequential flow of concepts. It relates the study of biology to real life through the use of technology. It links the discoveries and innovations in biology to everyday life such as environment, industry, health and agriculture. The updated curriculum focuses on understanding and application of scientific principles, while ensuring that ample opportunities and scope for learning and appreciating basic concepts continue to be available within its framework. The broad aims of the curriculum are:

- promote understanding of basic principles of Biology
- encourage learning of emerging knowledge and its relevance to individual and society
- promote rational/scientific attitude especially towards issues related to population, environment and development
- enhance awareness about environmental issues, problems and their appropriate solutions
- create awareness amongst the learners about diversity in living organisms and develop respect for other living beings
- appreciate that the most complex biological phenomena are built on essentially simple processes
- develop skills that are relevant to the study and practice of Biology
- encourage a systematic approach to problem – solving
- encourage effective communication

It is expected that the students would get an exposure to various branches of Biology in the curriculum in a more contextual and systematic manner as they study its various units.

BIOLOGY (Code No. 044) COURSE STRUCTURE CLASS XI (2021-22) (THEORY)

Time: 03 Hours

Max. Marks: 70

Unit	Title	No. of Periods	Marks
I	Diversity of Living Organisms	27	12
II	Structural Organization in Plants and Animals	27	12
III	Cell: Structure and Functions	26	12
IV	Plant Physiology	40	17
V	Human Physiology	40	17
	Total	160	70

Unit-I Diversity of Living Organisms

Chapter-1: The Living World

What is living? Biodiversity; Need for classification; taxonomy and systematics; concept of species and taxonomical hierarchy; binomial nomenclature; tools for study of taxonomy- museums, zoological parks, herbaria, botanical gardens, keys for identification.

Chapter-2: Biological Classification

Five kingdom classification; Salient features and classification of Monera, Protista and Fungi into major groups; Lichens, Viruses and Viroids.

Chapter-3: Plant Kingdom

Salient features and classification of plants into major groups - Algae, Bryophyta, Pteridophyta, Gymnospermae and Angiospermae (salient and distinguishing features and a few examples of each category): Angiosperms - classification up to class, characteristic features and examples. Plant life cycles and alternation of generations

Chapter-4: Animal Kingdom

Basis of Classification; Salient features and classification of animals, non-chordates up to phyla level and chordates up to class level (salient features and distinguishing features of a few examples of each category).

(No live animals or specimen should be displayed in school.)

Unit-II Structural Organization in Plants and Animals

Chapter-5: Morphology of Flowering Plants

Morphology and modifications: Morphology of different parts of flowering plants: root, stem, leaf, inflorescence, flower, fruit and seed. Description of families: Fabaceae, Solanaceae and Liliaceae (to be dealt along with the relevant experiments of the Practical Syllabus).

Chapter-6: Anatomy of Flowering Plants

Anatomy and functions of different tissues and tissue systems in dicots and monocots. Secondary growth.

Chapter-7: Structural Organisation in Animals

Animal tissues; Morphology, Anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of an insect-cockroach (a brief account only).

Unit-III Cell: Structure and Functions

Chapter-8: Cell-The Unit of Life

Cell theory and cell as the basic unit of life, structure of prokaryotic and eukaryotic cells; Plant cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system- endoplasmic reticulum, ribosomes, golgi bodies, lysosomes, vacuoles; mitochondria, plastids, microbodies; cytoskeleton, cilia, flagella, centrioles (ultrastructure and function); nucleus.

Chapter-9: Biomolecules

Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, nucleic acids; concept of metabolism; Enzymes - properties, enzyme action, factors, classification, Co-factors.

Chapter-10: Cell Cycle and Cell Division

Cell cycle, mitosis, meiosis and their significance

Unit-IV Plant Physiology

Chapter-11: Transport in Plants

Movement of water, gases and nutrients; cell to cell transport - diffusion, facilitated diffusion, active transport; plant-water relations, imbibition, water potential, osmosis, plasmolysis; long distance transport of water - Absorption, apoplast, symplast, transpiration pull, root pressure and guttation; transpiration, opening and closing of stomata; Uptake and translocation of mineral nutrients - Transport of food, phloem transport, mass flow hypothesis.

Chapter-12: Mineral Nutrition

Elementary idea of hydroponics as a method to study mineral nutrition; essential minerals, macro- and micronutrients and their role; deficiency symptoms; mineral toxicity; nitrogen metabolism, nitrogen cycle, biological nitrogen fixation.

Chapter-13: Photosynthesis in Higher Plants

Photosynthesis as a means of autotrophic nutrition; early experiments, site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C3 and C4 pathways; factors affecting photosynthesis.

Chapter-14: Cellular Respiration

Exchange of gases; do plants breathe; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules generated; amphibolic pathways; respiratory quotient.

Chapter-15: Plant - Growth and Development

Seed germination; characteristics, measurements and phases of plant growth, growth rate; conditions for growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA; seed dormancy; vernalisation; photoperiodism.

Unit-V Human Physiology

Chapter-16: Digestion and Absorption

Alimentary canal and digestive glands, role of digestive enzymes and gastrointestinal hormones; Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats; egestion; nutritional and digestive disorders - indigestion, constipation, vomiting, jaundice, diarrhoea.

Chapter-17: Breathing and Exchange of Gases

Introduction to respiratory organs in animals; Respiratory system in humans; mechanism of breathing and its regulation in humans - exchange of gases, transport of gases and regulation of respiration, respiratory volumes; disorders related to respiration - asthma, emphysema, occupational respiratory disorders.

Chapter-18: Body Fluids and Circulation

Composition of blood, blood groups, coagulation of blood; composition of lymph and its function; circulatory pathways; human circulatory system - Structure of human heart and blood vessels; cardiac cycle, cardiac output, ECG; double circulation; regulation of cardiac activity; disorders of circulatory system - hypertension, coronary artery disease, angina pectoris, heart failure.

Chapter-19: Excretory Products and their Elimination

Modes of excretion - ammonotelism, ureotelism, uricotelism; human excretory system – structure and function; urine formation, osmoregulation; regulation of kidney function - renin - angiotensin, atrial natriuretic factor, ADH, diabetes insipidus; micturition; role of other organs in excretion; disorders - uremia, renal failure, renal calculi, nephritis; dialysis and artificial kidney, kidney transplant.

Chapter-20: Locomotion and Movement

Types of movement – amoeboid, ciliary, flagellar, muscular; types of muscles; skeletal muscle, contractile proteins and muscle contraction; skeletal system and its functions; joints; disorders of muscular and skeletal systems - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.

Chapter-21: Neural Control and Coordination

Neuron and nerves; Nervous system in humans - central nervous system and peripheral nervous system; generation, conduction and transmission of nerve impulse; reflex action; sensory perception; sense organs; elementary structure and functions of eye and ear.

Chapter-22: Chemical Coordination and Integration

Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, thymus, adrenal, pancreas, gonads; hormones of heart, kidney and gastrointestinal tract; mechanism of hormone action (elementary idea); role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease.

Note: Diseases related to all the human physiological systems to be taught in brief.

PRACTICALS

Time: 03 hours

Max. Marks: 30

Evaluation Scheme		Marks
One Major Experiment Part A (Experiment No- 1,3,7,8)		5
One Minor Experiment Part A (Experiment No- 6,9,10,11,12,13)		4
Slide Preparation Part A (Experiment No- 2,4,5)		5
Spotting Part B		7
Practical Record + Viva Voce	Credit to the students' work over the academic session may be given	4
Project Record + Viva Voce		5
Total		30

A: List of Experiments

1. Study and describe three locally available common flowering plants, one from each of the families Solanaceae, Fabaceae and Liliaceae (Poaceae, Asteraceae or Brassicaceae can be substituted in case of particular geographical location) including dissection and display of floral whorls, anther and ovary to show number of chambers (floral formulae and floral diagrams). Types of root (Tap and adventitious); types of stem (herbaceous and woody); leaf (arrangement, shape, venation, simple and compound).
2. Preparation and study of T.S. of dicot and monocot roots and stems (primary).
3. Study of osmosis by potato osmometer.
4. Study of plasmolysis in epidermal peels (e.g. Rhoec/lily leaves or flashy scale leaves of onion bulb).
5. Study of distribution of stomata in the upper and lower surfaces of leaves.
6. Comparative study of the rates of transpiration in the upper and lower surface of leaves.
7. Test for the presence of sugar, starch, proteins and fats in suitable plant and animal materials.
8. Separation of plant pigments through paper chromatography.
9. Study of the rate of respiration in flower buds/leaf tissue and germinating seeds.
10. Test for presence of urea in urine.
11. Test for presence of sugar in urine.
12. Test for presence of albumin in urine.
13. Test for presence of bile salts in urine.

B. Careful observation of the following (spotting):

1. Parts of a compound microscope.
2. Specimens/slides/models and identification with reasons - Bacteria, *Oscillatoria*, *Spirogyra*, *Rhizopus*, mushroom, yeast, liverwort, moss, fern, pine, one monocotyledonous plant, one dicotyledonous plant and one lichen.
3. Virtual specimens/slides/models and identifying features of - *Amoeba*, *Hydra*, liverfluke, *Ascaris*, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, rohu, frog, lizard, pigeon and rabbit.
4. Tissues and diversity in shape and size of plant cells (palisade cells, guard cells, parenchyma, collenchyma, sclerenchyma, xylem and phloem) through temporary and permanent slides.

5. Tissues and diversity in shape and size of animal cells (squamous epithelium, smooth, skeletal and cardiac muscle fibers and mammalian blood smear) through temporary/permanent slides.
6. Mitosis in onion root tip cells and animals cells (grasshopper) from permanent slides.
7. Different modifications in roots, stems and leaves.
8. Different types of inflorescence (cymose and racemose).
9. Human skeleton and different types of joints with the help of virtual images/models only.

Practical Work for Visually Impaired Students - Class XI

Note: The ‘Evaluation scheme’ and ‘General Guidelines’ for visually impaired students given at the end of this document may be referred to.

A. Items for Identification/Familiarity with the apparatus /equipment/animal and plant material / chemicals etc. for assessment in practicals (All experiments)

- Plants of Solanaceae family (Brinjal, Petunia or any other), Fabaceae family (Pea, Gram or any other) or The Liliaceae family (Any of the Lilies)
- Mushroom, Succulents such as *Aloe vera/Kalanchoe*
- Raisins and Potatoes
- Honey comb, Mollusc shell, Model of cockroach, Pigeon and Star fish
- Compound microscope, Test tube, Petri dish, Beaker, Scalpel
- Chromatography paper, Chromatography chamber, Alcohol

B. List of Practical

1. Study three locally available common flowering plants of the families – Solanaceae, Fabaceae, Liliaceae and identify:
2. Types of stems as Herbaceous or Woody, Types of leaves as Compound or Simple
3. Study the parts of a compound microscope- eye piece and objective lens, mirror, stage, coarse and fine adjustment knobs.
4. Differentiate between monocot and dicot plants on the basis of venation patterns.
5. Study the following parts of human skeleton (Model): Ball and socket joints of thigh and shoulder, Rib cage
6. Study honey-bee/butterfly, snail shell, Starfish, Pigeon (through models).
7. Identify the given specimen of a fungus – Mushroom, gymnosperm- pine cone
8. Identify and relate the experimental set up with the aim of experiment:

For Potato Osmometer/ endosmosis in raisins.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Biology Class-XI, Published by NCERT
2. Other related books and manuals brought out by NCERT (including multimedia)

CLASS XII (2021-22) (THEORY)

Time: 03 Hours

Max. Marks: 70

Unit	Title	No. of Periods	Marks
VI	Reproduction	30	14
VII	Genetics and Evolution	40	18
VIII	Biology and Human Welfare	30	14
IX	Biotechnology and its Applications	30	10
X	Ecology and Environment	30	14
	Total	160	70

Unit-VI Reproduction

Chapter-1: Reproduction in Organisms

Reproduction, a characteristic feature of all organisms for continuation of species; modes of reproduction - asexual and sexual reproduction; asexual reproduction - binary fission, sporulation, budding, gemmule formation, fragmentation; vegetative propagation in plants; events in sexual reproduction.

Chapter-2: Sexual Reproduction in Flowering Plants

Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; outbreeding devices; pollen-pistil interaction; double fertilization; post fertilization events - development of endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

Chapter-3: Human Reproduction

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis - spermatogenesis and oogenesis; menstrual cycle; fertilisation, embryo development upto blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).

Chapter-4: Reproductive Health

Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods; medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT, AI (brief overview).

Unit-VII Genetics and Evolution

Chapter-5: Principles of Inheritance and Variation

Heredity and variation, Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; linkage and crossing over; Sex determination - in human being, birds, grasshopper and honey bee; Mutation, Pedigree analysis, sex linked inheritance - haemophilia, colour blindness; Mendelian disorders in humans –sickle cell anaemia, Phenylketonuria, thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Chapter-6: Molecular Basis of Inheritance

Structure of DNA and RNA; DNA packaging; Search for genetic material and DNA as genetic

material; DNA replication; Central Dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; Human genome project; DNA fingerprinting.

Chapter-7: Evolution

Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); adaptive radiation; Biological evolution: Lamarck's theory of use and disuse of organs, Darwin's theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy - Weinberg's principle; brief account of evolution; human evolution.

Unit-VIII Biology and Human Welfare

Chapter-8: Human Health and Diseases

Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

Chapter-9: Strategies for Enhancement in Food Production

Animal husbandry, Plant breeding, tissue culture, single cell protein.

Chapter-10: Microbes in Human Welfare

Microbes in food processing, industrial production, Antibiotics; production and judicious use, sewage treatment, energy generation and microbes as bio-control agents and bio-fertilizers.

Unit-IX Biotechnology and its Applications

Chapter-11: Biotechnology - Principles and Processes

Genetic Engineering (Recombinant DNA Technology).

Chapter-12: Biotechnology and its Application

Application of biotechnology in health and agriculture: genetically modified organisms - Bt crops; RNA interference, Human insulin, gene therapy; molecular diagnosis; transgenic animals; biosafety issues, biopiracy and patents.

Unit-X Ecology and Environment

Chapter-13: Organisms and Populations

Organisms and environment: Habitat and niche, abiotic factors, ecological adaptations; population interactions - mutualism, competition, predation, parasitism, commensalism; population attributes - growth, birth rate and death rate, age distribution.

Chapter-14: Ecosystem

Ecosystem: structure and function; productivity and decomposition; energy flow; pyramids of number, biomass, energy; nutrient cycles (carbon and phosphorous); ecological succession; ecological services - carbon fixation, pollination, seed dispersal, oxygen release (in brief).

Chapter-15: Biodiversity and Conservation

Biodiversity - Concept, levels, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

Chapter-16: Environmental Issues

Air pollution and its control; water pollution and its control; agrochemicals and their effects; solid waste management; radioactive waste management; greenhouse effect and climate change impact and mitigation; ozone layer depletion; deforestation; case study exemplifying success story addressing environmental issue(s).

PRACTICALS

Time allowed: 3 Hours

Max. Marks: 30

Evaluation Scheme		Marks
One Major Experiment	5, 6, 8, 9	5
One Minor Experiment	2, 3, 4	4
Slide Preparation	1, 7	5
Spotting		7
Practical Record + Viva Voce	} Credit to the students' work over the academic session may be given	4
Investigatory Project and its Project and its Record + Viva Voce		5
Total		30

A. List of Experiments

60 Periods

1. Prepare a temporary mount to observe pollen germination.
2. Collect and study soil from at least two different sites and study them for texture, moisture content, pH and water holding capacity. Correlate with the kinds of plants found in them.
3. Collect water from two different water bodies around you and study them for pH, clarity and presence of any living organism.
4. Study the presence of suspended particulate matter in air at two widely different sites.
5. Study the plant population density by quadrat method.
6. Study the plant population frequency by quadrat method.
7. Prepare a temporary mount of onion root tip to study mitosis.
8. Study the effect of different temperatures and three different pH on the activity of salivary amylase on starch.
9. Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.

B. Careful observation of the following (Spotting):

1. Flowers adapted to pollination by different agencies (wind, insects, birds).
2. Pollen germination on stigma through a permanent slide or scanning electron micrograph.
3. Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).
4. Meiosis in onion bud cell or grasshopper testis through permanent slides.
5. T.S. of blastula through permanent slides (Mammalian).
6. Mendelian inheritance using seeds of different colour/sizes of any plant.
7. Prepared pedigree charts of any one of the genetic traits such as rolling of tongue, blood groups,

ear lobes, widow's peak and colourblindness.

8. Controlled pollination - emasculation, tagging and bagging.
9. Common disease causing organisms like *Ascaris*, *Entamoeba*, *Plasmodium*, any fungus causing ringworm through permanent slides, models or virtual images. Comment on symptoms of diseases that they cause.
10. Two plants and two animals (models/virtual images) found in xeric conditions. Comment upon their morphological adaptations.
11. Two plants and two animals (models/virtual images) found in aquatic conditions. Comment upon their morphological adaptations.

Practical Work for Visually Impaired Students - Class XII

Note: The 'Evaluation scheme' and 'General Guidelines' for visually impaired students given at the end of this document may be referred to.

A. Items for Identification/ familiarity with the apparatus for assessment in practicals (All experiments)

- Soil from different sites- sandy, clayey, loamy;
- Small potted plants, Cactus/*Opuntia* (model), Large flowers, Maize inflorescence.
- Model of *Ascaris* and developmental stages of frog highlighting morula and blastula.
- Beaker, flask, petri plates, test tubes, aluminium foil, paint brush, bunsen burner/spirit lamp/water bath.
- Starch solution, iodine, ice cubes.

B. List of Practicals

1. Study of the soil obtained from at least two different sites for their texture.
2. Study of flowers adapted to pollination by different agencies (wind, insects).
3. Identification of T.S of morula or blastula of frog (model).
4. Study of Mendelian inheritance pattern using beads/seeds of different sizes/texture.
5. Preparation of pedigree charts of genetic traits such as rolling of tongue, colour blindness.
6. Study of emasculation, tagging and bagging by trying out an exercise on controlled pollination.
7. Identify common disease causing organisms like *Ascaris* (*Model*) and learn some common symptoms of the disease that they cause.
8. Comment upon the morphological adaptations of plants found in xerophytic conditions.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Biology, Class-XII, Published by NCERT
2. Other related books and manuals brought out by NCERT (including multimedia)
3. Biology Supplementary Material (Revised). Available on CBSE website.

Practical Examination for Visually Impaired Students of Classes XI and XII
Evaluation Scheme

Time Allowed: Two hours

Max. Marks: 30

Topic	Marks
Identification/Familiarity with the apparatus	5
Written test (Based on given / prescribed practicals)	10
Practical Records	5
Viva	10
Total	30

General Guidelines

- The practical examination will be of two-hour duration. A separate list of experiments is included in the curriculum.
- The written examination in practicals for these students will be conducted at the time of practical examination of all other students.
- The written test will be of 30 minutes duration.
- The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.
- All questions included in the question paper should be related to the listed practicals. Every question should require about two minutes to be answered.
- Questions may be generated jointly by the external/internal examiners and used for assessment.
- A writer may be allowed to such students as per CBSE examination rules.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.
- The viva questions may include questions based on basic theory / principle / concept, apparatus / materials / chemicals required, procedure, precautions, sources of error etc.

Question Paper Design (Theory) 2021-22
Class XII
Biology (044)

Typology of Questions →		Section A	Section B	Section C	Section D	Section E	Total	%
Competencies ↓		VSA (1 marks)	Case-based Questions	SA (2 marks)	LA-I (3 marks)	LA-II (5 marks)		
Demonstrate Knowledge and Understanding	Remembering	4 (1) =4	-	1 (2) =2	1 (3) =3	1 (5) =5	14	20%
	Understanding	7 (1) =7	1 (5) =5	3 (2) =6	1 (3) =3	-	21	30%
Application of Knowledge / Concepts		1 (1) =1	1(5) = 5	2 (2) =4	2 (3) = 6	1 (5) = 5	21	30%
Formulate, Analyse, Evaluate and Create		2 (1) =2	1 (4) = 4	-	1 (3) = 3	1 (5) = 5	14	20%
Total		14(14) =14	3 (14)	6 (2) = 12	5 (3) = 15	3 (5) = 15	31 (70)	100

Note:

All questions would be compulsory. However, an internal choice of approximately 33% would be provided.

Section- 'A' would have 10 MCQs (including matching type MCQs) and 04 Assertion-Reasoning type questions of one mark each.

Section 'B' would have 3 source-based/case-based /passage-based/integrated assessment questions: 2 questions of 5 marks each and 1 question of 4 marks with sub parts of the values 1/2/3 marks each.

Section 'C' would have 6 Short Answer (SA) type questions carrying 2 marks each.

Section 'D' would have 5 Long Answer-I (LA-I) type questions carrying 3 marks each.

Section 'E' would have 3 Long Answer-II (LA-II) type questions carrying 5 marks each.

Internal Choice would be provided in 3 questions of Section 'C', in 2 questions of Section 'D' and in all three questions of Section 'E'.

Suggestive verbs for various competencies

- **Demonstrate Knowledge and Understanding**
State, name, list, identify, define, suggest, describe, outline, summarize, etc.
- **Application of Knowledge/Concepts**
Calculate, illustrate, show, adapt, explain, distinguish, etc.
- **Formulate, Analyze, Evaluate and Create**
Interpret, analyse, compare, contrast, examine, evaluate, discuss, construct, etc.

