

**SYLLABUS - GENERAL KNOWLEDGE & APTITUDE  
(Common for All Disciplines)**

**Total Marks: 100  
Duration: 3 Hrs**

**PART-I – GENERAL AWARENESS & CURRENT AFFAIRS**

- a) Major Events & Current Affairs - National/International
- b) Personalities in News
- c) Sports News
- d) News about Power Sector in India

**PART-II – GENERAL APTITUDE AND COMPANY INFORMATION**

Will consist of numerical aptitude , ability to read graphs & tables, data interpretation, data sufficiency, abstract reasoning & company information. Company Information will include the following information:

1. **Power Scene in India**  
Historical Development, Financial Outlays, Technological trends, Organizational set-up, Reforms etc.
2. **THDC**
  - a) Vision & Mission of the Organization
  - b) Formulation, Objective & tasks – Articles of Association
  - c) Organization Structure
  - d) Details of Power Stations/Projects Location/Capacity/Reservoir/Schedule etc.
  - e) Financing of THDC Projects
3. **THDC Service Rules/Standing Orders/Reports/Policies**
  - a) Training & Learning Policy of THDC
  - b) Conduct, Discipline & Appeal Rules
  - c) Annual Report of the year 2006-2007
4. **General Procurement**  
General purchases procedures & terms of procurement, source identification, tendering order placement, post-order follow up & payments.
5. **Book Keeping**  
Double Entry: The Cash Accounts, The Ledger, Profit & the Balance Sheet, Maintenance of Imp rest Money.

**PART-III – GENERAL ENGLISH**

**Descriptive type test consisting of:**

- a) Writing a precise
- b) An essay of about 1000 words
- c) Basic English Composition – Grammar, Use of Idioms & Phrases etc.
- d) Case study of any general topic with questions on problem identification, generation of alternatives, evaluation of alternatives, courses of action to be taken & final decision making.

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# Civil Engineering

Maximum Marks : 100

Duration : 3 Hrs.

## **PART-I GENERAL ENGINEERING CONCEPT**

- I. **POWER PLANT ENGINEERING**
- Basic Power Plant Cycle, Types of energy, Conservation of energy, Water of Electricity.
  - Turbine & Turbine Auxiliaries (For Hydro Power Plant)
  - Generator & its Auxiliaries
  - Hydro Power Plant auxiliaries
  - Power Plant – Fixed & Operation Cost.
- II. **MATHEMATICS**
- Mensuration- Area of plain figures, volume of simple bodies.
  - Graphics: -Plotting of curves in two dimensions, Solution of simultaneous Equations.
  - Statistics: - Mean, Median, Mode-solving of simple problems.
  - Types of Matrices- Definitions.
  - Simple integration & differentiation.
- III. **APPLIED MECHANICS**
- Stress, Strain & Young's Modulus of Elasticity.
  - Concept of gravity, Gravitational Force & Centroid, concept of Moment of Inertia of regular bodies (rectangles & circles)
  - Law of Forces & Motion
  - Circular Motion:- Definition of Rectilinear motion, Velocity, Acceleration & Centripetal & Centrifugal forces.

## **PART-II BASIC CIVIL ENGINEERING**

- I **Surveying**
- Basic principles of surveying & classification of survey.
  - Chain & Compass Surveying :Principle and suitability, obstacles in chaining, calculation of areas, construction & use of prismatic compass.
  - Levelling: Purpose & types of leveling.
- II **Soil Engineering**
- Introduction to soil Mechanics: Residual & transported soils, Alluvial Deposits, lake deposits and Glacial deposits etc.
  - Definitions of void ratio, porosity, degree of saturation, drydensity, saturated density
  - Soil Classification & Identification: Engineering properties of soil, Gradation & its influence on engineering properties, relative density and its use in density and its use in describing cohesionless soils, Field identification tests for soils is : soils classification system, Darcy's Law, Co-efficient of permeability.
  - Deformation & Characteristics of Soils: Definition of consolidation & concept of consolidation settlement, lateral movement, compression index, co-efficient

- of consolidation, degree of consolidation, preconsolidated soil, factors contributing to shear strength of soils, coulomb's law.
- Soil Compaction: Definition of compaction and its necessity, definition & importance of optimum water content, maximum dry density.
  - Application soil Mechanics: concept of bearing capacity, definition & significance of ultimate bearing capacity, safe bearing capacity and allowable bearing pressure.

