CERTIFICATE

OF

VOCATIONAL EDUCATION

EXAMINATION (YEAR 12)

SYLLABUS FOR

TELECOMMUNICATION ENGINEERING TECHNICIAN

Correspondence should be addressed to

THE CHIEF EXECUTIVE & SECRETARY
COUNCIL FOR THE INDIAN SCHOOL CERTIFICATE EXAMINATIONS
P-35,36 Sector VI
Pushp Vihar
Saket
New Delhi – 110017

The certificate course in **TELECOMMUNICATION ENGINEERING TECHNICIAN (TET)** is equivalent to Class XII, having the added advantage of acquiring a knowledge of the basic concepts of Telecommunication Engineering.

A successful candidate has the following two options:

1. To become a small-scale entrepreneur and execute Telecommunication Engineering Contracts.
2. To find suitable employment in the Electronics & Electrical Industry.

A successful candidate, if interested, has a third option of taking up higher studies in Telecommunication Engineering by joining the Institution of Engineers (India) as a student member.

Eligibility Criteria:

The eligibility criteria for taking admission in CVE 12 Examination are as follows:

1. Age: 16 to 25 years
2. Must have passed Class X Examination from a recognised board with English, Science and Mathematics as compulsory subjects.

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CLASS XI – SUBJECT STRUCTURE & MARKING SCHEME

S. No.	NAME OF THE SUBJECT	Internal Assessment	External Assessment	Total Marks	Pass Criteria (%)
1	English	30	70	100	35
2	General Foundation, Industrial Sociology & Entrepreneurship	30	70	100	35
3	Engineering Physics	30	70	100	35
4	Engineering Chemistry	30	70	100	35
5	Applied Mathematics	30	70	100	35
6	Principles of Electricity & Electronics	30	70	100	35
7	Fundamentals of Computer	30	30 + 40	100	35
8	Telecommunication Technology Paper I	30	70	100	35
9	Telecommunication Technology Paper II	30	70	100	50

Note:

FUNDAMENTALS OF COMPUTER -There will a project of 30 marks and an examination of 40 marks to be conducted by the Council.

CLASS XII – SUBJECT STRUCTURE & MARKING SCHEME

S. No.	NAME OF THE SUBJECT	Internal Assessment	External Assessment	Total Marks	Pass Criteria(%)
1	English	30	70	100	35
2	General Foundation, Industrial Sociology & Entrepreneurship	30	70	100	35
3	Principles of Electricity & Electronics	30	70	100	35
4	Engineering Science	30	70	100	35
5	Electronics & Computer Mathematics	30	70	100	35
6	Telecommunication Technology - Paper I	30	70	100	35
7	Telecommunication Technology - Paper II	30	70	100	50

TELECOMMUNICATION ENGINEERING TECHNICIAN

AIMS: On successful completion of the course, the technician should:

1. Be aware of safety precautions to be taken in an Electronics Laboratory.
2. Be able to select common hand tools and equipment for specific use.
3. Know different testing & measuring equipment.
4. Identify, test & measure the values of different electronic components.
5. Know the importance of interchanging electronic components as per circuit requirements & design structure.
6. Know the different types of cables for communication purposes.
7. Identify the different types of antennae & their parameters through calculations.
8. Be familiar with the different types of tools & equipment used in the field of communication.
9. Be able to identify and tackle trouble shooting of different consumer goods.
10. Be able to operate, check and control different types of power supply.