BUSINESS STUDIES (Code No. 054)

Rationale

The courses in Business Studies and Accountancy are introduced at + 2 stage of Senior Secondary Education as formal commerce education is provided after first ten years of schooling. Therefore, it becomes necessary that instructions in these subjects are given in such a manner that students have a good understanding of the principles and practices bearing in business (trade and industry) as well as their relationship with the society.

Business is a dynamic process that brings together technology, natural resources and human initiative in a constantly changing global environment. To understand the framework in which a business operates, a detailed study of the organisation and management of business processes and its interaction with the environment is required. Globalisation has changed the way organizations transact their business.

Information Technology is becoming a part of business operations in more and more organisations. Computerised systems are fast replacing other systems. E-business and other related concepts are picking up fast which need to be emphasized in the curriculum.

The course in Business Studies prepares students to analyse, manage, evaluate and respond to changes which affect business. It provides a way of looking at and interacting with the business environment. It recognizes the fact that business influences and is influenced by social, political, legal and economic forces.

It allows students to appreciate that business is an integral component of society and develops an understanding of many social and ethical issues.

Therefore, to acquire basic knowledge of the business world, a course in Business Studies would be useful. It also informs students of a range of study and work options and bridges the gap between school and work.

Objectives:

- To inculcate business attitude and develop skills among students to pursue higher education, world of work including self employment.
- To develop students with an understanding of the processes of business and its environment;
- To acquaint students with the dynamic nature and inter-dependent aspects of business;
- To develop an interest in the theory and practice of business, trade and industry;
- To familiarize students with theoretical foundations of the process of organizing and managing the operations of a business firm;
- To help students appreciate the economic and social significance of business activity and the social cost and benefits arising there from;
- To acquaint students with the practice of managing the operations and resources of business;
- To enable students to act more effectively and responsibly as consumers, employers, employees and citizens;

BUSINESS STUDIES (Code No. 054)
CLASS–XI (2021-22)

Theory: 80 Marks
Project: 20 Marks

3 Hours

Units		Periods	Marks
Part A	Foundations of Business		
1	Nature and Purpose of Business	18	16
2	Forms of Business Organisations	24	
3	Public, Private and Global Enterprises	18	14
4	Business Services	18	
5	Emerging Modes of Business	10	10
6	Social Responsibility of Business and Business Ethics	12	
	Total	100	40
Part B	Finance and Trade		
7	Sources of Business Finance	30	20
8	Small Business	16	
9	Internal Trade	30	20
10	International Business	14	
	Total	90	40
	Project Work	30	20

Part A: Foundation of Business

Concept includes meaning and features

Unit 1: Evolution and Fundamentals of Business

Content	After going through this unit, the student/ learner would be able to:
History of Trade and Commerce in India: Indigenous Banking System, Rise of Intermediaries, Transport, Trading Communities: Merchant Corporations, Major Trade Centres, Major Imports and Exports, Position of Indian Sub-Continent in the World Economy.	<ul style="list-style-type: none"> To acquaint the History of Trade and Commerce in India
Business – meaning and characteristics	<ul style="list-style-type: none"> Understand the meaning of business with special reference to economic and non-economic activities. Discuss the characteristics of business.
Business, profession and employment-Concept	<ul style="list-style-type: none"> Understand the concept of business, profession and employment. Differentiate between business, profession and employment.

Objectives of business	<ul style="list-style-type: none"> • Appreciate the economic and social objectives of business. • Examine the role of profit in business.
Classification of business activities - Industry and Commerce	<ul style="list-style-type: none"> • Understand the broad categories of business activities- industry and commerce.
Industry-types: primary, secondary, tertiary Meaning and subgroups	<ul style="list-style-type: none"> • Describe the various types of industries.
Commerce-trade: (types-internal, external; wholesale and retail) and auxiliaries to trade; (banking, insurance, transportation, warehousing, communication, and advertising) – meaning	<ul style="list-style-type: none"> • Discuss the meaning of commerce, trade and auxiliaries to trade. • Discuss the meaning of different types of trade and auxiliaries to trade. • Examine the role of commerce-trade and auxiliaries to trade.
Business risk-Concept	<ul style="list-style-type: none"> • Understand the concept of risk as a special characteristic of business. • Examine the nature and causes of business risks.

Unit 2: Forms of Business organizations

Sole Proprietorship-Concept, merits and limitations.	<ul style="list-style-type: none"> • List the different forms of business organizations and understand their meaning. • Identify and explain the concept, merits and limitations of Sole Proprietorship.
Partnership - Concept, types, merits and limitation of partnership, registration of a partnership firm, partnership deed. Types of partners Partnership vs. Limited Liability Partnership (LLP)	<ul style="list-style-type: none"> • Identify and explain the concept, merits and limitations of a Partnership firm. • Understand the types of partnership on the basis of duration and on the basis of liability. • State the need for registration of a partnership firm. • Discuss types of partners –active, sleeping, secret, nominal and partner by estoppel.
Hindu Undivided Family Business: Concept	<ul style="list-style-type: none"> • Understand the concept of Hindu Undivided Family Business.
Cooperative Societies-Concept, merits, and limitations.	<ul style="list-style-type: none"> • Identify and explain the concept, merits and limitations of Cooperative Societies. • Understand the concept of consumers, producers, marketing, farmers, credit and housing co-operatives.

Company - Concept, merits and limitations; Types: Private, Public and One Person Company – Concept Private Company vs. Limited Liability Partnership (LLP)	<ul style="list-style-type: none"> • Identify and explain the concept, merits and limitations of private and public companies. • Understand the meaning of one person company. • Distinguish between a private company and a public company.
Formation of company - stages, important documents to be used in formation of a company	<ul style="list-style-type: none"> • Highlight the stages in the formation of a company. • Discuss the important documents used in the various stages in the formation of a company.
Choice of form of business organization	<ul style="list-style-type: none"> • Distinguish between the various forms of business organizations. • Explain the factors that influence the choice of a suitable form of business organization.

Unit 3: Public, Private and Global Enterprises

Public sector and private sector enterprises – Concept	<ul style="list-style-type: none"> • Develop an understanding of Public sector and private sector enterprises
Forms of public sector enterprises: Departmental Undertakings, Statutory Corporations and Government Company.	<ul style="list-style-type: none"> • Identify and explain the features, merits and limitations of different forms of public sector enterprises
Global Enterprises – Feature. Joint ventures, Public private partnership – concept	<ul style="list-style-type: none"> • Develop an understanding of Global Enterprises, joint ventures and public private partnership by studying their meaning and features.

Unit 4: Business Services

Business services – meaning and types. Banking: Types of bank accounts - savings, current, recurring, fixed deposit and multiple option deposit account	<ul style="list-style-type: none"> • Understand the meaning and types of business services. • Discuss the meaning and types of Business service Banking • Develop an understanding of difference types of bank account.
Banking services with particular reference to Bank Draft, Bank Overdraft, Cash credit. E-Banking meaning, Types of digital payments	<ul style="list-style-type: none"> • Develop an understanding of the different services provided by banks
Insurance – Principles. Types – life, health, fire and marine insurance – concept	<ul style="list-style-type: none"> • Recall the concept of insurance • Understand Utmost Good Faith, Insurable Interest, Indemnity, Contribution, Doctrine of Subrogation and Causa Proxima as principles of insurance

	<ul style="list-style-type: none"> • Discuss the meaning of different types of insurance-life, health, fire, marine insurance.
Postal Service - Mail, Registered Post, Parcel, Speed Post, Courier - meaning	<ul style="list-style-type: none"> • Understand the utility of different telecom services

Unit 5: Emerging Modes of Business

E - business: concept, scope and benefits	<ul style="list-style-type: none"> • Give the meaning of e-business. • Discuss the scope of e-business. • Appreciate the benefits of e-business • Distinguish e-business from traditional business.
Business Process Outsourcing (BPO): Concept, need and scope	<ul style="list-style-type: none"> • Understand the concept of outsourcing. • Examine the scope of outsourcing, appreciate the need of outsourcing. • Discuss the meaning of Business Process Outsourcing and Knowledge Process Outsourcing

Unit 6: Social Responsibility of Business and Business Ethics

Concept of social responsibility	<ul style="list-style-type: none"> • State the concept of social responsibility.
Case for social responsibility	<ul style="list-style-type: none"> • Examine the case for social responsibility.
Responsibility towards owners, investors, consumers, employees, government and community.	<ul style="list-style-type: none"> • Identify the social responsibility towards different interest groups.
Role of business in environment protection	<ul style="list-style-type: none"> • Appreciate the role of business in environment protection.
Business Ethics - Concept and Elements	<ul style="list-style-type: none"> • State the concept of business ethics. • Describe the elements of business ethics.

Part B: Finance and Trade

Unit 7: Sources of Business Finance

Concept of business finance	<ul style="list-style-type: none"> • State the meaning, nature and importance of business finance.
Owners' funds - equity shares, preferences share, retained earnings, Global Depository receipt (GDR), American Depository Receipt (ADR) and International Depository Receipt (IDR) – concept	<ul style="list-style-type: none"> • Classify the various sources of funds into owners' funds. • State the meaning of owners' funds. • Understand the meaning of Global Depository receipts, American

	Depository Receipts and International Depository Receipts.
Borrowed funds: debentures and bonds, loan from financial institution and commercial banks, public deposits, trade credit, Inter Corporate Deposits (ICD).	<ul style="list-style-type: none"> • State the meaning of borrowed funds. • Discuss the concept of debentures, bonds, loans from financial institutions and commercial banks, Trade credit and inter corporate deposits. • Distinguish between owners' funds and borrowed funds.

Unit 8: Small Business and Enterprises

Entrepreneurship Development (ED): Concept, Characteristics and Need. Process of Entrepreneurship Development: Start-up India Scheme, ways to fund start-up. Intellectual Property Rights and Entrepreneurship	<ul style="list-style-type: none"> • Understand the concept of Entrepreneurship Development (ED), Intellectual Property Rights
Small scale enterprise as defined by MSMED Act 2006 (Micro, Small and Medium Enterprise Development Act)	<ul style="list-style-type: none"> • Understand the meaning of small business
Role of small business in India with special reference to rural areas	<ul style="list-style-type: none"> • Discuss the role of small business in India
Government schemes and agencies for small scale industries: National Small Industries Corporation (NSIC) and District Industrial Centre (DIC) with special reference to rural, backward areas	<ul style="list-style-type: none"> • Appreciate the various Government schemes and agencies for development of small scale industries. NSIC and DIC with special reference to rural, backward area.

Unit 9: Internal Trade

Internal trade - meaning and types services rendered by a wholesaler and a retailer	<ul style="list-style-type: none"> • State the meaning and types of internal trade. • Appreciate the services of wholesalers and retailers.
Types of retail-trade-Itinerant and small scale fixed shops retailers	<ul style="list-style-type: none"> • Explain the different types of retail trade.
Large scale retailers-Departmental stores, chain stores - concept	<ul style="list-style-type: none"> • Highlight the distinctive features of departmental stores, chain stores and mail order business.
GST (Goods and Services Tax): Concept and key-features	<ul style="list-style-type: none"> • Understand the concept of GST

Unit 10: International Trade

International trade: concept and benefits	<ul style="list-style-type: none">• Understand the concept of international trade.• Describe the scope of international trade to the nation and business firms.
Export trade – Meaning and procedure	<ul style="list-style-type: none">• State the meaning and objectives of export trade.• Explain the important steps involved in executing export trade.
Import Trade - Meaning and procedure	<ul style="list-style-type: none">• State the meaning and objectives of import trade.• Discuss the important steps involved in executing import trade.
Documents involved in International Trade; indent, letter of credit, shipping order, shipping bills, mate's receipt (DA/DP)	<ul style="list-style-type: none">• Develop an understanding of the various documents used in international trade.• Identify the specimen of the various documents used in international trade.• Highlight the importance of the documents needed in connection with international trade transactions
World Trade Organization (WTO) meaning and objectives	<ul style="list-style-type: none">• State the meaning of World Trade Organization.• Discuss the objectives of World Trade Organization in promoting international trade.

Unit 11: Project Work

As per CBSE guidelines.

**Suggested Question Paper Design
Business Studies (Code No. 054)
Class XI (2021-22)
March 2022 Examination**

Marks: 80

Duration: 3 hrs.

SN	Typology of Questions	Marks	Percentage
1	<p>Remembering and Understanding: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas</p>	44	55%
2	<p>Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way</p>	19	23.75%
3	<p>Analysing, Evaluating and Creating: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.</p>	17	21.25%
Total		80	100%

Business Studies CLASS–XII (2021-22)

Theory: 80 Marks
Project: 20 Marks

3 Hours

Units		Periods	Marks
Part A	Principles and Functions of Management		
1	Nature and Significance of Management	12	16
2	Principles of Management	14	
3	Business Environment	12	
4	Planning	14	14
5	Organising	15	
6	Staffing	16	20
7	Directing	15	
8	Controlling	12	
	Total	110	50
Part B	Business Finance and Marketing		
9	Financial Management	20	15
10	Financial Markets	18	
11	Marketing Management	30	15
12	Consumer Protection	12	
	Total	80	30
Part C	Project Work (One)	30	20

Part A: Principles and Functions of Management

Unit 1: Nature and Significance of Management

Concept	After going through this unit, the student/ learner would be able to:
Management - concept, objectives, and importance	<ul style="list-style-type: none"> • Understand the concept of management. • Explain the meaning of 'Effectiveness and Efficiency. • Discuss the objectives of management. • Describe the importance of management.
Management as Science, Art and Profession	<ul style="list-style-type: none"> • Examine the nature of management as a science, art and profession.
Levels of Management	<ul style="list-style-type: none"> • Understand the role of top, middle and lower levels of management
Management functions-planning, organizing, staffing, directing and controlling	<ul style="list-style-type: none"> • Explain the functions of management
Coordination- concept and importance	<ul style="list-style-type: none"> • Discuss the concept and

	<p>characteristics of coordination.</p> <ul style="list-style-type: none"> • Explain the importance of coordination.
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Unit 2: Principles of Management

Principles of Management- concept and significance	<ul style="list-style-type: none"> • Understand the concept of principles of management. • Explain the significance of management principles.
Fayol's principles of management	<ul style="list-style-type: none"> • Discuss the principles of management developed by Fayol.
Taylor's Scientific management- principles and techniques	<ul style="list-style-type: none"> • Explain the principles and techniques of 'Scientific Management'. • Compare the contributions of Fayol and Taylor.

Unit 3: Business Environment

Business Environment- concept and importance	<ul style="list-style-type: none"> • Understand the concept of 'Business Environment'. • Describe the importance of Business Environment
Dimensions of Business Environment- Economic, Social, Technological, Political and Legal	<ul style="list-style-type: none"> • Describe the various dimensions of 'Business Environment'.
Demonetization - concept and features	<ul style="list-style-type: none"> • Understand the concept of Demonetization
Impact of Government policy changes on business with special reference to liberalization, privatization and globalization in India	<ul style="list-style-type: none"> • Examine the impact of government policy changes on business in India with reference to liberalisation, privatization and globalisation since 1991. • Discuss the managerial response to changes in business environment.

Unit 4: Planning

Concept, importance and limitations	<ul style="list-style-type: none"> • Understand the concept of planning. • Describe the importance of planning. • Understand the limitations of planning.
Planning process	<ul style="list-style-type: none"> • Describe the steps in the process of planning.
Single use and standing plans. Objectives, Strategy, Policy, Procedure, Method, Rule, Budget and Programme	<ul style="list-style-type: none"> • Develop an understanding of single use and standing plans

	<ul style="list-style-type: none"> Describe objectives, policies, strategy, procedure, method, rule, budget and programme as types of plans.
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Unit 5: Organising

Concept and importance	<ul style="list-style-type: none"> Understand the concept of organizing as a structure and as a process. Explain the importance of organising.
Organising Process	<ul style="list-style-type: none"> Describe the steps in the process of organising
Structure of organization - functional and divisional concept. Formal and informal organization - concept	<ul style="list-style-type: none"> Describe functional and divisional structures of organisation. Explain the advantages, disadvantages and suitability of functional and divisional structure. Understand the concept of formal and informal organisation. Discuss the advantages and disadvantages of formal and informal organisation.
Delegation: concept, elements and importance	<ul style="list-style-type: none"> Understand the concept of delegation. Describe the elements of delegation. Appreciate the importance of delegation.
Decentralization: concept and importance	<ul style="list-style-type: none"> Understand the concept of decentralisation. Explain the importance of decentralisation. Differentiate between delegation and decentralisation.

Unit 6: Staffing

Concept and importance of staffing	<ul style="list-style-type: none"> Understand the concept of staffing. Explain the importance of staffing
Staffing as a part of Human Resource Management – concept	<ul style="list-style-type: none"> Understand the specialized duties and activities performed by Human Resource Management
Staffing process	<ul style="list-style-type: none"> Describe the steps in the process of staffing
Recruitment process	<ul style="list-style-type: none"> Understand the meaning of recruitment. Discuss the sources of recruitment.

	<ul style="list-style-type: none"> • Explain the merits and demerits of internal and external sources of recruitment.
Selection - process	<ul style="list-style-type: none"> • Understand the meaning of selection. • Describe the steps involved in the process of selection.
Training and Development - Concept and importance, Methods of training - on the job and off the job - vestibule training, apprenticeship training and internship training	<ul style="list-style-type: none"> • Understand the concept of training and development. • Appreciate the importance of training to the organisation and to the employees. • Discuss the meaning of induction training, vestibule training, apprenticeship training and internship training. • Differentiate between training and development. • Discuss on the job and off the job methods of training.

Unit 7: Directing

Concept and importance	<ul style="list-style-type: none"> • Describe the concept of directing. • Discuss the importance of directing
Elements of Directing	<ul style="list-style-type: none"> • Describe the various elements of directing
Motivation - concept, Maslow's hierarchy of needs, Financial and non-financial incentives	<ul style="list-style-type: none"> • Understand the concept of motivation. • Develop an understanding of Maslow's Hierarchy of needs. • Discuss the various financial and non-financial incentives.
Leadership - concept, styles - authoritative, democratic and laissez faire	<ul style="list-style-type: none"> • Understand the concept of leadership. • Discuss the various styles of leadership.
Communication - concept, formal and informal communication; barriers to effective communication, how to overcome the barriers	<ul style="list-style-type: none"> • Understand the concept of communication • Understand the elements of the communication process. • Discuss the concept of formal and informal communication. • Discuss the various barriers to effective communication. • Suggest measures to overcome barriers to communication.

Unit 8: Controlling

Controlling - Concept and importance	<ul style="list-style-type: none">• Understand the concept of controlling.• Explain the importance of controlling.
Relationship between planning and controlling	<ul style="list-style-type: none">• Describe the relationship between planning and controlling
Steps in process of controlling	<ul style="list-style-type: none">• Discuss the steps in the process of controlling.

Part B: Business Finance and Marketing

Unit 9: Financial Management

Concept, role and objectives of Financial Management	<ul style="list-style-type: none">• Understand the concept of financial management.• Explain the role of financial management in an organisation.• Discuss the objectives of financial management
Financial decisions: investment, financing and dividend- Meaning and factors affecting them	<ul style="list-style-type: none">• Discuss the three financial decisions and the factors affecting them.
Financial Planning - concept and importance	<ul style="list-style-type: none">• Describe the concept of financial planning and its objectives.• Explain the importance of financial planning.
Capital Structure – concept and factors affecting capital structure	<ul style="list-style-type: none">• Understand the concept of capital structure.• Describe the factors determining the choice of an appropriate capital structure of a company.
Fixed and Working Capital - concept and factors affecting their requirements	<ul style="list-style-type: none">• Understand the concept of fixed and working capital.• Describe the factors determining the requirements of fixed and working capital.

Unit 10: Financial Markets

Financial Markets: Concept, Functions and Types	<ul style="list-style-type: none">• Understand the concept of financial market.• Explain the functions of financial market.• Understand capital market and money market as types of financial markets.
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Money market and its instruments	<ul style="list-style-type: none"> • Understand the concept of money market. • Describe the various money market instruments.
Capital market and its types (primary and secondary), methods of floatation in the primary market	<ul style="list-style-type: none"> • Discuss the concept of capital market. • Explain primary and secondary markets as types of capital market. • Differentiate between capital market and money market. • Discuss the methods of floating new issues in the primary market. • Distinguish between primary and secondary markets.
Stock Exchange - Functions and trading procedure	<ul style="list-style-type: none"> • Give the meaning of a stock exchange. • Explain the functions of a stock exchange. • Discuss the trading procedure in a stock exchange. • Give the meaning of depository services and demat account as used in the trading procedure of securities.
Securities and Exchange Board of India (SEBI) - objectives and functions	<ul style="list-style-type: none"> • State the objectives of SEBI. • Explain the functions of SEBI.

Unit 11: Marketing

Marketing – Concept, functions and philosophies	<ul style="list-style-type: none"> • Understand the concept of marketing. • Explain the features of marketing. • Discuss the functions of marketing. • Explain the marketing philosophies.
Marketing Mix – Concept and elements	<ul style="list-style-type: none"> • Understand the concept of marketing mix. • Describe the elements of marketing mix.
Product - branding, labelling and packaging – Concept	<ul style="list-style-type: none"> • Understand the concept of product as an element of marketing mix. • Understand the concept of branding, labelling and packaging.
Price - Concept, Factors determining price	<ul style="list-style-type: none"> • Understand the concept of price as an element of marketing mix. • Describe the factors determining price of a product.
Physical Distribution – concept, components and channels of distribution	<ul style="list-style-type: none"> • Understand the concept of physical distribution. • Explain the components of physical

	<p>distribution.</p> <ul style="list-style-type: none"> • Describe the various channels of distribution.
Promotion – Concept and elements; Advertising, Personal Selling, Sales Promotion and Public Relations	<ul style="list-style-type: none"> • Understand the concept of promotion as an element of marketing mix. • Describe the elements of promotion mix. • Understand the concept of advertising. • Understand the concept of sales promotion. • Discuss the concept of public relations.