### **PART-III CONCRETE TECHNOLOGY**

- I. Definition of concrete, Brief introduction to properties of concrete, Advantage of Concrete, Uses of concrete in comparison to other Building Materials, Ingredients of concrete.
- II. Cement  
Standard Portland cement: Physical tests – in respect of fineness, soundness, setting time and compressive & tensile strength tests, Basic idea about Chemical constituents of cement, heat of Hydration, air entraining agents.
- III. **Aggregates :-**  
Classification of aggregates according to source, size and their characteristics, Basic idea about Surface texture, specific gravity of aggregate, bulk density, Water absorption, surface moisture, Grading of aggregate, storing of aggregates.
- IV. **Workability:-**  
Definition of the phenomenon of workability, factors affecting workability, Measurement of workability by slump test.
- V. **Concrete:-**  
Difference between ordinary and controlled concrete, placement of concrete, Hand mixing, Machine mixing-Types and uses of mixtures, capacity of mixers, methods of Transportation of concrete, Hand compaction- Types of vibrators (Internal screed vibrators & form vibrators) Suitability of concrete for compaction with vibrators.

### **RECOMMENDED READINGS**

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| 1. Concrete Technology                     | <i>B.L. Handoo</i>                               |
| 2. Concrete Technology                     | <i>R.K. Aggarwal</i>                             |
| 3. Civil Engineering                       | <i>T.D.Ahuja &amp; G.S. Birdi</i>                |
| 4. Elements of Civil Engineering           | <i>R. Agor</i>                                   |
| 5. Soil Mechanics & Foundation Engineering | <i>(i) B.C. Punmia</i>                           |
|  | <i>(ii) Bharat Singh &amp; Shamsheer Prakash</i> |
|  | <i>M.L. Ohri</i>                                 |

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# Electrical Engineering

Maximum Marks : 100

Duration : 3 Hrs.

## **PART-I GENERAL ENGINEERING CONCEPT**

### I. POWER PLANT ENGINEERING

- Basic Power Plant Cycle, Types of energy, Conservation of energy, Water of Electricity.
- Turbine & Turbine Auxiliaries (For Hydro Power Plant)
- Generator & its Auxiliaries
- Hydro Power Plant auxiliaries
- Power Plant – Fixed & Operation Cost.

### II. MATHEMATICS

- Mensuration- Area of plain figures, volume of simple bodies.
- Graphics: -Plotting of curves in two dimensions, Solution of simultaneous Equations.
- Statistics: - Mean, Median, Mode-solving of simple problems.
- Types of Matrices- Definitions.
- Simple integration & differentiation.

### III. APPLIED MECHANICS

- Stress, Strain & Young's Modulus of Elasticity.
- Concept of gravity, Gravitational Force & Centroid, concept of Moment of Inertia of regular bodies (rectangles & circles)
- Law of Forces & Motion
- Circular Motion:- Definition of Rectilinear motion, Velocity, Acceleration & Centripetal & Centrifugal forces.

## **PART-II BASIC ELECTRICAL ENGINEERING**

- Ohm's Law and its simple calculation, Series and Parallel circuit and simple calculations.
- Star and Delta circuits and conversion.
- **Capacitance:** Units, uses and types of capacitors.
- **Electromagnetism:** Electromagnetic induction, production of induced E.M.F., Faraday's laws of electromagnetic induction, Lenz's laws, Mutual induction.
- **Chemical Effects of Current :** Faraday's laws of electrolysis, types of batteries, definition of boost/ trickle/ normal charging.
- **A.C. Fundamentals:** Generation of alternating voltage & current cycles, R.M.S. value, Peak value, Average value, Form Factor.

## PART-III ELECTRICAL MACHINES AND MEASURING INSTRUMENTS

### 1. Electrical Machines :

#### a) D.C. Generator

Generator principle, constructional details, EMF equation, Classification and applications.

#### b) D.C. Motor

Constructional details, types of motor, Motor principle, comparison of generator and motor, significance of back EMF, Definition of max. Power torque, armature torque of motor & shaft torque, Speed of DC motor, Series motor, shunt motor and compound motor.