Unit 12: Consumer Protection

Concept and importance of consumer protection	<ul style="list-style-type: none"> • Understand the concept of consumer protection. • Describe the importance of consumer protection. • Discuss the scope of Consumer Protection Act, 2019
<p>The Consumer Protection Act, 2019: <i>Source:</i> http://egazette.nic.in/WriteReadData/2019/210422.pdf</p> <p>Meaning of consumer Rights and responsibilities of consumers Who can file a complaint? Redressal machinery Remedies available</p>	<ul style="list-style-type: none"> • Understand the concept of a consumer according to the Consumer Protection Act, 2019. • Explain the consumer rights • Understand the responsibilities of consumers • Understand who can file a complaint and against whom? • Discuss the legal redressal machinery under Consumer Protection Act, 2019. • Examine the remedies available to the consumer under Consumer Protection Act, 2019.
Consumer awareness - Role of consumer organizations and Non-Governmental Organizations (NGOs)	<ul style="list-style-type: none"> • Describe the role of consumer organizations and NGOs in protecting consumers' interests.

Unit 13: Project Work

PROJECT WORK IN BUSINESS STUDIES FOR CLASS XI AND XII

Introduction

The course in Business Studies is introduced at Senior School level to provide students with a sound understanding of the principles and practices bearing in business (trade and industry) as well as their relationship with the society. Business is a dynamic process that brings together technology, natural resources and human initiative in a constantly changing global environment. With the purpose to help them understand the framework within which a business operates, and its interaction with the social, economic, technological and legal environment, the CBSE has introduced Project Work in the Business Studies Syllabus for Classes XI and XII. The projects have been designed to allow students to appreciate that business is an integral component of society and help them develop an understanding of the social and ethical issues concerning them.

The project work also aims to empower the teacher to relate all the concepts with what is happening around the world and the student's surroundings, making them appear more clear and contextual. This will enable the student to enjoy studies and use his free time effectively in observing what's happening around.

By means of Project Work the students are exposed to life beyond textbooks giving them opportunities to refer materials, gather information, analyze it further to obtain relevant information and decide what matter to keep.

Objectives

After doing the Project Work in Business Studies, the students will be able to do the following:

- develop a practical approach by using modern technologies in the field of business and management;
- get an opportunity for exposure to the operational environment in the field of business management and related services;
- inculcate important skills of team work, problem solving, time management, information collection, processing, analysing and synthesizing relevant information to derive meaningful conclusions
- get involved in the process of research work; demonstrate his or her capabilities while working independently and
- make studies an enjoyable experience to cherish.

CLASS XI: GUIDELINES FOR TEACHERS

This section provides some basic guidelines for the teachers to launch the projects in Business Studies. It is very necessary to interact, support, guide, facilitate and encourage students while assigning projects to them.

The teachers must ensure that the project work assigned to the students whether individually or in group are discussed at different stages right from assignment to drafts review and finalization. Students should be facilitated in terms of providing relevant

materials or suggesting websites, or obtaining required permissions from business houses, malls etc for their project. The periods assigned to the Project Work should be suitably spaced throughout the academic session. The teachers MUST ensure that the students actually go through the rigors and enjoy the process of doing the project rather than depending on any readymade material available commercially.

The following steps might be followed:

1. Students must take any one topic during the academic session of Class XI.
2. The project may be done in a group or individually.
3. The topic should be assigned after discussion with the students in the class and should then be discussed at every stage of submission of the draft/final project work.
4. The teacher should play the role of a facilitator and should closely supervise the process of project completion.
5. The teachers must ensure that the student's self esteem should go up, and he /she should be able to enjoy this process.
6. The project work for each term should culminate in the form of Power Point Presentation/Exhibition/ Skit before the entire class. This will help in developing ICT and communication skills among them.

The teacher should help students to identify any one project from the given topics.

I. Project One: Field Visit

The objective of introducing this project among the students is to give a first hand experience to them regarding the different types of business units operating in their surroundings, to observe their features and activities and relate them to the theoretical knowledge given in their text books. The students should select a place of field visit from the following: – (Add more as per local area availability.)

1. Visit to a Handicraft unit.
2. Visit to an Industry.
3. Visit to a Whole sale market (vegetables, fruits, flowers, grains, garments, etc.)
4. Visit to a Departmental store.
5. Visit to a Mall.

The following points should be kept in mind while preparing this visit.

1. Select a suitable day free from rush/crowd with lean business hours.
2. The teacher must visit the place first and check out on logistics. It's better to seek permission from the concerned business- incharge.
3. Visit to be discussed with the students in advance. They should be encouraged to prepare a worksheet containing points of observation and reporting.
4. Students may carry their cameras (at their own risk) with prior permission for collecting evidence of their observations.

1. Visit to a Handicraft Unit

The purpose of visiting a Handicraft unit is to understand nature and scope of its business, stake holders involved and other aspects as outlined below

- a) The raw material and the processes used in the business: People /parties/firms from which they obtain their raw material.
- b) The market, the buyers, the middlemen, and the areas covered. c) The countries to which exports are made.
- d) Mode of payment to workers, suppliers etc.
- e) Working conditions.
- f) Modernization of the process over a period of time.
- g) Facilities, security and training for the staff and workers.
- h) Subsidies available/ availed.
- i) Any other aspect that the teachers deem fit.

2. Visit to an Industry.

The students are required to observe the following:

- a) Nature of the business organisation.
- b) Determinants for location of business unit.
- c) Form of business enterprise: Sole Proprietorship, Partnership, Undivided Hindu Family, Joint Stock Company (a Multinational Company).
- d) Different stages of production/process
- e) Auxiliaries involved in the process.
- f) Workers employed, method of wage payment, training programmes and facilities available.
- g) Social responsibilities discharged towards workers, investors, society, environment and government.
- h) Levels of management.
- i) Code of conduct for employers and employees.
- j) Capital structure employed- borrowed v/s owned.
- k) Quality control, recycling of defective goods.
- l) Subsidies available/availed.
- m) Safety Measures employed.
- n) Working conditions for labour in observation of Labour Laws.
- o) Storage of raw material and finished goods.
- p) Transport management for employees, raw material and finished goods.
- q) Functioning of various departments and coordination among them (Production, Human Resource, Finance and Marketing)
- r) Waste Management.
- s) Any other observation.

3. Visit to a whole sale market: vegetables/fruits/flowers/grains/garments etc.

The students are required to observe the following:

- a) Sources of merchandise.
- b) Local market practices.
- c) Any linked up businesses like transporters, packagers, money lenders, agents, etc.
- d) Nature of the goods dealt in.
- e) Types of buyers and sellers.
- f) Mode of the goods dispersed, minimum quantity sold, types of packaging employed.
- g) Factors determining the price fluctuations.
- h) Seasonal factors (if any) affecting the business.

- i) Weekly/ monthly non-working days.
- j) Strikes, if any- causes thereof.
- k) Mode of payments.
- l) Wastage and disposal of dead stock.
- m) Nature of price fluctuations, reason thereof.
- n) Warehousing facilities available\availed.
- o) Any other aspect.

4. Visit to a Departmental store

The students are required to observe the following:

- a) Different departments and their lay out.
- b) Nature of products offered for sale.
- c) Display of fresh arrivals.
- d) Promotional campaigns.
- e) Spaces and advertisements.
- f) Assistance by Sales Personnel.
- g) Billing counter at store – Cash, Credit Card/ Debit Card, swipe facility. Added attractions and facilities at the counter.
- h) Additional facilities offered to customers
- i) Any other relevant aspect.

5. Visit to a Mall.

The students are required to observe the following:

- a) Number of floors, shops occupied and unoccupied.
- b) Nature of shops, their ownership status
- c) Nature of goods dealt in: local brands, international brands,
- d) Service business shops- Spas, gym, saloons etc.
- e) Rented spaces, owned spaces,
- f) Different types of promotional schemes.
- g) Most visited shops.
- h) Special attractions of the Mall- Food court, Gaming zone or Cinema etc.
- i) Innovative facilities.
- j) Parking facilities. Teachers may add more to the list.

II. Project Two: Case Study on a Product

- a) Take a product having seasonal growth and regular demand with which students can relate. For example,
 - Apples from Himachal Pradesh, Kashmir.
 - Oranges from Nagpur,
 - Mangoes from Maharashtra/U.P./Bihar/Andhra Pradesh etc.
 - Strawberries from Panchgani,
 - Aloe vera from Rajasthan,
 - Walnuts/almonds from Kashmir,
 - Jackfruit from South,
 - Guavas from Allahabad,
 - Pineapples from North East India,

- Tea from Assam,
- Orchids from Sikkim and Meghalaya,
- Pottery of Manipur,
- Fishes from coastal areas.

Students may develop a Case Study on the following lines:

- (i) Research for change in price of the product. For example, apples in Himachal Pradesh during plucking and non plucking season.
- (ii) Effect on prices in the absence of effective transport system.
- (iii) Effect on prices in the absence of suitable warehouse facilities.
- (iv) Duties performed by the warehouses.
- (v) Demand and supply situation of the product during harvesting season, prices near the place of origin and away.

Students may be motivated to find out the importance of producing and selling these products and their processed items along with the roles of Transport, Warehousing, Advertising, Banking, Insurance, Packaging, Wholesale selling, Retailing, Co-operative farming, Co-operative marketing etc.

The teacher may develop the points for other projects on similar lines for students to work on.

The teacher may assign this project as 'group' project and may give different products to different groups. It could conclude in the form of an exhibition.

III. Project Three: Aids to Trade

Taking any one AID TO TRADE, for example Insurance and gathering information on following aspects

1. History of Insurance Lloyd's contribution.
2. Development of regulatory Mechanism.
3. Insurance Companies in India
4. Principles of Insurance.
5. Types of Insurance. Importance of insurance to the businessmen.
6. Benefits of crop, orchards, animal and poultry insurance to the farmers.
7. Terminologies used (premium, face value, market value, maturity value, surrender value) and their meanings.
8. Anecdotes and interesting cases of insurance. Reference of films depicting people committing fraudulent acts with insurance companies.
9. Careers in Insurance.

Teachers to develop such aspects for other aids to trade.

IV. Project Four: Import /Export Procedure

Any one from the following

1. Import /Export procedure

The students should identify a product of their city/country which is imported /exported. They are required to find the details of the actual import/export procedure. They may take help from the Chambers of Commerce, Banker, existing Importers/Exporters, etc.

They should find details of the procedure and link it with their Text knowledge.

The specimens of documents collected should be pasted in the Project file with brief description of each. They may also visit railway godowns/dockyards/ transport agencies and may collect pictures of the same.

Presentation and submission of project report.

At the end of the stipulated term, each student will prepare and submit his/her project report.

Following essentials are required to be fulfilled for its preparation and submission.

1. The total project will be in a file format, consisting of the recordings of the value of shares and the graphs.
2. The project will be handwritten.
3. The project will be presented in a neat folder.
4. The project report will be developed in the following sequence-
 - Cover page should project the title, student information, school and year.
 - List of contents.
 - Acknowledgements and preface (acknowledging the institution, the news papers read, T.V. channels viewed, places visited and persons who have helped).
 - Introduction.
 - Topic with suitable heading.
 - Planning and activities done during the project, if any.
 - Observations and findings while conducting the project.
 - News paper clippings to reflect the changes of share prices.
 - Conclusions (summarised suggestions or findings, future scope of study).
 - Appendix (if needed).
 - Teachers report.
 - Teachers will initial preface page.
 - At the completion of the evaluation of the project, it will be punched in the centre so that the report cannot be reused but is available for reference only.
 - The projects will be returned after evaluation. The school may keep the best projects.

V. Project Five: A visit to any State Emporium (other than your school state).

The purpose of this project is that it leads to -

- Development of deeper understanding of the diversity of products in the states like Assam, Tripura, Nagaland, Mizoram, Manipur, Meghalaya, Sikkim, Arunachal Pradesh, Jammu and Kashmir, Kerala, Chhatisgarh, Telangana, Andhra Pradesh and other states of the country.
- Sensitization and orientation of students about other states, their trade, business and commerce,
- Understanding the cultural and socio-economic aspects of the state by the students,
- Developing the understanding of role of folk art, artisanship and craftsmanship of the state in its growth and economic development
- Understanding the role of gifts of nature and natural produce in the development of trade, business and commerce

- Understanding the role of vocational skills and abilities on the livelihood of artisans/craftsman
- Understanding of entrepreneurial skills and abilities of the artisans/craftsman
- Understanding of the unemployment problem of the state and role of art and craft of the state in generating employment opportunities
- Value aspect -
 - Sense of gratitude - by appreciating the contributions made by others in the betterment of our lives
 - Appreciating the dignity of work
 - Sensitivity towards social, cultural, ethnical and religious differences Benefits of social harmony and peace
 - Understanding and appreciating the unity in diversity in India
 - Appreciating differences in race, skin colour, languages, religion, habits, festivals, clothing coexistence

Presentation and Submission of Project Report

At the end of the stipulated term, each student will prepare and submit his/her project report.

Following essentials are required to be fulfilled for its preparation and submission.

1. Nature of the business organisation (emporium)
2. Determinants for location of the concerned emporium
3. Is the space rented or owned
4. Nature of the goods dealt in
5. Sources of merchandise of the emporium
6. Role of co-operative societies in the manufacturing and/or marketing of the merchandise
7. Role of gifts of nature or natural produce in the development of goods/merchandise
8. Types of buyers and sellers
9. Modes of goods dispersed, minimum quantity sold and type of carrying bag or package used for delivery of the products sold
10. Factors determining the pricing at the emporium
11. Comparison between the prices of goods available at the emporium with the prices in the open market. Also highlight probable causes of variations if any.
12. Kind of raw material available naturally, used in making the products
13. The technique used in making the products i.e., hand made or machine made
14. Has the child labour being used in making the products sold at the emporium
15. Are the products eco-friendly, in terms of manufacturing, disposal and packing
16. Seasonal factors if any affecting the business of the emporium
17. Weekly/ Monthly non-working days
18. Mode of billing and payments - Cash, Credit Card/ Debit Card, Swipe facility.
19. Does the emporium sell its merchandise in installment / deferred payment basis
20. Do they provide home delivery and after sales services.
21. Different types of promotional campaigns / schemes
22. Assistance by Sales Personnel
23. Export orientation of this emporium and procedure used
24. Policies related to damaged/ returned goods
25. Any government facility available to the emporium
26. Warehousing facilities available / availed
27. Impact of tourism on the business of emporium

28. Additional facility offered to customers
29. Any Corporate Social Responsibility (CSR) assumed by the emporium
30. Contribution made by the emporium to its locality

ASSESSMENT

The marks will be allocated on the following heads.

1	Initiative, cooperativeness and participation	2 Mark
2	Creativity in presentation	2 Mark
3	Content, observation and research work	4 Marks
4	Analysis of situations	4 Marks
5	Viva	8 Marks
	Total	20 Marks

CLASS XII: GUIDELINES FOR TEACHERS

Students are supposed to select one unit out of four and are required to make only ONE project from the selected unit. (Consist of one project of 20 marks)

1. Help students to select any ONE Topic for the entire year.
2. The topic should be assigned after discussion with the students in the class and should then be discussed at every stage of the submission of the project.

The teacher should play the role of a facilitator and should closely supervise the process of project completion. The teachers must ensure that the project work assigned to the students whether individually or in group are discussed at different stages right from assignment to drafts review and finalization. Students should be facilitated in terms of providing relevant materials or suggesting websites, or obtaining required permissions from business houses, malls etc for their project. The periods assigned to the Project Work should be suitably spaced throughout the academic session. The teachers MUST ensure that the student actually go through the rigors and enjoy the process of doing the project rather than depending on any readymade material available outside.

3. The students must make a presentation of the project before the class.
4. The teachers must ensure that the student's self-esteem and creativity is enhanced and both the teacher and the student enjoy this process.
5. The teachers should feel pride in the fact that they have explored the different dimensions of the project in an innovative way and their students have put in genuine work.

I. Project One: Elements of Business Environment

The teachers should help the students in selecting any one element of the following:

1. Changes witnessed over the last few years on mode of packaging and its economic impact. The teacher may guide the students to identify the following changes:
 - a) The changes in transportation of fruits and vegetables such as cardboard crates being used in place of wooden crates, etc. Reasons for above changes.

- b) Milk being supplied in glass bottles, later in plastic bags and now in tetra-pack and through vending machines.
- c) Plastic furniture [doors and stools] gaining preference over wooden furniture.
- d) The origin of cardboard and the various stages of changes and growth.
- e) Brown paper bags packing to recycled paper bags to plastic bags and cloth bags.
- f) Re use of packaging [bottles, jars and tins] to attract customers for their products.
- g) The concept of pyramid packaging for milk.
- h) Cost being borne by the consumer/manufacturer.
- i) Packaging used as means of advertisements.

2. The reasons behind changes in the following:

Coca – Cola and Fanta in the seventies to Thums up and Campa Cola in the eighties to Pepsi and Coke in nineties.

The teacher may guide the students to the times when India sold Coca Cola and Fanta which were being manufactured in India by the foreign companies.

The students may be asked to enquire about

- a) Reasons of stopping the manufacturing of the above mentioned drinks in India THEN.
- b) The introduction of Thums up and Campa cola range.
- c) Re entry of Coke and introduction of Pepsi in the Indian market.
- d) Factors responsible for the change.
- e) Other linkages with the above.
- f) Leading brands and the company having the highest market share.
- g) Different local brands venturing in the Indian market.
- h) The rating of the above brands in the market.
- i) The survival and reasons of failure in competition with the international brands.
- j) Other observations made by the students

The teacher may develop the following on the above lines

3. Changing role of the women in the past 25 years relating to joint families, nuclear families, women as a bread earner of the family, changes in the requirement trend of mixers, washing machines, micro wave and standard of living.

4. The changes in the pattern of import and export of different Products.

5. The trend in the changing interest rates and their effect on savings.

6. A study on child labour laws, its implementation and consequences.

7. The state of 'anti plastic campaign,' the law, its effects and implementation.

8. The laws of mining /setting up of industries, rules and regulations, licences required for running that business.

9. Social factors affecting acceptance and rejection of an identified product. (Dish washer, Atta maker, etc)

10. What has the effect of change in environment on the types of goods and services?

The students can take examples like:

- a) Washing machines, micro waves, mixers and grinder.
- b) Need for crèche, day care centre for young and old.
- c) Ready to eat food, eating food outside, and tiffin centres.

11. Change in the man-machine ratio with technological advances resulting in change of cost structure.

12. Effect of changes in technological environment on the behaviour of employee.

II. Project Two: Principles of Management

The students are required to visit any one of the following:

1. A departmental store.
2. An Industrial unit.
3. A fast food outlet.
4. Any other organisation approved by the teacher.

They are required to observe the application of the general Principles of management advocated by Fayol.

Fayol's principles

1. Division of work.
2. Unity of command.
3. Unity of direction.
4. Scalar chain
5. Espirit de corps
6. Fair remuneration to all.
7. Order.
8. Equity.
9. Discipline
10. Subordination of individual interest to general interest.
11. Initiative.
12. Centralisation and decentralisation.
13. Stability of tenure.

OR

They may enquire into the application of scientific management techniques by F.W. Taylor in the unit visited.

Scientific techniques of management.

1. Functional foremanship.
2. Standardisation and simplification of work.
3. Method study.
4. Motion Study.
5. Time Study.
6. Fatigue Study
7. Differential piece rate plan.

Tips to teacher

- (i) The teacher may organize this visit.
- (ii) The teacher should facilitate the students to identify any unit of their choice and guide them to identify the principles that are being followed.
- (iii) Similarly they should guide the students to identify the techniques of scientific management implemented in the organisation.
- (iv) It may be done as a group activity.
- (v) The observations could be on the basis of
 - The different stages of division of work resulting to specialisation.
 - Following instructions and accountability of subordinates to higher authorities.
 - Visibility of order and equity in the unit.
 - Balance of authority and responsibility.
 - Communication levels and pattern in the organisation.

- Methods and techniques followed by the organisation for unity of direction and coordination amongst all.
- Methods of wage payments followed. The arrangements of fatigue study.
- Derivation of time study.
- Derivation and advantages of method study.
- Organisational chart of functional foremanship.
- Any other identified in the organisation

vi. It is advised that students should be motivated to pick up different areas of visit. As presentations of different areas in the class would help in better understanding to the other students.

vii. The students may be encouraged to develop worksheets. Teachers should help students to prepare observation tools to be used for undertaking the project.

Examples; worksheets, questionnaire, interviews and organisational chart etc.

III. Project Three: Stock Exchange

The purpose of this project is to teach school students the values of investing and utilising the stock market. This project also teaches important lessons about the economy, mathematics and financial responsibility.

The basis of this project is to learn about the stock market while investing a specified amount of fake money in certain stocks. Students then study the results and buy and sell as they see fit.

This project will also guide the students and provide them with the supplies necessary to successfully monitor stock market trends and will teach students how to calculate profit and loss on stock.

The project work will enable the students to:

- understand the topics like sources of business finance and capital market
- understand the concepts used in stock exchange
- inculcate the habit of watching business channels, reading business journals/newspapers and seeking information from their elders.

The students are expected to:

- a) Develop a brief report on History of Stock Exchanges in India. (your country)
- b) Prepare a list of at least 25 companies listed on a Stock Exchange.
- c) To make an imaginary portfolio totalling a sum of Rs. 50,000 equally in any of the 5 companies of their choice listed above over a period of twenty working days.

The students may be required to report the prices of the stocks on daily basis and present it diagrammatically on the graph paper.

- They will understand the weekly holidays and the holidays under the Negotiable Instruments Act.
- They will also come across with terms like closing prices, opening prices, etc.
- During this period of recording students are supposed to distinctively record the daily and starting and closing prices of the week other days under the negotiable instrument act so that they acquire knowledge about closing and opening prices.
 - The students may conclude by identifying the causes in the fluctuations of prices. Normally it would be related to the front page news of the a business journal, for example,

- Change of seasons.
- Festivals.
- Spread of epidemic.
- Strikes and accidents
- Natural and human disasters.
- Political environment.
- Lack of faith in the government policies.
- Impact of changes in government policies for specific industry.
- International events.
- Contract and treaties at the international scene.
- Relations with the neighbouring countries.
- Crisis in developed countries, etc.

The students are expected to find the value of their investments and accordingly rearrange their portfolio. The project work should cover the following aspects;

1. Graphical presentation of the share prices of different companies on different dates.
2. Change in market value of shares due to change of seasons, festivals, natural and human disasters.
3. Change in market value of shares due to change in political environment/ policies of various countries/crisis in developed countries or any other reasons
4. Identify the top ten companies out of the 25 selected on the basis of their market value of shares.

It does not matter if they have made profits or losses.

IV. Project Four: Marketing

- | | |
|-------------------------|---------------------|
| 1. Adhesives | 27. Fruit candy |
| 2. Air conditioners | 28. Furniture |
| 3. Baby diapers | 29. Hair Dye |
| 4. Bathing Soap | 30. Hair Oil |
| 5. Bathroom cleaner | 31. Infant dress |
| 6. Bike | 32. Inverter |
| 7. Blanket | 33. Jams |
| 8. Body Spray | 34. Jeans |
| 9. Bread | 35. Jewellery |
| 10. Breakfast cereal | 36. Kurti |
| 11. Butter | 37. Ladies bag |
| 12. Camera | 38. Ladies footwear |
| 13. Car | 39. Learning Toys |
| 14. Cheese spreads | 40. Lipstick |
| 15. Chocolate | 41. Microwave oven |
| 16. Coffee | 42. Mixers |
| 17. Cosmetology product | 43. Mobile |
| 18. Crayons | 44. Moisturizer |
| 19. Crockery | 45. Music player |
| 20. Cutlery | 46. Nail polish |
| 21. Cycle | 47. Newspaper |
| 22. DTH | 48. Noodles |
| 23. Eraser | 49. Pen |
| 24. e-wash | 50. Pen drive |
| 25. Fairness cream | 51. Pencil |
| 26. Fans | 52. Pickles |

- 53. Razor
- 54. Ready Soups
- 55. Refrigerator
- 56. RO system
- 57. Roasted snacks
- 58. Salt
- 59. Sarees
- 60. Sauces/ Ketchup
- 61. Shampoo
- 62. Shaving cream
- 63. Shoe polish
- 64. Shoes
- 65. Squashes

- 66. Suitcase/ airbag
- 67. Sunglasses
- 68. Tea
- 69. Tiffin Wallah
- 70. Toothpaste
- 71. Wallet
- 72. Washing detergent
- 73. Washing machine
- 74. Washing powder
- 75. Water bottle
- 76. Water storage tank
- 77. Wipes

Any more as suggested by the teacher.

The teacher must ensure that the identified product should not be items whose consumption/use is discouraged by the society and government like alcohol products/pan masala and tobacco products, etc.

Identify one product/service from the above which the students may like to manufacture/provide [pre-assumption].

Now the students are required to make a project on the identified product/service keeping in mind the following:

1. Why have they selected this product/service?
2. Find out '5' competitive brands that exist in the market.
3. What permission and licences would be required to make the product?
4. What are your competitors Unique Selling Proposition.[U.S.P.]?
5. Does your product have any range give details?
6. What is the name of your product?
7. Enlist its features.
8. Draw the 'Label' of your product.
9. Draw a logo for your product.
10. Draft a tag line.
11. What is the selling price of your competitor's product?
 - (i) Selling price to consumer
 - (ii) Selling price to retailer
 - (iii) Selling price to wholesaler

What is the profit margin in percentage to the

- Manufacturer.
- Wholesaler.
- Retailer.

12. How will your product be packaged?
13. Which channel of distribution are you going to use? Give reasons for selection?
14. Decisions related to warehousing, state reasons.
15. What is going to be your selling price?
 - (i) To consumer
 - (ii) To retailer
 - (iii) To wholesaler

16. List 5 ways of promoting your product.
 17. Any schemes for
 - (i) The wholesaler
 - (ii) The retailer
 - (iii) The consumer
 18. What is going to be your 'U.S.P'?
 19. What means of transport you will use and why?
 20. Draft a social message for your label.
 21. What cost effective techniques will you follow for your product.
 22. What cost effective techniques will you follow for your promotion plan.
- At this stage the students will realise the importance of the concept of marketing mix and the necessary decision regarding the four P's of marketing.
- Product
 - Place
 - Price
 - Promotion

On the basis of the work done by the students the project report should include the following:

1. Type of product /service identified and the (consumer/industries) process involve there in.
2. Brand name and the product.
3. Range of the product.
4. Identification mark or logo.
5. Tagline.
6. Labeling and packaging.
7. Price of the product and basis of price fixation.
8. Selected channels of distribution and reasons thereof.
9. Decisions related to transportation and warehousing. State reasons.
10. Promotional techniques used and starting reasons for deciding the particular technique.
11. Grading and standardization.

Presentation and Submission of Project Report

At the end of the stipulated term, each student will prepare and submit his/her project report.

Following essentials are required to be fulfilled for its preparation and submission.

1. The total length of the project will be of 25 to 30 pages.
2. The project should be handwritten.
3. The project should be presented in a neat folder.
4. The project report should be developed in the following sequence-
 - Cover page should include the title of the Project, student information, school and year.
 - List of contents.
 - Acknowledgements and preface (acknowledging the institution, the places visited and the persons who have helped).
 - Introduction.
 - Topic with suitable heading.
 - Planning and activities done during the project, if any.
 - Observations and findings of the visit.

- Conclusions (summarized suggestions or findings, future scope of study).
- Photographs (if any).
- Appendix
- Teacher's observation.
- Signatures of the teachers.
- At the completion of the evaluation of the project, it should be punched in the centre so that the report may not be reused but is available for reference only.
- The project will be returned after evaluation. The school may keep the best projects.

ASSESSMENT

Allocation of Marks = 20 Marks

The marks will be allocated under the following heads:

1	Initiative, cooperativeness and participation	2 Mark
2	Creativity in presentation	2 Mark
3	Content, observation and research work	4 Marks
4	Analysis of situations	4 Marks
5	Viva	8 Marks
	Total	20 Marks

**Suggested Question Paper Design
Business Studies (Code No. 054)
Class XII (2021-22)
March 2022 Examination**

Marks: 80

Duration: 3 hrs.

SN	Typology of Questions	Marks	Percentage
1	<p>Remembering and Understanding: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas</p>	44	55%
2	<p>Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way</p>	19	23.75%
3	<p>Analysing, Evaluating and Creating: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.</p>	17	21.25%
	Total	80	100%

8. CHEMISTRY (Code No. 043)

Rationale

Higher Secondary is the most crucial stage of school education because at this juncture specialized discipline based, content -oriented courses are introduced. Students reach this stage after 10 years of general education and opt for Chemistry with a purpose of pursuing their career in basic sciences or professional courses like medicine, engineering, technology and study courses in applied areas of science and technology at tertiary level. Therefore, there is a need to provide learners with sufficient conceptual background of Chemistry, which will make them competent to meet the challenges of academic and professional courses after the senior secondary stage.

The new and updated curriculum is based on disciplinary approach with rigour and depth taking care that the syllabus is not heavy and at the same time it is comparable to the international level. The knowledge related to the subject of Chemistry has undergone tremendous changes during the past one decade. Many new areas like synthetic materials, bio -molecules, natural resources, industrial chemistry are coming in a big way and deserve to be an integral part of chemistry syllabus at senior secondary stage. At international level, new formulations and nomenclature of elements and compounds, symbols and units of physical quantities floated by scientific bodies like IUPAC and CGPM are of immense importance and need to be incorporated in the updated syllabus. The revised syllabus takes care of all these aspects. Greater emphasis has been laid on use of new nomenclature, symbols and formulations, teaching of fundamental concepts, application of concepts in chemistry to industry/ technology, logical sequencing of units, removal of obsolete content and repetition, etc.

Objectives

The curriculum of Chemistry at Senior Secondary Stage aims to:

- promote understanding of basic facts and concepts in chemistry while retaining the excitement of chemistry.
- make students capable of studying chemistry in academic and professional courses (such as medicine, engineering, technology) at tertiary level.
- expose the students to various emerging new areas of chemistry and apprise them with their relevance in future studies and their application in various spheres of chemical sciences and technology.
- equip students to face various challenges related to health, nutrition, environment, population, weather, industries and agriculture.
- develop problem solving skills in students.
- expose the students to different processes used in industries and their technological applications.
- apprise students with interface of chemistry with other disciplines of science such as physics, biology, geology, engineering etc.
- acquaint students with different aspects of chemistry used in daily life.
- develop an interest in students to study chemistry as a discipline.
- integrate life skills and values in the context of chemistry.

**COURSE STRUCTURE
CLASS-XI (THEORY) (2021-22)**

Total Periods (Theory 160 + Practical60)
Total Marks70

Time:3Hours

Unit No.	Title	No. of Periods	Marks
Unit I	Some Basic Concepts of Chemistry	12	11
Unit II	Structure of Atom	14	
Unit III	Classification of Elements and Periodicity in Properties	08	04
Unit IV	Chemical Bonding and Molecular Structure	14	21
Unit V	States of Matter: Gases and Liquids	12	
Unit VI	Chemical Thermodynamics	16	
Unit VII	Equilibrium	14	
Unit VIII	Redox Reactions	06	16
Unit IX	Hydrogen	08	
Unit X	s -Block Elements	10	
Unit XI	Some p -Block Elements	14	
Unit XII	Organic Chemistry: Some basic Principles and Techniques	14	18
Unit XIII	Hydrocarbons	12	
Unit XIV	Environmental Chemistry	06	
	Total	160	70

Unit I: Some Basic Concepts of Chemistry

12 Periods

General Introduction: Importance and scope of Chemistry.

Nature of matter, laws of chemical combination, Dalton's atomic theory: concept of elements, atoms and molecules.

Atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.

Unit II: Structure of Atom

14 Periods

Discovery of Electron, Proton and Neutron, atomic number, isotopes and isobars. Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals.

- Unit III: Classification of Elements and Periodicity in Properties** **08 Periods**
 Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100.
- Unit IV: Chemical Bonding and Molecular Structure** **14 Periods**
 Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear diatomic molecules(qualitative idea only), Hydrogen bond.
- Unit V: States of Matter: Gases and Liquids** **12 Periods**
 Three states of matter, intermolecular interactions, types of bonding, melting and boiling points, role of gas laws in elucidating the concept of the molecule, Boyle's law, Charles law, Gay Lussac's law, Avogadro's law, ideal behaviour, empirical derivation of gas equation, Avogadro's number, ideal gas equation. Deviation from ideal behaviour, liquefaction of gases, critical temperature, kinetic energy and molecular speeds (elementary idea), Liquid State- vapour pressure, viscosity and surface tension (qualitative idea only, no mathematical derivations)
- Unit VI: Chemical Thermodynamics** **16 Periods**
 Concepts of System and types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions.
 First law of thermodynamics -internal energy and enthalpy, heat capacity and specific heat, measurement of ΔU and ΔH , Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution. Second law of Thermodynamics (brief introduction)
 Introduction of entropy as a state function, Gibb's energy change for spontaneous and non-spontaneous processes, criteria for equilibrium.
 Third law of thermodynamics (brief introduction).
- Unit VII: Equilibrium** **14 Periods**
 Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium - Le Chatelier's principle, ionic equilibrium- ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of poly basic acids, acid strength, concept of pH, hydrolysis of salts (elementary idea), buffer solution, Henderson Equation, solubility product, common ion effect (with illustrative examples).
- Unit VIII: Redox Reactions** **06 Periods**
 Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions.
- Unit IX: Hydrogen** **08 Periods**
 Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen, hydrides-ionic covalent and interstitial; physical and chemical properties of water, heavy water, hydrogen peroxide -preparation, reactions and structure and use; hydrogen as a fuel

- Unit X: s-Block Elements (Alkali and Alkaline Earth Metals) 10 Period**
 Group 1 and Group 2 Elements
 General introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens, uses.
Preparation and Properties of Some Important Compounds:
 Sodium Carbonate, Sodium Chloride, Sodium Hydroxide and Sodium Hydrogen carbonate, Biological importance of Sodium and Potassium.
 Calcium Oxide and Calcium Carbonate and their industrial uses, biological importance of Magnesium and Calcium.
- Unit XI: Some p-Block Elements 14 Periods**
General Introduction to p -Block Elements
Group 13 Elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group, Boron - physical and chemical properties, some important compounds: Borax, Boric acid, Boron Hydrides, Aluminium: Reactions with acids and alkalies, uses.
Group 14 Elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous behaviour of first elements. Carbon-catenation, allotropic forms, physical and chemical properties; uses of some important compounds: oxides. Important compounds of Silicon and a few uses: Silicon Tetrachloride, Silicones, Silicates and Zeolites, their uses.
- Unit XII: Organic Chemistry -Some Basic Principles and Techniques 14 Periods**
 General introduction, methods of purification, qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, electromeric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions.
- Unit XIII: Hydrocarbons 12 Periods**
Classification of Hydrocarbons
Aliphatic Hydrocarbons:
 Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis.
 Alkenes - Nomenclature, structure of double bond (ethene), geometrical isomerism, physical properties, methods of preparation, chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition.
 Alkynes - Nomenclature, structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water.
Aromatic Hydrocarbons:
 Introduction, IUPAC nomenclature, benzene: resonance, aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation, directive influence of functional group in monosubstituted benzene. Carcinogenicity and toxicity.

Unit XIV: Environmental Chemistry**06 Periods**

Environmental pollution - air, water and soil pollution, chemical reactions in atmosphere, smog, major atmospheric pollutants, acid rain, ozone and its reactions, effects of depletion of ozone layer, greenhouse effect and global warming- pollution due to industrial wastes, green chemistry as an alternative tool for reducing pollution, strategies for control of environmental pollution.

PRACTICALS

Evaluation Scheme for Examination	Marks
Volumetric Analysis	08
Salt Analysis	08
Content Based Experiment	06
Project Work	04
Class record and viva	04
Total	30

PRACTICAL SYLLABUS**Total Periods: 60**

Micro-chemical methods are available for several of the practical experiments, wherever possible such techniques should be used.

A. Basic Laboratory Techniques

1. Cutting glass tube and glass rod
2. Bending a glass tube
3. Drawing out a glass jet
4. Boring a cork

B. Characterization and Purification of Chemical Substances

1. Determination of melting point of an organic compound.
2. Determination of boiling point of an organic compound.
3. Crystallization of impure sample of any one of the following: Alum, Copper Sulphate, Benzoic Acid.

C. Experiments based on pH

- a) Any one of the following experiments:
 - Determination of pH of some solutions obtained from fruit juices, solution of known and varied concentrations of acids, bases and salts using pH paper or universal indicator.
 - Comparing the pH of solutions of strong and weak acids of same concentration.
 - Study the pH change in the titration of a strong base using universal indicator.
- b) Study the pH change by common-ion in case of weak acids and weak bases.

D. Chemical Equilibrium

One of the following experiments:

- a) Study the shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of either of the ions.

- b) Study the shift in equilibrium between $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ and chloride ions by changing the concentration of either of the ions.

E. Quantitative Estimation

- i. Using a mechanical balance/electronic balance.
- ii. Preparation of standard solution of Oxalic acid.
- iii. Determination of strength of a given solution of Sodium hydroxide by titrating it against standard solution of Oxalic acid.
- iv. Preparation of standard solution of Sodium carbonate.
- v. Determination of strength of a given solution of hydrochloric acid by titrating it against standard Sodium Carbonate solution.

F. Qualitative Analysis

a) Determination of one anion and one cation in a given salt

Cations- Pb^{2+} , Cu^{2+} , As^{3+} , Al^{3+} , Fe^{3+} , Mn^{2+} , Ni^{2+} , Zn^{2+} , Co^{2+} , Ca^{2+} , Sr^{2+} , Ba^{2+} , Mg^{2+} , NH_4^+

Anions – $(\text{CO}_3)^{2-}$, S^{2-} , NO_2^- , SO_3^{2-} , SO_4^{2-} , NO_3^- , Cl^- , Br^- , I^- , PO_4^{3-} , $\text{C}_2\text{O}_4^{2-}$, CH_3COO^-
(Note: Insoluble salts excluded)

b) Detection of -Nitrogen, Sulphur, Chlorine in organic compounds.

c) PROJECTS

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

A few suggested Projects

- Checking the bacterial contamination in drinking water by testing sulphide ion
- Study of the methods of purification of water
- Testing the hardness, presence of Iron, Fluoride, Chloride, etc., depending upon the regional variation in drinking water and study of causes of presence of these ions above permissible limit (if any).
- Investigation of the foaming capacity of different washing soaps and the effect of addition of Sodium carbonate on it
- Study the acidity of different samples of tea leaves.
- Determination of the rate of evaporation of different liquids
- Study the effect of acids and bases on the tensile strength of fibers.
- Study of acidity of fruit and vegetable juices.

Note: Any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

Practical Examination for Visually Impaired Students Class XI

Note: Same Evaluation scheme and general guidelines for visually impaired students as given for Class XII may be followed.

A. List of apparatus for identification for assessment in practicals (All experiments)

Beaker, tripod stand, wire gauze, glass rod, funnel, filter paper, Bunsen burner, test tube, test tube stand, dropper, test tube holder, ignition tube, china dish, tongs, standard flask, pipette, burette, conical flask, clamp stand, dropper, wash bottle

- Odour detection in qualitative analysis
- Procedure/Setup of the apparatus

B. List of Experiments

A. Characterization and Purification of Chemical Substances

1. Crystallization of an impure sample of any one of the following: copper sulphate, benzoic acid

B. Experiments based on pH

1. Determination of pH of some solutions obtained from fruit juices, solutions of known and varied concentrations of acids, bases and salts using pH paper
2. Comparing the pH of solutions of strong and weak acids of same concentration.

C. Chemical Equilibrium

1. Study the shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of either ions.
2. Study the shift in equilibrium between $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ and chloride ions by changing the concentration of either of the ions.

D. Quantitative estimation

1. Preparation of standard solution of oxalic acid.
2. Determination of molarity of a given solution of sodium hydroxide by titrating it against standard solution of oxalic acid.

E. Qualitative Analysis

1. Determination of one anion and one cation in a given salt
2. Cations - NH_4^+
Anions - $(\text{CO}_3)^{2-}$, S^{2-} , $(\text{SO}_3)^{2-}$, Cl^- , CH_3COO^-
(Note: insoluble salts excluded)
3. Detection of Nitrogen in the given organic compound.
4. Detection of Halogen in the given organic compound.

Note : The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Chemistry Part – I, Class-XI, Published by NCERT.
2. Chemistry Part – II, Class-XI, Published by NCERT.

(CLASS - XII) (2021-22)
(THEORY)

Total Periods (Theory 160 + Practical 60)

Time : 3 Hours

70 Marks

Unit No.	Title	No. of Periods	Marks
Unit I	Solid State	10	23
Unit II	Solutions	10	
Unit III	Electrochemistry	12	
Unit IV	Chemical Kinetics	10	
Unit V	Surface Chemistry	08	
Unit VI	General Principles and Processes of Isolation of Elements	08	19
Unit VII	p -Block Elements	12	
Unit VIII	d -and f -Block Elements	12	
Unit IX	Coordination Compounds	12	28
Unit X	Haloalkanes and Haloarenes	10	
Unit XI	Alcohols, Phenols and Ethers	10	
Unit XII	Aldehydes, Ketones and Carboxylic Acids	10	
Unit XIII	Amines	10	
Unit XIV	Biomolecules	12	
Unit XV	Polymers	08	
Unit XVI	Chemistry in Everyday Life	06	
	Total	160	70

Unit I: Solid State

10 Periods

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 atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties.

Band theory of metals, conductors, semiconductors and insulators and n and p type semiconductors.

Unit II: Solutions

10 Periods

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

Unit III: Electrochemistry

12 Periods

Redox reactions, 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, conductance in electrolytic solutions, 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, fuel cells, corrosion.

Unit IV: Chemical Kinetics**10 Periods**

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, Arrhenius equation.

Unit V: Surface Chemistry**08 Periods**

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

Unit VI: General Principles and Processes of Isolation of Elements**08 Periods**

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

Unit VII: p-Block Elements**12 Periods**

Group -15 Elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; Nitrogen preparation properties and uses; compounds of Nitrogen: preparation and properties of Ammonia and Nitric Acid, Oxides of Nitrogen (Structure only); Phosphorus - allotropic forms, compounds of Phosphorus: Preparation and properties of Phosphine, Halides 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, Sulphur -allotropic forms; compounds of Sulphur: 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.