#### c) Transformer

Applications & types of transformers, constructional details, EMF equation of transformer, voltage regulation, transformer constant, capacity of a transformer, losses in a transformer, short & open circuit test, safety device associated with it, transformer cooling, efficiency of a transformer.

#### d) Alternator

Protections, pre-requisites for parallel operation of alternator.

#### e) Induction Motor

Classification of A.C. motors, General principle and construction of Stator, squirrel cage rotor, phase wound rotor, relation between speed, pole and slip, Construction of slip ring motor, types of losses.

#### f) Synchronous Motor

Definition, principle of action, constructional features of synchronous motors, starting of synchronous motors, speed of synchronous motors, effect of change of excitation.

### 2. Measuring Instruments

PMMC, Moving iron and moving coil meters, Ammeters, meggers, watt meter, CT & PT, tongue tester, Galvanometer, IR value testing.

### RECOMMENDED READINGS

1. Basic Electrical Engineering	<i>I.J. Nagrath</i>
2. Basic Electrical Engineering	<i>H. Partab</i>
3. Electrical Measurement & Measuring Instrument	N.V. Suryanarayana
4. Electrical Measurement & Measuring Instrument	J.B. Gupta
5. Electrical Machinery	P.S. Bimbhra
6. Electrical Machines	S.K. Bhattacharya
7. Theory & Performance of Electrical Machines	J.B. Gupta

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# Mechanical Engineering

Maximum Marks : 100

Duration : 3 Hrs.

## **PART-I GENERAL ENGINEERING CONCEPT**

### **I. POWER PLANT ENGINEERING**

- Basic Power Plant Cycle, Types of energy, Conservation of energy, Water of Electricity.
- Turbine & Turbine Auxiliaries (For Hydro Power Plant)
- Generator & its Auxiliaries
- Hydro Power Plant auxiliaries
- Power Plant – Fixed & Operation Cost.

### **II. MATHEMATICS**

- Mensuration- Area of plain figures, volume of simple bodies.
- Graphics: -Plotting of curves in two dimensions, Solution of simultaneous Equations.
- Statistics: - Mean, Median, Mode-solving of simple problems.
- Types of Matrices- Definitions.
- Simple integration & differentiation.

### **III. APPLIED MECHANICS**

- Stress, Strain & Young's Modulus of Elasticity.
- Concept of gravity, Gravitational Force & Centroid, concept of Moment of Inertia of regular bodies (rectangles & circles)
- Law of Forces & Motion
- Circular Motion:- Definition of Rectilinear motion, Velocity, Acceleration & Centripetal & Centrifugal forces.

## **PART-II BASIC MECHANICAL ENGINEERING**

### **I) SIMPLE MECHANISM**

Definition of Link, Kinematic Pair, Kinematic Chain, Mechanism, Inversions, Mechines, Simple Examples of Mechanisms with Lower Pairs Four Bar Chain, Slider Crank Chain, Double Slider Crank Chain, Higher Pairs, Cams & Value Gearing.

### **II) MOTION OF VARIOUS TYPES**

Definiton of Displacement, Velocity and relative Velocity, displacement-time, Velocity-time graphs and acceleration- time graphs, Definition of Simple Harmonic Motion, & Angular Motion, Simple Pendulum Rectilinear Motion, Tangential Acceleration.

### **III) MOTION OF FORCE, TORQUE AND ENERGY**

Definition of Mass, Moments of Inertia, Linear & Angular Momentum, Force, Torque, Work, Power & Energy, fluctuation of Energy, Energy of Flywheel.

#### **IV) FRICTION BEARING & LUBRICATION**

Co-efficient of friction, Motion of a body along Horizontal and Inclined Plane, Bearings & Effects of Friction on Bearings, film Lubrication, Various types of Lubrication & their Properties.

#### **V) TRANSMISSION OF POWER**

Definition of Power & Efficiency, Various Types of Pulleys, Open & Crossed Belt Lengths, Flat Power transmitted, types of gears, gear trains.

#### **VI) BALANCING**

Concept & Causes of Unbalance, concept of Static & Dynamic Balancing, Various methods used in Balancing.