Unit VIII: d and f Block Elements**12 Periods**

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 $K_2Cr_2O_7$ and $KMnO_4$.

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

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

Unit IX: Coordination Compounds**12 Periods**

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 stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

Unit X: Haloalkanes and Haloarenes.**10 Periods**

Haloalkanes: Nomenclature, nature of C–X bond, physical and chemical properties, optical rotation mechanism of substitution reactions.

Haloarenes: Nature of C–X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only).

Uses and environmental effects of - dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

Unit XI: Alcohols, Phenols and Ethers**10 Periods**

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

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

Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

Unit XII: Aldehydes, Ketones and Carboxylic Acids**10 Periods**

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, uses.

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

Unit XIII: Amines**10 Periods**

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

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

Unit XIV: Biomolecules**12 Periods**

Carbohydrates - Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates.

Proteins -Elementary idea of - amino acids, peptide bond, polypeptides, proteins, structure of proteins - primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Hormones - Elementary idea excluding structure.

Vitamins - Classification and functions.

Nucleic Acids: DNA and RNA.

Unit XV: Polymers

08 Period

Classification - natural and synthetic, methods of polymerization (addition and condensation), copolymerization, some important polymers: natural and synthetic like polythene, nylon polyesters, bakelite, rubber. Biodegradable and non-biodegradable polymers.

Unit XVI: Chemistry in Everyday life

06 Periods

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

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

Cleansing agents- soaps and detergents, cleansing action.

PRACTICALS

Evaluation Scheme for Examination	Marks
Volumetric Analysis	08
Salt Analysis	08
Content Based Experiment	06
Project Work	04
Class record and viva	04
Total	30

PRACTICAL SYLLABUS

60Periods

Micro-chemical methods are available for several of the practical experiments. Wherever possible, such techniques should be used.

A. Surface Chemistry

(a) Preparation of one lyophilic and one lyophobic sol

Lyophilic sol - starch, egg albumin and gum

Lyophobic sol - aluminium hydroxide, ferric hydroxide, arsenous sulphide.

(b) 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

(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, (KIO_3) and Sodium Sulphite: (Na_2SO_3) using starch solution as indicator (clock reaction).

C. Thermochemistry

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

Variation of cell potential in $\text{Zn}/\text{Zn}^{2+} \parallel \text{Cu}^{2+}/\text{Cu}$ with change in concentration of electrolytes (CuSO_4 or ZnSO_4) at room temperature.

E. Chromatography

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

F. Preparation of Inorganic Compounds

Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum.
Preparation of Potassium Ferric Oxalate.

G. Preparation of Organic Compounds

Preparation of any one of the following compounds

- i) Acetanilide
- ii) Di-benzalAcetone
- iii) p-Nitroacetanilide
- iv) Aniline yellow or 2 - Naphthol Anilinedye.

H. Tests for the functional groups present in organic compounds:

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

I. Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given foodstuffs.

J. Determination of concentration/ molarity of KMnO_4 solution by titrating it against a standard solution of:

- i) Oxalic acid,
 - ii) Ferrous Ammonium Sulphate
- (Students will be required to prepare standard solutions by weighing themselves).

K. Qualitative analysis

Determination of one cation and one anion in a given salt.

Cation : Pb^{2+} , Cu^{2+} , As^{3+} , Al^{3+} , Fe^{3+} , Mn^{2+} , Zn^{2+} , Cu^{2+} , Ni^{2+} , Ca^{2+} , Sr^{2+} , Ba^{2+} , Mg^{2+} , NH_4^+

Anions: $(\text{CO}_3)^{2-}$, S^{2-} , $(\text{SO}_3)^{2-}$, $(\text{NO}_2)^-$, $(\text{SO}_4)^{2-}$, Cl^- , Br^- , I^- , PO_4^{3-} , $(\text{C}_2\text{O}_4)^{2-}$, CH_3COO^- , NO_3^-
(Note: Insoluble salts excluded)

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 Bisulphate 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.
- Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).
- 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.

Practical Examination for Visually Impaired Students of Classes XI and XII Evaluation Scheme

Time Allowed: Two hours

Max. Marks:30

Identification/Familiarity with the apparatus	5 marks
Written test (based on given/prescribed practicals)	10 marks
Practical Record	5 marks
Viva	10 marks
Total	30 marks

General Guidelines

- The practical examination will be of two hour duration.
- A separate list of ten experiments is included here.
- The written examination in practicals for these students will be conducted at the time of practical examination of all other students.
- The written test will be of 30 minutes duration.

- The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.
- A writer may be allowed to such students as per CBSE examination rules.
- All questions included in the question papers should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.
- Questions may be generated jointly by the external/internal examiners and used for assessment.
- The viva questions may include questions based on basic theory/principle/concept, apparatus/materials/ chemicals required, procedure, precautions, sources of error etc.

A. Items for Identification/Familiarity of the apparatus for assessment in practical (All experiments)

Beaker, glass rod, tripod stand, wire gauze, Bunsen burner, Whatman filter paper, gas jar, capillary tube, pestle and mortar, test tubes, tongs, test tube holder, test tube stand, burette, pipette, conical flask, standard flask, clamp stand, funnel, filter paper

Hands-on Assessment

- Identification/familiarity with the apparatus
- Odour detection in qualitative analysis

B. List of Practicals

The experiments have been divided into two sections: Section A and Section B. The experiments mentioned in Section B are mandatory.

SECTION- A

A Surface Chemistry

- (1) Preparation of one lyophilic and one lyophobic sol
Lyophilic sol - starch, egg albumin and gum
- (2) Preparation of one lyophobic sol
Lyophobic sol – Ferric hydroxide

B Chromatography

- (1) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of R_f values (distance values may be provided).

C Tests for the functional groups present in organic compounds:

- (1) Alcoholic and Carboxylic groups.
- (2) Aldehydic and Ketonic

D Characteristic tests of carbohydrates and proteins in the given foodstuffs.

E Preparation of Inorganic Compounds- Potash Alum

SECTION-B (Mandatory)

F Quantitative analysis

- (1) (a) Preparation of the standard solution of Oxalic acid of a given volume
(b) Determination of molarity of KMnO_4 solution by titrating it against a standard solution of Oxalic acid.
- (2) The above exercise [F 1 (a) and (b)] to be conducted using Ferrous ammonium sulphate (Mohr's salt)

G Qualitative analysis:

- (1) Determination of one cation and one anion in a given salt. Cation – NH_4^+
Anions – CO_3^{2-} , S^{2-} , SO_3^{2-} , Cl^- , CH_3COO^-
(Note: Insoluble salts excluded)

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Chemistry Part -I, Class-XII, Published by NCERT.
2. Chemistry Part -II, Class-XII, Published by NCERT.

CHEMISTRY (Code No. 043) QUESTION PAPER DESIGN CLASSES –XI and XII (2020-21)

S	Domains	Total Marks	%
1	Remembering and Understanding: Exhibit memory of previously learned material by recalling facts, terms, basic concepts and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions and stating main ideas.	28	40
2	Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	21	30
3	Analysing, Evaluating and Creating: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	21	30

1. No chapter wise weightage. Care to be taken to cover all the chapters.
2. Suitable *internal variations may be made for generating various templates.*

Choice(s):

- There will be no overall choice in the question paper.
- However, 33% internal choices will be given in all the sections.

ECONOMICS (Code No. 030)

(2021-22)

Rationale

Economics is one of the social sciences, which has great influence on every human being. As economic life and the economy go through changes, the need to ground education in children's own experience becomes essential. While doing so, it is imperative to provide them opportunities to acquire analytical skills to observe and understand the economic realities.

At senior secondary stage, the learners are in a position to understand abstract ideas, exercise the power of thinking and to develop their own perception. It is at this stage, the learners are exposed to the rigour of the discipline of economics in a systematic way.

The economics courses are introduced in such a way that in the initial stage, the learners are introduced to the economic realities that the nation is facing today along with some basic statistical tools to understand these broader economic realities. In the later stage, the learners are introduced to economics as a theory of abstraction.

The economics courses also contain many projects and activities. These will provide opportunities for the learners to explore various economic issues both from their day-to-day life and also from issues, which are broader and invisible in nature. The academic skills that they learn in these courses would help to develop the projects and activities. The syllabus is also expected to provide opportunities to use information and communication technologies to facilitate their learning process.

Objectives:

- Understanding of some basic economic concepts and development of economic reasoning which the learners can apply in their day-to-day life as citizens, workers and consumers.
- Realisation of learners' role in nation building and sensitivity to the economic issues that the nation is facing today.
- Equipment with basic tools of economics and statistics to analyse economic issues. This is pertinent for even those who may not pursue this course beyond senior secondary stage.
- Development of understanding that there can be more than one view on any economic issue and necessary skills to argue logically with reasoning.

ECONOMICS (030)

CLASS – XI (2021-22)

Theory: 80 Marks

3 Hours

Project: 20 Marks

Units		Marks	Periods
Part A	Statistics for Economics		
Unit 1	Introduction	13	07
Unit 2	Collection, Organisation and Presentation of Data		27
Unit 3	Statistical Tools and Interpretation	27	66
		40	100
Part B	Introductory Microeconomics		
Unit 4	Introduction	4	8
Unit 5	Consumer's Equilibrium and Demand	13	32
Unit 6	Producer Behaviour and Supply	13	32
Unit 7	Forms of Market and Price Determination under perfect competition with simple applications	10	28
		40	100
Part C	Project Work	20	20

Part A: Statistics for Economics

In this course, the learners are expected to acquire skills in collection, organisation and presentation of quantitative and qualitative information pertaining to various simple economic aspects systematically. It also intends to provide some basic statistical tools to analyse, and interpret any economic information and draw appropriate inferences. In this process, the learners are also expected to understand the behaviour of various economic data.

Unit 1: Introduction

07 Periods

What is Economics?

Meaning, scope, functions and importance of statistics in Economics

Unit 2: Collection, Organisation and Presentation of data

27 Periods

Collection of data - sources of data - primary and secondary; how basic data is collected with concepts of Sampling; methods of collecting data; some important sources of secondary data: Census of India and National Sample Survey Organisation.

Organisation of Data: Meaning and types of variables; Frequency Distribution.

Presentation of Data: Tabular Presentation and Diagrammatic Presentation of Data:
(i) Geometric forms (bar diagrams and pie diagrams), (ii) Frequency diagrams (histogram, polygon and Ogive) and (iii) Arithmetic line graphs (time series graph).

Unit 3: Statistical Tools and Interpretation

66 Periods

For all the numerical problems and solutions, the appropriate economic interpretation may be attempted. This means, the students need to solve the problems and provide interpretation for the results derived.

Measures of Central Tendency- Arithmetic mean, median and mode

Measures of Dispersion - absolute dispersion (range, quartile deviation, mean deviation and standard deviation); relative dispersion (co-efficient of range, co-efficient of quartile-deviation, co-efficient of mean deviation, co-efficient of variation)

Correlation – meaning and properties, scatter diagram; Measures of correlation - Karl Pearson's method (two variables ungrouped data) Spearman's rank correlation.

Introduction to Index Numbers - meaning, types - wholesale price index, consumer price index and index of industrial production, uses of index numbers; Inflation and index numbers.

Part B: Introductory Microeconomics

Unit 4: Introduction

8 Periods

Meaning of microeconomics and macroeconomics; positive and normative economics

What is an economy? Central problems of an economy: what, how and for whom to produce; concepts of production possibility frontier and opportunity cost.

Unit 5: Consumer's Equilibrium and Demand

32 Periods

Consumer's equilibrium - meaning of utility, marginal utility, law of diminishing marginal utility, conditions of consumer's equilibrium using marginal utility analysis.

Indifference curve analysis of consumer's equilibrium-the consumer's budget (budget set and budget line), preferences of the consumer (indifference curve, indifference map) and conditions of consumer's equilibrium.

Demand, market demand, determinants of demand, demand schedule, demand curve and its slope, movement along and shifts in the demand curve; price elasticity of demand - factors affecting price elasticity of demand; measurement of price elasticity of demand – percentage-change method.

Unit 6: Producer Behaviour and Supply

32 Periods

Meaning of Production Function – Short-Run and Long-Run

Total Product, Average Product and Marginal Product.

Returns to a Factor: Law of Variable Proportions

Cost: Short run costs - total cost, total fixed cost, total variable cost; average cost; average fixed cost, average variable cost and marginal cost-meaning and their relationships.

Revenue - total, average and marginal revenue - meaning and their relationship.

Producer's equilibrium - meaning and its conditions in terms of marginal revenue - marginal cost.

Supply, market supply, determinants of supply, supply schedule, supply curve and its slope, movements along and shifts in supply curve, price elasticity of supply; measurement of price elasticity of supply - percentage-change method.

Unit 7: Forms of Market and Price Determination under Perfect Competition with simple applications.

28 Periods

Perfect competition - Features; Determination of market equilibrium and effects of shifts in demand and supply.

Other Market Forms - monopoly, monopolistic competition - their meaning and features.

Simple Applications of Demand and Supply: Price ceiling, price floor.

Part C: Project in Economics

20 Periods

Guidelines as given in class XII curriculum

Suggested Question Paper Design
Economics (Code No. 030)
Class XI (2021-22)
March 2022 Examination

Marks: 80

Duration: 3 hrs.

SN	Typology of Questions	Marks	Percentage
1	<p>Remembering and Understanding: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas</p>	44	55%
2	<p>Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.</p>	18	22.5%
3	<p>Analysing, Evaluating and Creating: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.</p>	18	22.5%
	Total	80	100%

ECONOMICS
CLASS - XII (2021-22)

Theory: 80 Marks
Project: 20 Marks

3 Hours

Units		Marks	Periods
Part A	Introductory Macroeconomics		
Unit 1	National Income and Related Aggregates	12	30
Unit 2	Money and Banking	6	15
Unit 3	Determination of Income and Employment	10	25
Unit 4	Government Budget and the Economy	6	15
Unit 5	Balance of Payments	6	15
		40	100
Part B	Indian Economic Development		
Unit 6	Development Experience (1947-90) and Economic Reforms since 1991	12	28
Unit 7	Current Challenges facing Indian Economy	22	60
Unit 8	Development Experience of India – A Comparison with Neighbours	06	12
	Theory Paper (40+40 = 80 Marks)	40	100
Part C	Project Work	20	20

Part A: Introductory Macroeconomics

Unit 1: National Income and Related Aggregates

30 Periods

What is Macroeconomics?

Basic concepts in macroeconomics: consumption goods, capital goods, final goods, intermediate goods; stocks and flows; gross investment and depreciation.

Circular flow of income (two sector model); Methods of calculating National Income - Value Added or Product method, Expenditure method, Income method.

Aggregates related to National Income:

Gross National Product (GNP), Net National Product (NNP), Gross Domestic Product (GDP) and Net Domestic Product (NDP) - at market price, at factor cost; Real and Nominal GDP, GDP Deflator.

GDP and Welfare

Unit 2: Money and Banking

15 Periods

Money - meaning and supply of money - Currency held by the public and net demand deposits held by commercial banks.

Money creation by the commercial banking system.

Central bank and its functions (example of the Reserve Bank of India): Bank of issue, Govt. Bank, Banker's Bank, Control of Credit through Bank Rate, CRR, SLR, Repo Rate and Reverse Repo Rate, Open Market Operations, Margin requirement.

Unit 3: Determination of Income and Employment **25 Periods**

Aggregate demand and its components.

Propensity to consume and propensity to save (average and marginal).

Short-run equilibrium output; investment multiplier and its mechanism.

Meaning of full employment and involuntary unemployment.

Problems of excess demand and deficient demand; measures to correct them - changes in government spending, taxes and money supply.

Unit 4: Government Budget and the Economy **15 Periods**

Government budget - meaning, objectives and components.

Classification of receipts - revenue receipts and capital receipts; classification of expenditure – revenue expenditure and capital expenditure.

Measures of government deficit - revenue deficit, fiscal deficit, primary deficit their meaning.

Unit 5: Balance of Payments **15 Periods**

Balance of payments account - meaning and components; balance of payments deficit-meaning.

Foreign exchange rate - meaning of fixed and flexible rates and managed floating.

Determination of exchange rate in a free market.

Part B: Indian Economic Development

Unit 6: Development Experience (1947-90) and Economic Reforms since 1991:

28 Periods

A brief introduction of the state of Indian economy on the eve of independence.

Indian economic system and common goals of Five Year Plans.

Main features, problems and policies of agriculture (institutional aspects and new agricultural strategy), industry (IPR 1956; SSI – role & importance) and foreign trade.

Economic Reforms since 1991:

Features and appraisals of liberalisation, globalisation and privatisation (LPG policy);
Concepts of demonetization and GST

Unit 7: Current challenges facing Indian Economy

60 Periods

Poverty- absolute and relative; Main programmes for poverty alleviation: A critical assessment;

Human Capital Formation: How people become resource; Role of human capital in economic development; Growth of Education Sector in India

Rural development: Key issues - credit and marketing - role of cooperatives; agricultural diversification; alternative farming - organic farming

Employment: Growth and changes in work force participation rate in formal and informal sectors; problems and policies

Infrastructure: Meaning and Types: Case Studies: Energy and Health: Problems and Policies- A critical assessment;

Sustainable Economic Development: Meaning, Effects of Economic Development on Resources and Environment, including global warming

Unit 8: Development Experience of India:

12 Periods

A comparison with neighbours

India and Pakistan

India and China

Issues: economic growth, population, sectoral development and other Human Development Indicators

Part C: Project in Economics

20 Periods

Prescribed Books:

1. Statistics for Economics, NCERT
2. Indian Economic Development, NCERT
3. Introductory Microeconomics, NCERT
4. Macroeconomics, NCERT
5. Supplementary Reading Material in Economics, CBSE

Note: The above publications are also available in Hindi Medium.

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2	Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	18	22.5%
3	Analysing, Evaluating and Creating: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	18	22.5%
	Total	80	100%

Guidelines for Project Work in Economics (Class XI and XII)

The **objectives** of the project work are to enable learners to:

- probe deeper into theoretical concepts learnt in classes XI and XII
- analyse and evaluate real world economic scenarios using theoretical constructs and arguments
- demonstrate the learning of economic theory
- follow up aspects of economics in which learners have interest
- develop the communication skills to argue logically

The **expectations** of the project work are that:

- learners will complete only **ONE** project in each academic session
- project should be of 3,500-4,000 words (excluding diagrams & graphs), preferably hand-written
- it will be an independent, self-directed piece of study

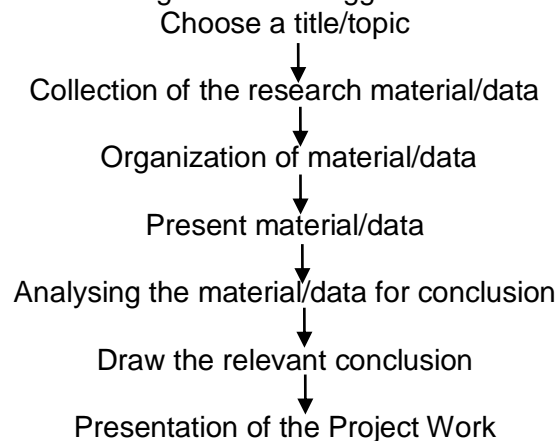
Role of the teacher:

The teacher plays a critical role in developing thinking skills of the learners. A teacher should:

- help each learner select the topic based on recently published extracts from the news media, government policies, RBI bulletin, NITI Aayog reports, IMF/World Bank reports etc., after detailed discussions and deliberations of the topic
- play the role of a facilitator and supervisor to monitor the project work of the learner through periodic discussions
- guide the research work in terms of sources for the relevant data
- educate learner about plagiarism and the importance of quoting the source of the information to ensure authenticity of research work
- prepare the learner for the presentation of the project work
- arrange a presentation of the project file

Scope of the project:

Learners may work upon the following lines as a suggested flow chart:



Expected Checklist:

- Introduction of topic/title
- Identifying the causes, consequences and/or remedies
- Various stakeholders and effect on each of them
- Advantages and disadvantages of situations or issues identified
- Short-term and long-term implications of economic strategies suggested in the course of research
- Validity, reliability, appropriateness and relevance of data used for research work and for presentation in the project file
- Presentation and writing that is succinct and coherent in project file
- *Citation of the materials referred to, in the file in footnotes, resources section, bibliography etc.*

Mode of presentation/submission of the Project:

At the end of the stipulated term, each learner will present the research work in the Project File to the External and Internal examiner. **The questions should be asked from the Research Work/ Project File of the learner. The Internal Examiner should ensure that the study submitted by the learner is his/her own original work.** In case of any doubt, authenticity should be checked and verified.

Marking Scheme :

Marks are suggested to be given as –

S. No.	Heading	Marks Allotted
1.	Relevance of the topic	3
2.	Knowledge Content/Research Work	6
3.	Presentation Technique	3
4.	Viva-voce	8
	Total	20 Marks

Suggestive List of Projects:

Class XI	
• Effect on PPC due to various government policies	• Invisible Hand (Adam Smith)
• Opportunity Cost as an Economic Tool (taking real life situations)	• Effect of Price Change on a Substitute Good (taking prices from real life visiting local market)
• Effect on equilibrium Prices in Local Market (taking real life situation or recent news)	• Effect of Price Change on a Complementary Good (taking prices from real life visiting local market)
• Solar Energy, a Cost Effective Comparison with Conventional Energy Sources	• Bumper Production- Boon or Bane for the Farmer
• Any other newspaper article and its evaluation on basis of economic principles	• Any other topic

Class XII	
• Micro and Small Scale Industries	• Food Supply Channel in India
• Contemporary Employment situation in India	• Disinvestment policy of the government
• Goods and Services Tax Act and its Impact on GDP	• Health Expenditure (of any state)
• Human Development Index	• Inclusive Growth Strategy
• Self-help group	• Trends in Credit availability in India
• Monetary policy committee and its functions	• Role of RBI in Control of Credit
• Government Budget & its Components	• Trends in budgetary condition of India
• Exchange Rate determination – Methods and Techniques	• Currency War – reasons and repercussions
• Livestock – Backbone of Rural India	• Alternate fuel – types and importance
• Sarwa Siksha Abhiyan – Cost Ratio Benefits	• Golden Quadrilateral- Cost ratio benefit
• Minimum Support Prices	• Relation between Stock Price Index and Economic Health of Nation
• Waste Management in India – Need of the hour	• Minimum Wage Rate – approach and Application
• Digital India- Step towards the future	• Rain Water Harvesting – a solution to water crises
• Vertical Farming – an alternate way	• Silk Route- Revival of the past
• Make in India – The way ahead	• Bumper Production- Boon or Bane for the farmer
• Rise of Concrete Jungle- Trend Analysis	• Organic Farming – Back to the Nature
• Any other newspaper article and its evaluation on basis of economic principles	• Any other topic

ENGLISH (CORE)- 301

(2021-22)

Background

Students are expected to have acquired a reasonable degree of language proficiency in English Language by the time they come to class XI, and the course aims, essentially, at promoting the higher-order language skills.

For a large number of students, the higher secondary stage will be a preparation for the university, where a fairly high degree of proficiency in English may be required. But for another large group, the higher secondary stage may be a preparation for entry into the professional domain. The Core Course should cater to both groups by promoting the language skills required for academic study as well as the language skills required for the workplace.

Competencies to be focused on:

The general objectives at this stage are to:

- listen and comprehend live as well as record in writing oral presentations on a variety of topics
- develop greater confidence and proficiency in the use of language skills necessary for social and academic purpose to participate in group discussions, interviews by making short oral presentation on given topics
- perceive the overall meaning and organisation of the text (i.e., correlation of the vital portions of the text)
- identify the central/main point and supporting details, etc., to build communicative competence in various lexicons of English
- promote advanced language skills with an aim to develop the skills of reasoning, drawing inferences, etc. through meaningful activities
- translate texts from mother tongue(s) into English and vice versa
- develop ability and acquire knowledge required in order to engage in independent reflection and enquiry
- read and comprehend extended texts (prescribed and non-prescribed) in the following genres: science fiction, drama, poetry, biography, autobiography, travel and sports literature, etc.
- text-based writing (i.e., writing in response to questions or tasks based on prescribed or unseen texts) understand and respond to lectures, speeches, etc.

- write expository / argumentative essays, explaining or developing a topic, arguing a case, etc. write formal/informal letters and applications for different purposes
- make use of contextual clues to infer meanings of unfamiliar vocabulary
- select, compile and collate information for an oral presentation
- produce unified paragraphs with adequate details and support
- use grammatical structures accurately and appropriately
- write items related to the workplace (minutes, memoranda, notices, summaries, reports etc.
- filling up of forms, preparing CV, e-mail messages., making notes from reference materials, recorded talks etc.

The core course should draw upon the language items suggested for class IX-X and delve deeper into their usage and functions. Particular attention may, however, be given to the following areas of grammar:

- The use of passive forms in scientific and innovative writings.
- Convert one kind of sentence/clause into a different kind of structure as well as other items to exemplify stylistic variations in different discourses modal auxiliaries-uses based on semantic considerations.

A. Specific Objectives of Reading

Students are expected to develop the following study skills:

- skim for main ideas and scan for details
- refer to dictionaries, encyclopedia, thesaurus and academic reference material in any format
- select and extract relevant information, using reading skills of skimming and scanning
- understand the writer's purpose and tone
- comprehend the difference between the literal and the figurative
- differentiate between claims and realities, facts and opinions, form business opinions on the basis of latest trends available
- comprehend technical language as required in computer related fields, arrive at personal conclusion and logically comment on a given text
- Specifically develop the ability to be original and creative in interpreting opinion, develop the ability to be logically persuasive in defending one's opinion and making notes based on a text

Develop literary skills as enumerated below:

- respond to literary texts
- appreciate and analyse special features of languages that differentiate literary texts from non-literary ones, explore and evaluate features of character, plot, setting, etc.
- understand and appreciate the oral, mobile and visual elements of drama .Identify the elements of style such as humour, pathos, satire and irony, etc.
- make notes from various resources for the purpose of developing the extracted ideas into sustained pieces of writing

B. Listening and Speaking

Speaking needs a very strong emphasis and is an important objective leading to professional competence. Hence, testing of oral skills must be made an important component of the overall testing pattern. To this end, speaking and listening skills are overtly built into the material to guide the teachers in actualization of the skills.

I. Specific Objectives of Listening & Speaking

Students are expected to develop the ability to:

- take organized notes on lectures, talks and listening passages
- listen to news bulletins and to develop the ability to discuss informally a wide ranging issues like current national and international affairs, sports, business, etc.
- respond in interviews and to participate in formal group discussions.
- make enquiries meaningfully and adequately and to respond to enquiries for the purpose of travelling within the country and abroad.
- listen to business news and to be able to extract relevant important information.
- to develop public speaking skills.

II. Guidelines for Assessment in Listening and Speaking Skills

i. Activities:

- Activities for listening and speaking available at www.cbseacademic.in can be used for developing listening and speaking skills of students.

- Subject teachers should also refer to books prescribed in the syllabus.
- In addition to the above, teachers may plan their own activities and create their own material for assessing the listening and speaking skills.

ii. Parameters for Assessment:

The listening and speaking skills are to be assessed on the following parameters:

- i. Interactive competence (Initiation & turn taking, relevance to the topic).
- ii. Fluency (cohesion, coherence and speed of delivery).
- iii. Pronunciation
- iv. Language (accuracy and vocabulary).

iii. Schedule:

- The practice of listening and speaking skills should be done throughout the academic year.
- The final assessment of the skills is to be done as per the convenience and schedule of the school.

III. Record keeping:

The record of the activities done and the marks given must be kept for three months after the declaration of result, for any random checking by the Board.

No recording of speaking skills is to be sent to the Board.

C. Specific Objectives of Writing

The students will be able to:

- write letters to friends, relatives, etc. to write business and official letters.
- open accounts in post offices and banks. To fill in railway/airline reservation forms.
- draft notices, advertisements and design posters effectively and appropriately
- write on various issues to institutions seeking relevant information, lodge complaints, express gratitude or render apology.
- write applications, fill in application forms, prepare a personal bio-data for admission into colleges, universities, entrance tests and jobs.
- write informal reports as part of personal letters on functions, programmes and activities held in school (morning assembly, annual day, sports day, etc.)
- write formal reports for school magazines/events/processes/ or in local newspapers about events or occasions.
- express opinions, facts, arguments in the form of speech or debates, using a variety of accurate sentence structures
- draft papers to be presented in symposia.

- take down notes from talks and lectures.
- write examination answers according to the requirement of various subjects.
- summarise a text.

D. More About Reading

Inculcating good reading habits in children has always been a concern for all stakeholders in education. The purpose is to create independent thinking individuals with the ability to not only create their own knowledge but also critically interpret, analyse and evaluate it with objectivity and fairness. This will also help students in learning and acquiring better language skills.

Creating learners for the 21st century involves making them independent learners who can learn, unlearn and relearn. If our children are in the habit of reading, they will learn to reinvent themselves and deal with the many challenges that lie ahead of them.

Reading is not merely decoding information or pronouncing words correctly. It is an interactive dialogue between the author and the reader in which the reader and the author share their experiences and knowledge with each other. Good readers are critical readers with an ability to arrive at a deeper understanding of not only the world presented in the book but also of the real world around them.

Consequently, they become independent thinkers capable of taking their own decisions in life rationally. Hence, a few activities are suggested below which teachers may use as a part of the reading project.

- Short review / dramatization of the story
- Commentary on the characters
- Critical evaluation of the plot, storyline and characters
- Comparing and contrasting the characters within the story, with other characters in stories by the same author or by different authors
- Extrapolating about the story read or life of characters after the story ends
- defending characters actions in the story
- Making an audio story out of the novel/text to be read aloud.
- Interacting with the author
- Holding a literature fest where students role-play as various characters to interact with each other
- Role playing as authors/poets/dramatists, to defend their works and characters
- Symposiums and seminars for introducing a book, an author, or a theme
- Creating graphic novels out of novel or short stories they read
- Dramatizing incidents from a novel or a story

- Creating their own stories
- Books of one genre to be read by the whole class.

Teachers may select books and e-books suitable to the age and level of the learners. Care ought to be taken to choose books that are appropriate in terms of language, theme and content and which do not hurt the sensibilities of a child.

Teachers may later suggest books from other languages by dealing with the same themes as an extended activity. The Project should lead to independent learning/reading skills and hence the chosen book should not be taught in class, but may be introduced through activities and be left for the students to read at their own pace. Teachers may, however, choose to assess a student's progress or success in reading the book by asking for verbal or written progress reports, looking at their diary entries, engaging in a discussion about the book, giving a short quiz or a work sheet about the book/short story. A befitting mode of assessment may be chosen by the teacher.

Methods and Techniques

The techniques used for teaching should promote habits of self-learning and reduce dependence on the teacher. In general, we recommend a multi-skill, learner-centred, activity based approach, of which there can be many variations. The core classroom activity is likely to be that of silent reading of prescribed/selected texts for comprehension, which can lead to other forms of language learning activities such as role-play, dramatization, group discussion, writing, etc., although many such activities could be carried out without the preliminary use of textual material. It is important that students be trained to read independently and intelligently, interacting actively with texts, with the use of reference materials (dictionary, thesaurus, etc.) where necessary. Some pre-reading activity will generally be required, and the course books should suggest suitable activities, leaving teachers free to devise other activities when desired. So also, the reading of texts should be followed by post reading activities. It is important to remember that students should be encouraged to interpret texts in different ways.

Group and pair activities can be resorted to when desired, although many useful language activities can be carried out individually. In general, teachers should encourage students to interact actively with texts and with each other. Oral activity (group discussion, etc.) should be encouraged.

ENGLISH CORE (CODE NO.301)

CLASS – XI (2021-22)

PART A - 40 MARKS

Reading

18 Marks

I. Multiple Choice questions based on one unseen passage to assess comprehension, interpretation and inference. Vocabulary and inference of meaning will also be assessed. The passage may be factual, descriptive or literary. Ten out of eleven questions to be done. **(10x1=10 Marks)**

II. Multiple Choice questions based on one unseen **case-based** factual passage with verbal/visual inputs like statistical data, charts etc. Eight out of Nine questions to be done. **(8x1=8 Marks)**

Note: The combined word limit for both the passages will be 600-750.

Grammar

8 Marks

III. Multiple choice questions on Gap filling (Determiners, Tenses, **Modals Clauses, Change of Voice, Error Correction, editing task/cloze passages**

IV. Multiple choice questions on re-ordering/transformation of sentences

(Total eight questions to be done out of the ten given).

Literature Section

14 Marks

V. Multiple Choice questions from an extract from Poetry from **Hornbill** to assess comprehension and appreciation. Any 1 out of 2 extracts to be done.(3x1=3)

VI. Multiple Choice questions based on two Prose extracts, out of the three given, from Prose (**Hornbill as well as Snapshots** to assess comprehension and appreciation. (6x1=6)

VII. Text based Multiple Choice Questions to assess comprehension, analysis and interpretation, from Prose and Poetry. Five questions out of six to be done. (5x1=5)

PART B - 40 MARKS

Reading Section:

8 Marks

Q1. Note Making and Summarization based on a passage of approximately 200-250 words.

I. Note Making:

5 Marks

- Title: 1
- Numbering and indenting: 1
- Key/glossary: 1
- Notes: 2

II. Summary (up to 50 words):

3 Marks

- Content: 2
- Expression: 1

Writing Section:

16 Marks

Q2. Short writing task -**Notice/ Advertisement** writing up to 50 words. One out of the two given questions to be answered (**3 Marks**: Format : 1 / Content : 1 / Expression : 1)

Q3. Short writing task –**Poster** up to 50 words. One out of the two given questions to be answered. (**3marks**:Format : 1 / Content : 1 / Expression : 1)

Q4. Letters based on verbal/visual input, to be answered in 120-150 words. Business or official letters (for making enquiries, registering complaints, asking for and giving information, placing orders and sending replies), letter to the school or college authorities, regarding admissions, school issues, requirements / suitability of courses, Application for Job interview etc. One out of the two given questions to be answered (**5 Marks**: Format: 1 / Content: 2 / Expression: 2)

Q5 .Writing composition based on visual/verbal inputs in 120-150 words. May be descriptive / argumentative in nature such as Article/Report/ Narrative/speech/debate. The theme should be contemporary topical issues. One out of the two given questions to be answered. (**5 Marks**: Format: 1 / Content: 2 / Expression: 2)

Literature Section:

16 Marks

Q6. Two Short answer type question (**one from Prose and one from Poetry from the book Hornbill**), **out of four**, to be answered in 30-40 words. Questions should elicit inferential responses through critical thinking. (**2x2=4**)

Q7. One Short answer type question, from **Prose (Snapshots)**, to be answered in 40-50 words. Questions should elicit inferential responses through critical thinking. Any 1 out of 2 questions to be done. **(1x2=2)**

Q 8. One Long answer type question, from **Prose/poetry (Hornbill)**, to be answered in 120-150 words to assess global comprehension and extrapolation beyond the text. Questions to provide evaluative and analytical responses using incidents, events, themes as reference points. Any 1 out of 2 questions to be done.**(1x5=5)**

Q.9 One Long answer type question, based on the chapters from the book **Snapshots**, to be answered in 120-150 words to assess global comprehension and extrapolation beyond the text. Questions to provide evaluative and analytical responses using incidents, events, themes as reference points. Any 1 out of 2 questions to be done.**(1x5=5)**

Prescribed Books

1. **Hornbill:** English Reader published by National Council of Education Research and Training, New Delhi
2. **Snapshots:** Supplementary Reader published by National Council of Education Research and Training, New Delhi

Question Paper Design 2021-22

English CORE XI (Code No. 301)

Section	Competencies	Total marks	%
Reading Comprehension	Conceptual understanding, decoding, Analyzing, inferring, interpreting, appreciating, literary, conventions and vocabulary, summarizing and using appropriate format/s	26	32.5%
Creative Writing Skills and Grammar	Conceptual Understanding, application of rules, Analysis, Reasoning, appropriacy of style and tone, using appropriate format and fluency, inference, analysis, evaluation and creativity	24	30%
Literature Textbooks and Supplementary Reading Text	Recalling, reasoning, appreciating literary convention, inference, analysis, creativity with fluency	30	37.5%
	TOTAL	80	100%
Assessment of Listening and Speaking Skills		20	-
	GRAND TOTAL	100	

ENGLISH CORE (CODE NO.

301) CLASS – XII 2021-22

PART A 40 MARKS

Reading Comprehension 20 Marks

I. Multiple Choice questions based on one unseen passage to assess comprehension, interpretation and inference. Vocabulary and inference of meaning will also be assessed. The passage may be factual, descriptive or literary. Ten out of eleven questions to be done. **(10x1=10 Marks)**

II. Multiple Choice questions based on one unseen **case-based** factual passage with verbal/visual inputs like statistical data, charts, newspaper report etc. Ten out of eleven questions to be done. **(10x1=10 Marks)**

Note: The combined word limit for both the passages will be 700-750 words.

Literature 20 Marks

III. Multiple Choice Questions based on two prose extracts, one each from the books **Flamingo and Vistas**, to assess comprehension and appreciation. Refer to the lines to answer questions based on the given extract. Any 2 out of 3 extracts to be done. **(8x1=8)**

IV. Multiple Choice Questions based on a poetry extract from the book **Flamingo** to assess comprehension, analysis and inference. Refer to the lines to answer questions based on the given extract. Any 1 out of 2 extracts to be done. **(4x1=4)**

V. Multiple Choice Questions to assess comprehension, analysis, inference and interpretation from the books **Flamingo and Vistas**. Eight out of ten questions to be done. **(8x1=8)**

PART B (SUBJECTIVE QUESTIONS) - 40 MARKS

Writing Section: 16 Marks

Q1. Short writing task –Notice/Advertisement/Poster up to 50 words. One out of the two given questions to be answered.(3 Marks: Format : 1 / Content : 1 / Expression : 1).

Q2. Short writing task –Formal/Informal Invitation and Reply up to 50 words.One out of the two given questions to be answered.(3 Marks: Format : 1 / Content : 1 / Expression : 1)

Q3. Letters based on verbal/visual input, to be answered in approximately 120-150 words. Letter types include application for a job, Letters to the editor (giving suggestions or opinion on issues of public interest), Business or official letters (for making enquiries, registering complaints, asking for and giving information, placing orders and sending replies). One out of the two given questions to be answered (5 Marks :Format: 1 / Content: 2 / Expression: 2)

Q4. Article/Debate/ Speech/ Report Writing, descriptive and analytical in nature, based on verbal inputs, to be answered in 120-150 words. One out of the two given questions to be answered (5Marks:Format : 1 / Content : 2 / Expression : 2)

Literature Section: 24 Marks

Q5. Five Short answer type question, **out of six, from Prose and Poetry from the book Flamingo**, to be answered in 30-40 words. Questions should elicit inferential responses through critical thinking.(5x2=10)

Q6. Two Short answer type question ,out of three, from **Prose (Vistas)**, to be answered in 30-40 words. Questions should elicit inferential responses through critical thinking. (2x2=4)

Q 7. One Long answer type question, from **Prose/poetry (Flamingo)**, to be answered in 120-150 words to assess global comprehension and extrapolation beyond the text. Questions to provide evaluative and analytical responses using incidents, events, themes as reference points. Any 1 out of 2 questions to be done.(1x5=5)

Q.8 One Long answer type question, based on the chapters from the book **Vistas**, to be answered in 120-150 words to assess global comprehension and extrapolation beyond the text. Questions to provide evaluative and analytical responses using incidents, events, themes as reference points. Any 1 out of 2 questions to be done.(1x5=5)

Prescribed Books

1. **Flamingo:** English Reader published by National Council of Education Research and Training, New Delhi
2. **Vistas:** Supplementary Reader published by National Council of Education Research and Training, New Delhi

Question Paper Design 2021-22

English CORE XII (Code No. 301)

Section	Competencies	Total marks	%
Reading Comprehension	Conceptual understanding, decoding, Analyzing, inferring, interpreting, appreciating, literary, conventions and vocabulary, summarizing and using appropriate format/s	20	25%
Creative Writing Skills	Conceptual Understanding, application of rules, Analysis, Reasoning, appropriacy of style and tone, using appropriate format and fluency, inference, analysis, evaluation and creativity	16	20%
Literature Textbooks and Supplementary Reading Text	Recalling, reasoning, appreciating literary convention, inference, analysis, creativity with fluency	44	55%
	TOTAL	80	100%
Assessment of Listening and Speaking Skills		20	-
	GRAND TOTAL	100	

MATHEMATICS (XI-XII)

(Code No. 041)

Session – 2021-22

The Syllabus in the subject of Mathematics has undergone changes from time to time in accordance with growth of the subject and emerging needs of the society. Senior Secondary stage is a launching stage from where the students go either for higher academic education in Mathematics or for professional courses like Engineering, Physical and Biological science, Commerce or Computer Applications. The present revised syllabus has been designed in accordance with National Curriculum Framework 2005 and as per guidelines given in Focus Group on Teaching of Mathematics 2005 which is to meet the emerging needs of all categories of students. Motivating the topics from real life situations and other subject areas, greater emphasis has been laid on application of various concepts.

Objectives

The broad objectives of teaching Mathematics at senior school stage intend to help the students:

- to acquire knowledge and critical understanding, particularly by way of motivation and visualization, of basic concepts, terms, principles, symbols and mastery of underlying processes and skills.
- to feel the flow of reasons while proving a result or solving a problem.
- to apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method.
- to develop positive attitude to think, analyze and articulate logically.
- to develop interest in the subject by participating in related competitions.
- to acquaint students with different aspects of Mathematics used in daily life.
- to develop an interest in students to study Mathematics as a discipline.
- to develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of gender biases.
- to develop reverence and respect towards great Mathematicians for their contributions to the field of Mathematics.

COURSE STRUCTURE
CLASS XI (2021-22)

One Paper

Total Period–240 [35 Minutes each]

Three Hours

Max Marks: 80

No.	Units	No. of Periods	Marks
I.	Sets and Functions	60	23
II.	Algebra	70	30
III.	Coordinate Geometry	40	10
IV.	Calculus	30	05
V.	Mathematical Reasoning	10	02
VI.	Statistics and Probability	30	10
	Total	240	80
	Internal Assessment		20

*No chapter/unit-wise weightage. Care to be taken to cover all the chapters.

Unit-I: Sets and Functions

1. Sets

(20) Periods

Sets and their representations, Empty set, Finite and Infinite sets, Equal sets, Subsets,. Subsets of a set of real numbers especially intervals (with notations). Power set. Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set. Properties of Complement.

2. Relations & Functions

(20) Periods

Ordered pairs. Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the set of reals with itself (upto $R \times R \times R$). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs. Sum, difference, product and quotients of functions.