#### **RECOMMENDED READINGS**

1. Theory of Machines
2. Theory of Machines

P.L. Ballaney  
R.S. Khurmi & J.K. Gupta

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# Electronics Engineering

Maximum Marks : 100  
Duration : 3 Hrs.

## **PART-I GENERAL ENGINEERING CONCEPT**

- I. **POWER PLANT ENGINEERING**
  - Basic Power Plant Cycle, Types of energy, Conservation of energy, Water of Electricity.
  - Turbine & Turbine Auxiliaries (For Hydro Power Plant)
  - Generator & its Auxiliaries
  - Hydro Power Plant auxiliaries
  - Power Plant – Fixed & Operation Cost.
- II. **MATHEMATICS**
  - Mensuration- Area of plain figures, volume of simple bodies.
  - Graphics: -Plotting of curves in two dimensions, Solution of simultaneous Equations.
  - Statistics: - Mean, Median, Mode-solving of simple problems.
  - Types of Matrices- Definitions.
  - Simple integration & differentiation.
- III. **APPLIED MECHANICS**
  - Stress, Strain & Young's Modulus of Elasticity.
  - Concept of gravity, Gravitational Force & Centroid, concept of Moment of Inertia of regular bodies (rectangles & circles)
  - Law of Forces & Motion
  - Circular Motion:- Definition of Rectilinear motion, Velocity, Acceleration & Centripetal & Centrifugal forces.

## **PART-II BASIC ELECTRONICS ENGINEERING**

- Classification and Uses of Amplifiers.
- Basic idea and use of Semiconductor Devices (SCR, UTI, TRIAC, DIAC)
- Multivibrator- I) Astable multivibrator II) Mono Vibrator III) Bistable Vibrator (Principles)
- Introduction to Digital Circuits and Switching. (AND, OR, NOR, NOT, NAND).

## **Part-III – PROCESS CONTROL & ELECTRICAL MACHINES**

- I **PROCESS CHARACTERISTICS**

Concept of process control, response of a general control process in following a control action, block diagram of general close loop, open loop process controls system.
- II **AUTOMATIC CONTROL ACTION (only basic ideas)**

Various types of control action viz two position control action(ON/OFF action), proportional reset, proportional + derivative proportional + integral proportional + Integral + derivative actions, Basic pneumatic control mechanism, pneumatic relays & application of pneumatic controller.

### III ELECTRICAL MACHINES

- a) D.C. Generator & Motor – Basic Principles, EMF equation, Applications
- b) Transformer – Types of Transformers, EMF equation of Transformer
- c) Alternator – Basic Principles
- d) Induction Motor – Basic Principles
- e) Synchronous Motor – Basic Principles

### RECOMMENDED READINGS

- |   |                     |
|---|---------------------|
| 1. Electric Devices & Circuits            | Jacob Millman       |
| 2. Electronic Devices & Linear Circuits   | Christos C. Halkias |
|   | G.N.Graud           |
|   | L.C.Jain            |
| 3. Electronic Devices & Circuits          | G.K.Mithal          |
| 4. Automatic Process Control              | Donald P. Eckman    |
| 5. Automatic Control of Industrial Drives | C.H. Pike           |
| 6. Automatic Control System               | S.N.Verma           |

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# EDP

## **Part I - SYSTEM ANALYSIS & DESIGN**

**Total Marks: 100**  
**Duration 3.00 Hrs**

1. System Approach
2. System Requirement Specifications, Acceptance etc
3. Data Base Management Systems
  - (a) Types of DBMS
  - (b) Steps involved in designing a relational Database
  - (c) Concept of primary key
  - (d) Table relationships
  - (e) The process of table normalization
  - (f) The relevance of data validation, security and data locking schemes

## **Part 2 - PC SOFTWARE**

1. Introduction to DOS
  - Features of DOS
  - Concept of Root Directories, Sub-Directories & Path
  - Creating, Changing & Removing Directories
  - Other DOS Commands
  - Batch Files
2. Introduction to Windows'95
  - Planning and Installation
  - Architecture & Memory
  - Customizing & Configuring Windows 95
  - Managing Disk resources & utilities
  - Networking & Interoperability
  - Plug and Play
  - Troubleshooting
3. MS Office' 97
  - WORD
  - EXCEL
  - POWER POINT
  - ACCESS
  - OUTLOOK
4. Work Flow Mgmt
  - Lotus Notes Basics
5. Introduction to Internet
  - What is Internet
  - Internet Applications - E-mail, World Wide Webs, FTP, Telnet Etc.
  - Hardware/Software requirements for Internet
  - Connecting to the Internet
  - Internet Protocols

## **Part 3- PROGRAMMING CONCEPTS AND LANGUAGES**

1. Basic Programming Concepts
  - Definition
  - Algorithm
  - GUI Concepts and Programming
  - Flow Charts
  - OOPS Concepts
2. Program Documentation

## **Part 4- COMPUTER PLANNING & MANAGEMENT**

1. Steps in Hardware Selection
2. Steps in Software Selection
3. Various facts of providing efficient computing facility
4. Basic Concepts of Computer Net Working
5. Computer Viruses and Vaccines

### **Recommended Readings**

1. Elements of System Analysis, Marvi Gore, John Stubbe, Galgotia Book
2. System Analysis & Design Methods, Bentley & Barlow, Galgotia Publications
3. Analysis and Design of Information Systems, v. Rajaraman, Prentice Hall
4. Database System Concepts- H.Karth, A Silbersehatz, McGraw Hill
5. DOS Manuals,
6. Windows' 95-Complete Reference L Yone & Young, Tata McGraw Hill
7. MCSE Training Guide- Windows'95
8. Office 97 Jones & Sutton, Comdex
9. Internet Starter Kit : Adam C Engst, Michal A Simson, Techmedia
10. Computers Today- Chapter 12,13,14 Mcgraw Hill
11. Computers in Management System O'Brien- Chapter 7
12. COBOL – Phillipkins
13. Computer Management & Planning, U.K. Banerjee (Chapt 13, 14, 15, 20,21)
14. Selecting & Managing Small Computers- BSwamy (Tata McGraw Hill)

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# FINANCE

**Total Marks: 100**  
**Duration 3.00 Hrs**

## **I ACCOUNTING & AUDIT**

### Accounting:

1. Company Accounts – Trial Balance, Profit & Loss Account, Balance Sheet, Incidental Expenditure during construction, Distinction between Capital & Revenue expenditure, various rates and methods of depreciation and their accounting under Cos. Act, Income Tax Act & Electricity Act .
2. Accounting Standards issued by Institute of Chartered Accountants of India
3. Accounts Manual, Accounting Policies of THDC and General Awareness of Corporation's Accounts including stores accounting

### Companies Act :

4. Provision under Companies Act regarding Accounts and Audit including Provisions of statutory audit and supplementary audit by CAG of India, Companies Auditors Report Order (CARO) 2003, Provisions of Schedule-VI and Schedule –XIV Companies Act 1956.
5. Memorandum and Articles of Association of THDC.

### Internal Audit:

6. Internal Audit in THDC – Concepts, Scope & Procedures.

## **II FINANCE**

1. Purchase & Works Policy
2. Delegation of Power
3. Works
  - a) Estimates
  - b) Tendering, Evaluation & Award
  - c) Role of Finance Deptt. in vetting of proposals having financial implication.
4. Sources of Financing of THDC Projects.
5. Works payment procedure relating to payments to contractors & their accounting including maintenance of records.
6. Payments to suppliers' bills & checking them with reference to order, latter of award etc.

## **III ESTABLISHMENT & TAXATION**

1. Establishment Payments
  - a) TA Rules/LTC Rules
  - b) Medical Rules
  - c) HBA /Conveyance/Computer Advance Rule
  - d) PF & Gratuity
  - e) Telephone Policy

2. Income Tax Act, Rules & other Laws
  - a) Definition of important terms under Section 2
  - b) Computation of total income of a salaried person including deductions in computing total income.
  - c) Fringe benefit Tax
  - d) Tax audit (Section 44AB & Form 3 CD)
  - e) Deduction at source from employees, contractors & others and filling of their returns.
3. CST Act
4. VAT
5. Service Tax Law

#### IV **COSTING & BUDGETING**

1. Costing
  - a) Definitions
  - b) Elements of cost
    - i) Direct Labour
    - ii) Direct Material
    - iii) Direct Expenses
    - iv) Overhead
  - c) Methods of costing  
Marginal costing – Break even analysis
2. Budgeting
  - a) Capital Budget
  - b) O & M Budget
3. Tariff formulation in THDC  
Basic – Tariff formulation in THDC  
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# PERSONNEL/HRD