3. Trigonometric Functions

(20) Periods

Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2x + \cos^2x = 1$, for all x . Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing $\sin(x \pm y)$ and $\cos(x \pm y)$ in terms of $\sin x$, $\sin y$, $\cos x$ & $\cos y$ and their simple applications. Deducing identities like the following:

$$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}, \cot(x \pm y) = \frac{\cot x \cot y \mp 1}{\cot y \pm \cot x}$$

$$\sin \alpha \pm \sin \beta = 2 \sin \frac{1}{2}(\alpha \pm \beta) \cos \frac{1}{2}(\alpha \mp \beta)$$

$$\cos \alpha + \cos \beta = 2 \cos \frac{1}{2}(\alpha + \beta) \cos \frac{1}{2}(\alpha - \beta)$$

$$\cos \alpha - \cos \beta = -2 \sin \frac{1}{2}(\alpha + \beta) \sin \frac{1}{2}(\alpha - \beta)$$

Identities related to $\sin 2x$, $\cos 2x$, $\tan 2x$, $\sin 3x$, $\cos 3x$ and $\tan 3x$. General solution of trigonometric equations of the type $\sin y = \sin a$, $\cos y = \cos a$ and $\tan y = \tan a$.

Unit-II: Algebra

1. Principle of Mathematical Induction

(10) Periods

Process of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications.

2. Complex Numbers and Quadratic Equations

(15) Periods

Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve some of the quadratic equations. Algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations (with real coefficients) in the complex number system. Square root of a complex number.

3. Linear Inequalities

(15) Periods

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Graphical method of finding a solution of system of linear inequalities in two variables.

4. Permutations and Combinations

(10) Periods

Fundamental principle of counting. Factorial n . ($n!$) Permutations and combinations, derivation of Formulae for n_P_r and n_C_r and their connections, simple applications.

5. Binomial Theorem

(10) Periods

Historical perspective, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, General and middle term in binomial expansion, simple applications.

6. Sequence and Series

(10) Periods

Sequence and Series. Arithmetic Progression (A. P.). Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M. Formulae for the following special sums.

$$\sum_{k=1}^n k, \sum_{k=1}^n k^2 \text{ and } \sum_{k=1}^n k^3$$

Unit-III: Coordinate Geometry

1. Straight Lines

(10) Periods

Brief recall of two dimensional geometry from earlier classes. Shifting of origin. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point -slope form, slope-intercept form, two-point form, intercept form and normal form. General equation of a line. Equation of family of lines passing through the point of intersection of two lines. Distance of a point from a line.

2. Conic Sections

(20) Periods

Sections of a cone: circles, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

3. Introduction to Three-dimensional Geometry

(10) Periods

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula.

Unit-IV: Calculus

1. Limits and Derivatives

(30) Periods

Derivative introduced as rate of change both as that of distance function and geometrically. Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. Definition of derivative relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

Unit-V: Mathematical Reasoning

1. Mathematical Reasoning

(10) Periods

Mathematically acceptable statements. Connecting words/ phrases - consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics. Validating the statements involving the connecting words, difference among contradiction, converse and contrapositive.

Unit-VI: Statistics and Probability

1. Statistics

(15) Periods

Measures of Dispersion: Range, Mean deviation, variance and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.

2. Probability

(15) Periods

Random experiments; outcomes, sample spaces (set representation). Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability, connections with other theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events.

MATHEMATICS
QUESTION PAPER DESIGN
CLASS – XI (2021-22)

Time: 3 Hours

Max. Marks: 80

S. No.	Typology of Questions	Total Marks	% Weight age
1	<p>Remembering: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.</p> <p>Understanding: Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas</p>	44	55
2	<p>Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.</p>	20	25
3	<p>Analysing : Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations</p> <p>Evaluating: Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.</p> <p>Creating: Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions</p>	16	20
Total		80	100

- No chapter wise weightage. Care to be taken to cover all the chapters*
- Suitable internal variations may be made for generating various templates keeping the overall weightage to different form of questions and typology of questions same.*

Choice(s):

There will be no overall choice in the question paper.

However, 33% internal choices will be given in all the sections

INTERNAL ASSESSMENT	20 MARKS
Periodic Tests (Best 2 out of 3 tests conducted)	10 Marks
Mathematics Activities	10 Marks

Note: Please refer the guidelines given under XII Mathematics Syllabus:

CLASS-XII
(2021-22)

One Paper

Max Marks: 80

No.	Units	No. of Periods	Marks
I.	Relations and Functions	30	08
II.	Algebra	50	10
III.	Calculus	80	35
IV.	Vectors and Three - Dimensional Geometry	30	14
V.	Linear Programming	20	05
VI.	Probability	30	08
	Total	240	80
	Internal Assessment		20

Unit-I: Relations and Functions

1. Relations and Functions **15 Periods**

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function.

2. Inverse Trigonometric Functions **15 Periods**

Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions
Elementary properties of inverse trigonometric functions.

Unit-II: Algebra

1. Matrices **25 Periods**

Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operation on matrices: Addition and multiplication and multiplication with a scalar. 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).

2. Determinants

25 Periods

Determinant of a square matrix (up to 3 x 3 matrices), properties of determinants, minors, co-factors and applications 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.

Unit-III: Calculus

1. Continuity and Differentiability

20 Periods

Continuity and differentiability, derivative of composite functions, chain rule, derivative of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions.

Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives. Rolle's and Lagrange's Mean Value Theorems (without proof) and their geometric interpretation.

2. Applications of Derivatives

10 Periods

Applications of derivatives: rate of change of bodies, increasing/decreasing functions, tangents and normals, use of derivatives in approximation, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).

3. Integrals

20 Periods

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$
$$\int \frac{px + q}{ax^2 + bx + c} dx, \int \frac{px + q}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2} dx, \int \sqrt{x^2 - a^2} dx$$
$$\int \sqrt{ax^2 + bx + c} dx, \int (px + q)\sqrt{ax^2 + bx + c} dx$$

Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

4. Applications of the Integrals

15 Periods

Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only), Area between any of the two above said curves (the region should be clearly identifiable).

5. Differential Equations

15 Periods

Definition, order and degree, general and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type:

$$\frac{dy}{dx} + py = q, \text{ where } p \text{ and } q \text{ are functions of } x \text{ or constants.}$$

$$\frac{dx}{dy} + px = q, \text{ where } p \text{ and } q \text{ are functions of } y \text{ or constants.}$$

Unit-IV: Vectors and Three-Dimensional Geometry

1. Vectors

15 Periods

Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors, scalar triple product of vectors.

2. Three - dimensional Geometry

15 Periods

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

Unit-V: Linear Programming

1. Linear Programming

20 Periods

Introduction, 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 (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

Unit-VI: Probability

1. Probability

30 Periods

Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean and variance of random variable. Binomial probability distribution.

MATHEMATICS (Code No. - 041)
QUESTION PAPER DESIGN CLASS - XII
(2021 - 22)

Time: 3 hours

Max. Marks: 80

S. No.	Typology of Questions	Total Marks	% Weightage
1	<p>Remembering: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.</p> <p>Understanding: Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas</p>	44	55
2	<p>Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.</p>	20	25
3	<p>Analysing : Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations</p> <p>Evaluating: Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.</p> <p>Creating: Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions</p>	16	20
	Total	80	100

- No chapter wise weightage. Care to be taken to cover all the chapters*
- Suitable internal variations may be made for generating various templates keeping the overall weightage to different form of questions and typology of questions same.*

Choice(s):

There will be no overall choice in the question paper.

However, 33% internal choices will be given in all the sections

INTERNAL ASSESSMENT	20 MARKS
Periodic Tests (Best 2 out of 3 tests conducted)	10 Marks
Mathematics Activities	10 Marks

Note: For activities NCERT Lab Manual may be referred.

Conduct of Periodic Tests:

Periodic Test is a Pen and Paper assessment which is to be conducted by the respective subject teacher. The format of periodic test must have questions items with a balance mix, such as, very short answer (VSA), short answer (SA) and long answer (LA) to effectively assess the knowledge, understanding, application, skills, analysis, evaluation and synthesis. Depending on the nature of subject, the subject teacher will have the liberty of incorporating any other types of questions too. The modalities of the PT are as follows:

- a) **Mode:** The periodic test is to be taken in the form of pen-paper test.
- b) **Schedule:** In the entire Academic Year, three Periodic Tests in each subject may be conducted as follows:

Test	Pre Mid-term (PT-I)	Mid-Term (PT-II)	Post Mid-Term (PT-III)
Tentative Month	July-August	November	December-January

This is only a suggestive schedule and schools may conduct periodic tests as per their convenience. The winter bound schools would develop their own schedule with similar time gaps between two consecutive tests.

- c) **Average of Marks:** Once schools complete the conduct of all the three periodic tests, they will convert the weightage of each of the three tests into ten marks each for identifying best two tests. The best two will be taken into consideration and the average of the two shall be taken as the final marks for PT.
- d) The school will ensure simple documentation to keep a record of performance as suggested in detail circular no.Acad-05/2017.
- e) **Sharing of Feedback/Performance:** The students' achievement in each test must be shared with the students and their parents to give them an overview of the level of learning that has taken place during different periods. Feedback will help parents formulate interventions (conducive ambience, support materials, motivation and morale-boosting) to further enhance learning. A teacher, while sharing the feedback with student or parent, should be empathetic, non- judgmental and motivating. It is recommended that the teacher share best examples/performances of IA with the class to motivate all learners.

Assessment of Activity Work:

Throughout the year any 10 activities shall be performed by the student from the activities given in the NCERT Laboratory Manual for the respective class (XI or XII) which is available on the link: <http://www.ncert.nic.in/exemplar/labmanuals.html> a record of the same may be kept by the student. An year end test on the activity may be conducted

The weightage are as under:

- The activities performed by the student throughout the year and record keeping : 5 marks
- Assessment of the activity performed during the year end test: 3 marks
- Viva-voce : 2 marks

Prescribed Books:

- 1) Mathematics Textbook for Class XI, NCERT Publications
- 2) Mathematics Part I - Textbook for Class XII, NCERT Publication
- 3) Mathematics Part II - Textbook for Class XII, NCERT Publication
- 4) Mathematics Exemplar Problem for Class XI, Published by NCERT
- 5) Mathematics Exemplar Problem for Class XII, Published by NCERT
- 6) Mathematics Lab Manual class XI, published by NCERT
- 7) Mathematics Lab Manual class XII, published by NCERT

PHYSICAL EDUCATION (048)
Class XI (2021–22)

Theory

Max. Marks 70

Unit I Changing Trends & Career in Physical Education

- Meaning & definition of Physical Education
- Aims & Objectives of Physical Education
- Career Options in Physical Education
- Competitions in various sports at national and international level
- Khelo-India Program

Unit II Olympic Value Education

- Olympics, Paralympics and Special Olympics
- Olympic Symbols, Ideals, Objectives & Values of Olympism
- International Olympic Committee
- Indian Olympic Association

Unit III Physical Fitness, Wellness & Lifestyle

- Meaning & Importance of Physical Fitness, Wellness & Lifestyle
- Components of physical fitness and Wellness
- Components of Health related fitness

Unit IV Physical Education & Sports for CWSN (Children With Special Needs- Divyang)

- Aims & objectives of Adaptive Physical Education
- Organization promoting Adaptive Sports (Special Olympics Bharat; Paralympics; Deaflympics)
- Concept of Inclusion, its need and Implementation
- Role of various professionals for children with special needs (Counsellor, Occupational Therapist, Physiotherapist, Physical Education Teacher, Speech Therapist & special Educator)

Unit V Yoga

- Meaning & Importance of Yoga
- Elements of Yoga
- Introduction - Asanas, Pranayam, Meditation & Yogic Kriyas
- Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Shashankasana, Naukasana, Vrikshasana (Tree pose), Garudasana (Eagle pose)
- Relaxation Techniques for improving concentration – Yog-nidra

Unit VI Physical Activity & Leadership Training

- Leadership Qualities & Role of a Leader
- Creating leaders through Physical Education
- Meaning, objectives & types of Adventure Sports (Rock Climbing, Tracking, River Rafting, Mountaineering, Surfing and Para Gliding)
- Safety measures to prevent sports injuries

Unit VII Test, Measurement & Evaluation

- Define Test, Measurement & Evaluation
- Importance of Test, Measurement & Evaluation In Sports
- Calculation of BMI & Waist - Hip Ratio
- Somato Types (Endomorphy, Mesomorphy & Ectomorphy)
- Measurement of health related fitness

Unit VIII Fundamentals of Anatomy, Physiology & Kinesiology in Sports

- Definition and Importance of Anatomy, Physiology & Kinesiology
- Function of Skeleton System, Classification of Bones & Types of Joints
- Properties and Functions of Muscles
- Function & Structure of Respiratory System and Circulatory System
- Equilibrium – Dynamic & Static And Centre of Gravity and its application in sports

Unit IX Psychology & Sports

- Definition & Importance of Psychology in Phy. Edu. & Sports
- Define & Differentiate Between Growth & Development
- Developmental Characteristics At Different Stages of Development
- Adolescent Problems & Their Management

Unit X Training and Doping in Sports

- Meaning & Concept of Sports Training
- Principles of Sports Training
- Warming up & limbering down
- Skill, Technique & Style
- Concept & classification of doping
- Prohibited Substances & their side effects
- Dealing with alcohol and substance abuse

Practical

Max. Marks 30

- | | |
|---|-----------|
| 01. Physical Fitness Test | - 6 Marks |
| 02. Proficiency in Games and Sports (Skill of any one Game of choice from the given list*)- 7 Marks | |
| 03. Yogic Practices | - 7 Marks |
| 04. Record File ** | - 5 Marks |
| 05. Viva Voce (Health/ Games & Sports/ Yoga) | - 5 Marks |

* Athletics, Archery, Badminton, Boxing, Chess, Judo, Shooting, Skating, Swimming, Taekwondo, Tennis, Aerobics, Gymnastics, Rope-Skipping, Yoga, Bocce & Unified Basketball [CWSN (Children With Special Needs - Divyang)]

***Record File shall include:*

Practical-1: Labelled diagram of 400 M Track & Field with computations.

Practical-2: Computation of BMI from family or neighbourhood & graphical

representation of the data. Practical-3: Labelled diagram of field & equipment of any one game of your choice out of the above list. Practical-4: List of current National Awardees (Dronacharya Award, Arjuna Award & Rajiv Gandhi Khel Ratna Award)

Practical-5: Pictorial presentation of any five Asanas for improving concentration.

PHYSICAL EDUCATION (048)
Class XII (2021–22)

Theory

Max. Marks 70

Unit I Planning in Sports

- Meaning & Objectives Of Planning
- Various Committees & its Responsibilities (pre; during & post)
- Tournament – Knock-Out, League Or Round Robin & Combination
- Procedure To Draw Fixtures – Knock-Out (Bye & Seeding) & League (Staircase & Cyclic)
- Intramural & Extramural – Meaning, Objectives & Its Significance
- Specific Sports Programme (Sports Day, Health Run, Run For Fun, Run For Specific Cause & Run For Unity)

Unit II Sports & Nutrition

- Balanced Diet & Nutrition: Macro & Micro Nutrients
- Nutritive & Non-Nutritive Components Of Diet
- Eating For Weight Control – A Healthy Weight, The Pitfalls of Dieting, Food Intolerance & Food Myths

Unit III Yoga & Lifestyle

- Asanas as preventive measures
- Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana
- Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana
- Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana
- Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Shavasana
- Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana

Unit IV Physical Education & Sports for CWSN (Children With Special Needs - *Divyang*)

- Concept of Disability & Disorder
- Types of Disability, its causes & nature (cognitive disability, intellectual disability, physical disability)
- Types of Disorder, its cause & nature (ADHD, SPD, ASD, ODD, OCD)
- Disability Etiquettes
- Advantage of Physical Activities for children with special needs
- Strategies to make Physical Activities assessable for children with special need.

Unit V Children & Women in Sports

- Motor development & factors affecting it
- Exercise Guidelines at different stages of growth & Development
- Common Postural Deformities - Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis and their corrective measures
- Sports participation of women in India
- Special consideration (Menarch & Menstrual Dysfunction)
- Female Athletes Triad (Oestoperosis, Amenoria, Eating Disorders)

Unit VI Test & Measurement in Sports

- Motor Fitness Test – 50 M Standing Start, 600 M Run/Walk, Sit & Reach, Partial Curl Up, Push Ups (Boys), Modified Push Ups (Girls), Standing Broad Jump, Agility – 4x10 M Shuttle Run
- General Motor Fitness – Barrow three item general motor ability (Standing Broad Jump, Zig Zag Run, Medicine Ball Put – For Boys: 03 Kg & For Girls: 01 Kg)
 - Measurement of Cardio Vascular Fitness – Harvard Step Test/Rockport Test Computation of Fitness Index: $\frac{\text{Duration of the Exercise in Seconds} \times 100}{5.5 \times \text{Pulse count of 1-1.5 Min after Exercise}}$

- Rikli & Jones - Senior Citizen Fitness Test
 1. Chair Stand Test for lower body strength
 2. Arm Curl Test for upper body strength
 3. Chair Sit & Reach Test for lower body flexibility
 4. Back Scratch Test for upper body flexibility
 5. Eight Foot Up & Go Test for agility
 6. Six Minute Walk Test for Aerobic Endurance

Unit VII Physiology & Injuries in Sports

- Physiological factor determining component of Physical Fitness
- Effect of exercise on Cardio Respiratory System
- Effect of exercise on Muscular System
- Physiological changes due to ageing
- Sports injuries: Classification (Soft Tissue Injuries:(Abrasion, Contusion, Laceration, Incision, Sprain & Strain) Bone & Joint Injuries: (Dislocation, Fractures: Stress Fracture, Green Stick, Communated, Transverse Oblique & Impacted) Causes, Prevention&treatment
- First Aid – Aims & Objectives

Unit VIII Biomechanics & Sports

- Meaning and Importance of Biomechanics in Sports
- Types of movements (Flexion, Extension, Abduction & Adduction)
- Newton's Law of Motion & its application in sports
- Friction & Sports

Unit IX Psychology & Sports

- Personality; its definition & types – Trait & Types (Sheldon & Jung Classification) & Big Five Theory
- Motivation, its type & techniques
- Exercise Adherence; Reasons to Exercise, Benefits of Exercise
- Strategies for Enhancing Adherence to Exercise
- Meaning, Concept & Types of Aggressions in Sports

Unit X Training in Sports

- Strength – Definition, types & methods of improving Strength – Isometric, Isotonic & Isokinetic
- Endurance - Definition, types & methods to develop Endurance – Continuous Training, Interval Training & Fartlek Training
- Speed – Definition, types & methods to develop Speed – Acceleration Run & Pace Run
- Flexibility – Definition, types & methods to improve flexibility
- Coordinative Abilities – Definition & types
- Circuit Training - Introduction & its importance

Practical

Max. Marks 30

- | | |
|---|-----------|
| 01. Physical Fitness Test | - 6 Marks |
| 02. Proficiency in Games and Sports (Skill of any one Game of choice from the given list*)- 7 Marks | |
| 03. Yogic Practices | - 7 Marks |
| 04. Record File ** | - 5 Marks |
| 05. Viva Voce (Health/ Games & Sports/ Yoga) | - 5 Marks |

* Basketball, Football, Kabaddi, Kho-Kho, Volleyball, Handball, Hockey, Cricket, Bocce & Unified Basketball [CWSN (Children With Special Needs - Divyang)]

****Record File shall include:**

Practical-1: Fitness tests administration for all items.

Practical-2: Procedure for Asanas, Benefits & Contraindication for any two Asanas for each lifestyle disease.

Practical-3: Procedure for administering Senior Citizen Fitness Test for 5 elderly family members. Practical-4: Any one game of your choice out of the list above. Labelled diagram of field & equipment (Rules, Terminologies & Skills).

PHYSICS
Class XI-XII (Code No. 042)
(2021-22)

Senior Secondary stage of school education is a stage of transition from general education to discipline-based focus on curriculum. The present updated syllabus keeps in view the rigour and depth of disciplinary approach as well as the comprehension level of learners. Due care has also been taken that the syllabus is comparable to the international standards. Salient features of the syllabus include:

- Emphasis on basic conceptual understanding of the content.
- Emphasis on use of SI units, symbols, nomenclature of physical quantities and formulations as per international standards.
- Providing logical sequencing of units of the subject matter and proper placement of concepts with their linkage for better learning.
- Reducing the curriculum load by eliminating overlapping of concepts/content within the discipline and other disciplines.
- Promotion of process-skills, problem-solving abilities and applications of Physics concepts.

Besides, the syllabus also attempts to

- Strengthen the concepts developed at the secondary stage to provide firm foundation for further learning in the subject.
- Expose the learners to different processes used in Physics-related industrial and technological applications.
- Develop process-skills and experimental, observational, manipulative, decision making and investigatory skills in the learners.
- Promote problem solving abilities and creative thinking in learners.
- Develop conceptual competence in the learners and make them realize and appreciate the interface of Physics with other disciplines.

PHYSICS (Code No. 042)
COURSE STRUCTURE
Class XI – 2021-22 (Theory)

Time: 3 hrs.