Total Marks: 100  
Duration 3.00 Hrs

## **Part I- PERSONNEL MANAGEMENT & ORGANISATIONAL BEHAVIOUR**

- a) Personnel function – Its Scope & Organization
- b) Selection: Process & Methods
- c) Training in Organization
- d) Performance Appraisal
- e) Communication

## **Part II- LABOUR LAWS & INDUSTRIAL RELATIONS**

### 1. Labour Laws

- a) Industrial Employment ( S 0) Act (1946)
- b) Factories Act (1948)
- c) Trade Union Act (1926)
- d) Payment of Wages Act (1936)
- e) Contract Labour – Abolition & Regulations Act (1975)

### 2. Industrial Relations

- (a) I.R. Machinery/Dispute Resolution
- (b) Collective Bargaining

## **Part III- THDC HUMAN RESOURCE MANAGEMENT SYSTEMS**

1. Organization /Functions of Personnel Management in THDC.
2. THDC Recruitment Policy & Procedures.
3. Training & Learning Policy of THDC .
4. Performance Appraisal System in THDC.
5. Promotion Policy- as applicable to Exes./Supers./Workmen in THDC.
6. Grievance procedure in THDC

## **Part IV- THDC PERSONNEL RULES AND POLICIES**

1. Service Rules
2. Conduct, Discipline and Appeal Rules
3. Leave Rules
4. Pay Fixation Rules
5. L.T.C. Rules
6. H.B.A. Rules
7. Conveyance Advance
8. Festival Advance
9. Conveyance Reimbursement
10. Gratuity & Provident Fund Rules
11. Group Insurance Scheme
12. Family Planning Incentives Schemes
13. Others Personnel Policies/Amendments/Circulars

## **Recommended Readings:**

1. Personnel Management by Arun Monapa & Mirza S. Saiyadin
2. Industrial law by B.L. Mullick
3. Personnel/HRD Policy Documents/Circulars / IOMs, issued from time to time

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# LAW

**Total Marks: 100**  
**Duration 3.00 Hrs**

**Part I      CONSTITUTIONAL LAWS**

1. Preamble
2. Fundamental Rights
3. Directive Principles of State Policy
4. Center-State Relation (Union/State/Concurrent –Lists)
5. Writs (Arts 12, 32 & 226)
6. Institution/Offices/Commissions set up by the Constitution.

**Part II-     COMMERCIAL LAW/BUSINESS LAWS**

1. Indian Contract Act
2. Indian Arbitration Act
3. Negotiable Instrument's Act

**Part III-     LABOUR LEGISLATIONS**

1. Industrial Dispute Act
2. Trade Union Act
3. Factory's Act
4. Contract Labour Act
5. Payment of Wages Act
6. Standing Order Act

**Part IV-     PROCEDURAL LAWS**

1. Specific Relief Act
2. Civil Procedure Code
3. Indian Evidence Act

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# Public Relations

Total Marks: 100  
Duration 3.00 Hrs

- i. Fundamental Principles of Corporate Communications
- ii. Role of PR function in THDC
- iii. Vision statement on PR in THDC
- iv. Media Relations: Conducting Press conferences, maintaining relations with Print Media, Press, & Satellite TV Channels
- v. Procedure: Tendering & Award
- vi. Writing Press notes, Reports and Editing House Journals/Broachers etc.
- vii. Knowledge about printing technology, latest trends.
- viii. Basic Knowledge of Photography
- ix. Basic knowledge of computers: Familiarization with Windows , MS Word/Excel/Website/Internet.
- x. Basic knowledge of Documentary Film Production
- xi. Role of Executive in Organisation
- xii. Noting & Drafting
- xiii. Essay Writing

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# पाठ्यक्रम - हिंदी

- 1) राजभाषा नीति, नियम एवं अधिनियम
- 2) प्रशासनिक शब्दावली
- 3) टिप्पणः- पत्राचार में प्रयुक्त वाक्यांश /टिप्पणियां
- 4) निबंध
- 5) अनुवाद (हिंदी से अंग्रेजी तथा अंग्रेजी से हिंदी)

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