Max Marks: 70

		No. of Periods	Marks
Unit-I	Physical World and Measurement	10	23
	Chapter-1: Physical World		
	Chapter-2: Units and Measurements		
Unit-II	Kinematics	24	
	Chapter-3: Motion in a Straight Line		
	Chapter-4: Motion in a Plane		
Unit-III	Laws of Motion	14	
	Chapter-5: Laws of Motion		
Unit-IV	Work, Energy and Power	12	
	Chapter-6: Work, Energy and Power		
Unit-V	Motion of System of Particles and Rigid Body	18	
	Chapter-7: System of Particles and Rotational Motion		
Unit-VI	Gravitation	12	
	Chapter-8: Gravitation		
Unit-VII	Properties of Bulk Matter	24	
	Chapter-9: Mechanical Properties of Solids		
	Chapter-10: Mechanical Properties of Fluids		
	Chapter-11: Thermal Properties of Matter	12	
Unit-VIII	Thermodynamics		
	Chapter-12: Thermodynamics		
Unit-IX	Behaviour of Perfect Gases and Kinetic Theory of Gases	08	
	Chapter-13: Kinetic Theory		
Unit-X	Oscillations and Waves	26	
	Chapter-14: Oscillations		
	Chapter-15: Waves		
Total		160	70

Unit I: Physical World and Measurement

10 Periods

Chapter–1: Physical World

Physics-scope and excitement; nature of physical laws; Physics, technology and society.

Chapter–2: Units and Measurements

Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements; accuracy and precision of measuring instruments; errors in measurement; significant figures.

Dimensions of physical quantities, dimensional analysis and its applications.

Unit II: Kinematics

24 Periods

Chapter–3: Motion in a Straight Line

Frame of reference, Motion in a straight line: Position-time graph, speed and velocity.

Elementary concepts of differentiation and integration for describing motion, uniform and non- uniform motion, average speed and instantaneous velocity, uniformly accelerated motion, velocity - time and position-time graphs.

Relations for uniformly accelerated motion (graphical treatment).

Chapter–4: Motion in a Plane

Scalar and vector quantities; position and displacement vectors, general vectors and their notations; equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors, relative velocity, Unit vector; resolution of a vector in a plane, rectangular components, Scalar and Vector product of vectors.

Motion in a plane, cases of uniform velocity and uniform acceleration- projectile motion, uniform circular motion.

Unit III: Laws of Motion

14 Periods

Chapter–5: Laws of Motion

Intuitive concept of force, Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion.

Law of conservation of linear momentum and its applications.

Equilibrium of concurrent forces, Static and kinetic friction, laws of friction, rolling friction, lubrication.

Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicle on a level circular road, vehicle on a banked road).

Unit IV: Work, Energy and Power

12 Periods

Chapter–6: Work, Engery and Power

Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power.

Notion of potential energy, potential energy of a spring, conservative forces: conservation of mechanical energy (kinetic and potential energies); non-conservative forces: motion in a vertical circle; elastic and inelastic collisions in one and two dimensions.

Unit V: Motion of System of Particles and Rigid Body

18 Periods

Chapter–7: System of Particles and Rotational Motion

Centre of mass of a two-particle system, momentum conservation and centre of mass motion. Centre of mass of a rigid body; centre of mass of a uniform rod.

Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications.

Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions.

Moment of inertia, radius of gyration, values of moments of inertia for simple geometrical objects (no derivation). Statement of parallel and perpendicular axes theorems and their applications.

Unit VI: Gravitation**12 Periods****Chapter–8: Gravitation**

Kepler's laws of planetary motion, universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth.

Gravitational potential energy and gravitational potential, escape velocity, orbital velocity of a satellite, Geo-stationary satellites.

Unit VII: Properties of Bulk Matter**24 Periods****Chapter–9: Mechanical Properties of Solids**

Elastic behaviour, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity, Poisson's ratio; elastic energy.

Chapter–10: Mechanical Properties of Fluids

Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes), effect of gravity on fluid pressure.

Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its applications.

Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

Chapter–11: Thermal Properties of Matter

Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity; C_p , C_v - calorimetry; change of state - latent heat capacity.

Heat transfer-conduction, convection and radiation, thermal conductivity, qualitative ideas of Blackbody radiation, Wein's displacement Law, Stefan's law, Greenhouse effect.

Unit VIII: Thermodynamics

12 Periods

Chapter–12: Thermodynamics

Thermal equilibrium and definition of temperature (zeroth law of thermodynamics), heat, work and internal energy. First law of thermodynamics, isothermal and adiabatic processes.

Second law of thermodynamics: reversible and irreversible processes, Heat engine and refrigerator.

Unit IX: Behaviour of Perfect Gases and Kinetic Theory of Gases

08 Periods

Chapter–13: Kinetic Theory

Equation of state of a perfect gas, work done in compressing a gas.

Kinetic theory of gases - assumptions, concept of pressure. Kinetic interpretation of temperature; rms speed of gas molecules; degrees of freedom, law of equi-partition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.

Unit X: Oscillations and Waves

26 Periods

Chapter–14: Oscillations

Periodic motion - time period, frequency, displacement as a function of time, periodic functions.

Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a loaded spring- restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum derivation of expression for its time period. Free, forced and damped oscillations (qualitative ideas only), resonance.

Chapter–15: Waves

Wave motion: Transverse and longitudinal waves, speed of travelling wave, displacement relation for a progressive wave, principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, Doppler effect.

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 12 Experiments [with 6 from each section], to be performed by the students.
- Record of at least 6 Activities [with 3 each from section A and section B], to be performed by the students.
- Report of the project to be carried out by the students.

EVALUATION SCHEME

Time Allowed: Three hours

Max. Marks: 30

Two experiments one from each section	7+7 Marks
Practical record (experiment and activities)	5 Marks
One activity from any section	3 Marks
Investigatory Project	3 Marks
Viva on experiments, activities and project	5 Marks
Total	30 Marks

SECTION–A

Experiments

1. To measure diameter of a small spherical/cylindrical body and to measure internal diameter and depth of a given beaker/calorimeter using Vernier Callipers and hence find its volume.
2. To measure diameter of a given wire and thickness of a given sheet using screw gauge.
3. To determine volume of an irregular lamina using screw gauge.
4. To determine radius of curvature of a given spherical surface by a spherometer.

5. To determine the mass of two different objects using a beam balance.
6. To find the weight of a given body using parallelogram law of vectors.
7. Using a simple pendulum, plot its $L-T^2$ graph and use it to find the effective length of second's pendulum.
8. To study variation of time period of a simple pendulum of a given length by taking bobs of same size but different masses and interpret the result.
9. To study the relationship between force of limiting friction and normal reaction and to find the co-efficient of friction between a block and a horizontal surface.
10. To find the downward force, along an inclined plane, acting on a roller due to gravitational pull of the earth and study its relationship with the angle of inclination θ by plotting graph between force and $\sin\theta$.

Activities

1. To make a paper scale of given least count, e.g., 0.2cm, 0.5 cm.
2. To determine mass of a given body using a metre scale by principle of moments.
3. To plot a graph for a given set of data, with proper choice of scales and error bars.
4. To measure the force of limiting friction for rolling of a roller on a horizontal plane.
5. To study the variation in range of a projectile with angle of projection.
6. To study the conservation of energy of a ball rolling down on an inclined plane (using a double inclined plane).
7. To study dissipation of energy of a simple pendulum by plotting a graph between square of amplitude and time.

SECTION-B

Experiments

1. To determine Young's modulus of elasticity of the material of a given wire.
2. To find the force constant of a helical spring by plotting a graph between load and extension.
3. To study the variation in volume with pressure for a sample of air at constant temperature by plotting graphs between P and V, and between P and $1/V$.
4. To determine the surface tension of water by capillary rise method.
5. To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.
6. To study the relationship between the temperature of a hot body and time by plotting a cooling curve.
7. To determine specific heat capacity of a given solid by method of mixtures.
8. To study the relation between frequency and length of a given wire under constant tension using sonometer.
9. To study the relation between the length of a given wire and tension for constant frequency using sonometer.
10. To find the speed of sound in air at room temperature using a resonance tube by two resonance positions.

Activities

1. To observe change of state and plot a cooling curve for molten wax.
2. To observe and explain the effect of heating on a bi-metallic strip.
3. To note the change in level of liquid in a container on heating and interpret the observations.
4. To study the effect of detergent on surface tension of water by observing capillary rise.
5. To study the factors affecting the rate of loss of heat of a liquid.
6. To study the effect of load on depression of a suitably clamped metre scale loaded at (i) its end (ii) in the middle.
7. To observe the decrease in pressure with increase in velocity of a fluid.

Practical Examination for Visually Impaired Students Class XI

Note: Same Evaluation scheme and general guidelines for visually impaired students as given for Class XII may be followed.

A. Items for Identification/Familiarity of the apparatus for assessment in practicals (All experiments)

Spherical ball, Cylindrical objects, vernier calipers, beaker, calorimeter, Screw gauge, wire, Beam balance, spring balance, weight box, gram and milligram weights, forceps, Parallelogram law of vectors apparatus, pulleys and pans used in the same 'weights' used, Bob and string used in a simple pendulum, meter scale, split cork, suspension arrangement, stop clock/stop watch, Helical spring, suspension arrangement used, weights, arrangement used for measuring extension, Sonometer, Wedges, pan and pulley used in it, 'weights' Tuning Fork, Meter scale, Beam balance, Weight box, gram and milligram weights, forceps, Resonance Tube, Tuning Fork, Meter scale, Flask/Beaker used for adding water.

B. List of Practicals

1. To measure diameter of a small spherical/cylindrical body using vernier calipers.
2. To measure the internal diameter and depth of a given beaker/calorimeter using vernier calipers and hence find its volume.
3. To measure diameter of given wire using screw gauge.
4. To measure thickness of a given sheet using screw gauge.
5. To determine the mass of a given object using a beam balance.
6. To find the weight of given body using the parallelogram law of vectors.
7. Using a simple pendulum plot $L-T$ and $L-T^2$ graphs. Hence find the effective length of second's pendulum using appropriate length values.
8. To find the force constant of given helical spring by plotting a graph between load and extension.

9. (i) To study the relation between frequency and length of a given wire under constant tension using a sonometer.
(ii) To study the relation between the length of a given wire and tension, for constant frequency, using a sonometer.
10. To find the speed of sound in air, at room temperature, using a resonance tube, by observing the two resonance positions.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Physics Part-I, Textbook for Class XI, Published by NCERT
2. Physics Part-II, Textbook for Class XI, Published by NCERT
3. Laboratory Manual of Physics, Class XI Published by NCERT
4. The list of other related books and manuals brought out by NCERT (consider multimedia also).

CLASS XII (2021-22)
(THEORY)

Time: 3 hrs.

Max Marks: 70

		No. of Periods	Marks
Unit-I	Electrostatics	24	16
	Chapter-1: Electric Charges and Fields		
	Chapter-2: Electrostatic Potential and Capacitance		
Unit-II	Current Electricity	18	
	Chapter-3: Current Electricity		
Unit-III	Magnetic Effects of Current and Magnetism	22	17
	Chapter-4: Moving Charges and Magnetism		
	Chapter-5: Magnetism and Matter		
Unit-IV	Electromagnetic Induction and Alternating Currents	20	
	Chapter-6: Electromagnetic Induction		
	Chapter-7: Alternating Current		
Unit-V	Electromagnetic Waves	04	
	Chapter-8: Electromagnetic Waves		
Unit-VI	Optics	27	18
	Chapter-9: Ray Optics and Optical Instruments		
	Chapter-10: Wave Optics		
Unit-VII	Dual Nature of Radiation and Matter	08	12
	Chapter-11: Dual Nature of Radiation and Matter		
Unit-VIII	Atoms and Nuclei	15	
	Chapter-12: Atoms		
	Chapter-13: Nuclei		
Unit-IX	Electronic Devices	12	
	Chapter-14: Semiconductor Electronics: Materials, Devices and Simple Circuits		
Total		150	70

Unit I: Electrostatics

24 Periods

Chapter–1: Electric Charges and Fields

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).

Chapter–2: Electrostatic Potential and Capacitance

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, energy stored in a capacitor.

Unit II: Current Electricity

18 Periods

Chapter–3: Current Electricity

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.

Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's laws and simple applications, Wheatstone bridge, metre bridge.

Potentiometer - principle and its applications to measure potential difference and for comparing EMF of two cells; measurement of internal resistance of a cell.

Unit III: Magnetic Effects of Current and Magnetism

22 Periods

Chapter–4: Moving Charges and Magnetism

Concept of magnetic field, Oersted's experiment.

Biot - Savart law and its application to current carrying circular loop.

Ampere's law and its applications to infinitely long straight wire. Straight and toroidal solenoids (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields, Cyclotron.

Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors-definition of ampere, torque experienced by a current loop in uniform magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter.

Chapter–5: Magnetism and Matter

Current loop as a magnetic dipole and its magnetic dipole moment, magnetic dipole moment of a revolving electron, magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis, torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; earth's magnetic field and magnetic elements.

Para-, dia- and ferro - magnetic substances, with examples. Electromagnets and factors affecting their strengths, permanent magnets.

Unit IV: Electromagnetic Induction and Alternating Currents **20 Periods**

Chapter–6: Electromagnetic Induction

Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Eddy currents. Self and mutual induction.

Chapter–7: Alternating Current

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, power factor, wattless current.

AC generator and transformer.

Unit V: Electromagnetic waves **04 Periods**

Chapter–8: Electromagnetic Waves

Basic idea of displacement current, Electromagnetic waves, their characteristics, their Transverse nature (qualitative ideas only).

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Unit VI: Optics **27 Periods**

Chapter–9: Ray Optics and Optical Instruments

Ray Optics: 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, lensmaker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction 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.

Chapter–10: Wave Optics

Wave optics: Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width, coherent sources and sustained interference of light, diffraction due to a single slit, width of central maximum, resolving power of microscope and astronomical telescope, polarisation, plane polarised light, Brewster's law, uses of plane polarised light and Polaroids.

Unit VII: Dual Nature of Radiation and Matter

08 Periods

Chapter–11: Dual Nature of Radiation and Matter

Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light.

Experimental study of photoelectric effect

Matter waves-wave nature of particles, de-Broglie relation, Davisson-Germer experiment (experimental details should be omitted; only conclusion should be explained).

Unit VIII: Atoms and Nuclei

15 Periods

Chapter–12: Atoms

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum.

Chapter–13: Nuclei

Composition and size of nucleus, Radioactivity, alpha, beta and gamma particles/rays and their properties; radioactive decay law, half life and mean life.

Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.

Unit IX: Electronic Devices

12 Periods

Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits

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 junction diodes: LED, photodiode, solar cell and Zener diode and their characteristics, zener diode as a voltage regulator.

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 12 Experiments [with 6 from each section], to be performed by the students.
- Record of at least 6 Activities [with 3 each from section A and section B], to be performed by the students.
- The Report of the project to be carried out by the students.

Evaluation Scheme

Time Allowed: Three hours

Max. Marks: 30

Two experiments one from each section	7+7 Marks
Practical record [experiments and activities]	5 Marks
One activity from any section	3 Marks

Investigatory Project	3 Marks
Viva on experiments, activities and project	5 Marks
Total	30 marks

Experiments

SECTION–A

1. To determine resistivity of two / three wires by plotting a graph for potential difference versus current.
2. To find resistance of a given wire / standard resistor using metre bridge.
3. To verify the laws of combination (series) of resistances using a metre bridge.

OR

To verify the laws of combination (parallel) of resistances 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 and to find its figure of merit.
7. To convert the given galvanometer (of known resistance and figure of merit) into a voltmeter of desired range and to verify the same.

OR

To convert the given galvanometer (of known resistance and figure of merit) into an ammeter of desired range and to verify the same.

8. To find the frequency of AC mains with a sonometer.

Activities

1. To measure the resistance and impedance of an inductor with or without iron core.
2. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multimeter.
3. To assemble a household circuit comprising three bulbs, three (on/off) switches, a

fuse and a power source.

4. To assemble the components of a given electrical circuit.
5. To study the variation in potential drop with length of a wire for a steady current.
6. To draw the diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

SECTION-B

Experiments

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 or between $1/u$ and $1/v$.
4. To find the focal length of a concave lens, using a convex lens.
5. To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.
6. To determine refractive index of a glass slab using a travelling microscope.
7. To find refractive index of a liquid by using convex lens and plane mirror.
8. To draw the I-V characteristic curve for a p-n junction diode in forward bias and reverse bias.
9. To draw the characteristic curve of a zener diode and to determine its reverse breakdown voltage.

Activities

1. To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.
2. Use of multimeter to see the unidirectional flow of current in case of a diode and an LED and check whether a given electronic component (e.g., diode) is in working order.
3. To study effect of intensity of light (by varying distance of the source) on an LDR.
4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
5. To observe polarization of light using two Polaroids.
6. To observe diffraction of light due to a thin slit.
7. To study the nature and size of the image formed by a (i) convex lens, (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).
8. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

Suggested Investigatory Projects

1. To study various factors on which the internal resistance/EMF of a cell depends.
2. To study the variations in current flowing in a circuit containing an LDR because of a variation in
 - (a) the power of the incandescent lamp, used to 'illuminate' the LDR (keeping all the lamps at a fixed distance).
 - (b) the distance of a incandescent lamp (of fixed power) used to 'illuminate' the LDR.
3. To find the refractive indices of (a) water (b) oil (transparent) using a plane mirror, an equi convex lens (made from a glass of known refractive index) and an adjustable object needle.
4. To design an appropriate logic gate combination for a given truth table.
5. To investigate the relation between the ratio of (i) output and input voltage and (ii) number of turns in the secondary coil and primary coil of a self-designed transformer.
6. To investigate the dependence of the angle of deviation on the angle of incidence using a hollow prism filled one by one, with different transparent fluids.
7. To estimate the charge induced on each one of the two identical styrofoam (or pith) balls suspended in a vertical plane by making use of Coulomb's law.
8. To study the factor on which the self-inductance of a coil depends by observing the effect of this coil, when put in series with a resistor/(bulb) in a circuit fed up by an A.C. source of adjustable frequency.
9. To study the earth's magnetic field using a tangent galvanometer.

**Practical Examination for Visually Impaired Students of
Classes XI and XII Evaluation Scheme**

Time Allowed: Two hours

Max. Marks: 30

Identification/Familiarity with the apparatus	5 marks
Written test (based on given/prescribed practicals)	10 marks
Practical Record	5 marks
Viva	10 marks
Total	30 marks

General Guidelines

- The practical examination will be of two hour duration.
- A separate list of ten experiments is included here.
- The written examination in practicals for these students will be conducted at the time of practical examination of all other students.
- The written test will be of 30 minutes duration.
- The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.
- A writer may be allowed to such students as per CBSE examination rules.
- All questions included in the question papers should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.
- Questions may be generated jointly by the external/internal examiners and used for assessment.
- The viva questions may include questions based on basic theory/principle/concept, apparatus/ materials/chemicals required, procedure, precautions, sources of error etc.

Class XII

A. Items for Identification/ familiarity with the apparatus for assessment in practicals (All experiments)

Meter scale, general shape of the voltmeter/ammeter, battery/power supply, connecting wires, standard resistances, connecting wires, voltmeter/ammeter, meter bridge, screw gauge, jockey Galvanometer, Resistance Box, standard Resistance, connecting wires, Potentiometer, jockey, Galvanometer, Lechlanche cell, Daniell cell [simple distinction between the two vis-à-vis their outer (glass and copper) containers], rheostat connecting wires, Galvanometer, resistance box, Plug-in and tapping keys, connecting wires battery/power supply, Diode, Resistor (Wire-wound or carbon ones with two wires connected to two ends), capacitors (one or two types), Inductors, Simple electric/electronic bell, battery/power supply, Plug-in and tapping keys, Convex lens, concave lens, convex mirror, concave mirror, Core/hollow wooden cylinder, insulated wire, ferromagnetic rod, Transformer core, insulated wire.

B. List of Practicals

1. To determine the resistance per cm of a given wire by plotting a graph between voltage and current.
2. To verify the laws of combination (series/parallel combination) of resistances by Ohm's law.
3. To find the resistance of a given wire / standard resistor using a meter bridge.
4. To compare the e.m.f of two given primary cells using a potentiometer.
5. To determine the resistance of a galvanometer by half deflection method.
6. To identify a resistor, capacitor, inductor and diode from a mixed collection of such items.
7. To observe the difference between
 - (i) a convex lens and a concave lens
 - (ii) a convex mirror and a concave mirror and to estimate the likely difference between the power of two given convex /concave lenses.
8. To design an inductor coil and to know the effect of
 - (i) change in the number of turns

(ii) Introduction of ferromagnetic material as its core material on the inductance of the coil.

9. To design a (i) step up (ii) step down transformer on a given core and know the relation between its input and output voltages.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Physics, Class XI, Part -I and II, Published by NCERT.
2. Physics, Class XII, Part -I and II, Published by NCERT.
3. Laboratory Manual of Physics for class XII Published by NCERT.
4. The list of other related books and manuals brought out by NCERT (consider multimedia also).

QUESTION PAPER DESIGN

Theory (Class: XI/XII)

Maximum Marks: 70

Duration: 3 hrs.

S	Typology of Questions	Total Marks	Approximate Percentage
1	<p>Remembering: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.</p> <p>Understanding: Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas</p>	27	38 %
2	<p>Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.</p>	22	32%
3	<p>Analysing : Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations</p> <p>Evaluating : Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.</p> <p>Creating: Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.</p>	21	30%
	Total Marks	70	100

Practical: 30 Marks

Note:

- Internal Choice:** *There is no overall choice in the paper. However, there will be at least 33% internal choice.*
- The above template is only a sample. Suitable internal variations may be made for generating similar templates keeping the overall weightage to different form of questions and typology of questions same.*