TELECOMMUNICATION ENGINEERING

TECHNICIAN

SYLLABUS FOR CLASS XI

English
Class XI

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
	GRAMMAR	
1	Sentences	6
2	Subject & Predicate	6
3	Parts of Speech	20
4	Phrases & Clauses	9
5	Simple, Compound & Complex Sentences	10
6	Tenses	12
7	Formal Letter Writing	12
	LITERATURE	
1	The Eyes Have It	6
2	Job Hunting	6
3	Benjamin Franklin	6
4	The Martyr's Corner	6
5	Life History of Abdul Kalam	6
TOTAL NUMBER OF HOURS		**105**

General Foundation, Industrial Sociology and Entrepreneurship
Class XI

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	Personality Development	13
2	Human and Industrial Relationship	15
3	Developing Coping Mechanisms	15
4	Motivation	10
5	Professional Ethics	12
6	Developing Fitness for a Job	15
TOTAL NUMBER OF HOURS		80

1. **Personality Development:**
   - **1.1** Self -esteem
   - **1.2** Self-concept
   - **1.3** Self-acceptance

2. **Human and Industrial Relations:**
   - **2.1** Human relations and performance in organisation
   - **2.2** Understand self and others for effective behaviour
   - **2.3** Behaviour modification techniques
   - **2.4** Industrial relations and disputes
   - **2.5** Relations with subordinates, peers & superiors
   - **2.6** Characteristics of group behaviour and trade unions

3. **Developing Coping Mechanisms:**
   - **3.1** Coping with loneliness
   - **3.2** Coping with depression
   - **3.3** Coping with fear
   - **3.4** Coping with shyness
   - **3.5** Coping with anger
   - **3.6** Coping with failure
   - **3.7** Coping with criticism
   - **3.8** Coping with conflicts
   - **3.9** Coping with change
   - **3.10** Coping with study

- **3.11** Substance abuse
- **3.12** Mass media

4. **Motivation:**
   - **4.1** Factors determining motivation
   - **4.2** Characteristics of motivation
   - **4.3** Methods of improving motivation

5. **Professional Ethics:**
   - **5.1** Concept of ethics
   - **5.2** Concept of professionalism
   - **5.3** Need for professional ethics

6. **Developing fitness for a job:**
   - **6.1** Leadership
   - **6.2** Team work
   - **6.3** Career guidance
   - **6.4** Work environment

Engineering Physics
Class XI

Examination Duration: 3 Hours

S. No.	Name of the Topic	No of Hours
1	**Units**	5
2	**Mass, Weight & Density**	15
3	**Rest & Motion**	20
4	**Work, Power & Energy**	18
5	**Moments, Lever and Centre of Gravity**	18
6	**Heat & Temperature**	24
7	**Friction**	15
TOTAL NUMBER OF HOURS		**115**

1. **Units:**
   - **1.1** Introduction
   - **1.2** Definition of Unit
   - **1.3** System of Units (CGS, MKS & FPS)
   - **1.4** Physical Quantity
   - **1.5** Fundamental Units
   - **1.6** SI Derived units
   - **1.7** Inter relation between Metric & British System of Units

2. **Mass, Weight & Density:**
   - **2.1** Mass
   - **2.2** Weight
   - **2.3** Differences between mass & weight of substances
   - **2.4** Density
   - **2.5** Relative Density
   - **2.6** Differences between Density & Relative Density
   - **2.7** Archimedes' s Principle
   - **2.8** Finding out the relative density of the substances using Archimedes' Principle
   - **2.9** Buoyancy, Law of Floatation & Centre of Floatation
   - **2.10** Hydrometer, Nicholson's Hydrometer and related numerical

3. **Rest & Motion:**
   - **3.1** Rest & Motion
   - **3.2** Laws of Inertia
   - **3.3** First Law of Motion

3.4 Momentum
3.5 Second Law of Motion
3.6 Third Law of Motion
3.7 Vector Quantity
3.8 Scalar Quantity
3.9 Speed &Velocity
3.10 Differences between speed & velocity
3.11 Acceleration
3.12 Equation of motion
3.13 Motion under the force of gravity

4. Work, Power & Energy:

4.1 Work
4.2 Work represented by an area or diagram of force
4.3 Work done by an oblique force
4.4 Torque
4.5 Power
4.6 Horse power of engines
4.7 Power required for rotation & determination of the output power of a machine by means of a brake system
4.8 Efficiency of a machine
4.9 Energy – Its uses & application
4.10 Types of energy – Potential & Kinetic with their applications
4.11 Principle of conservation of energy
4.12 Other forms of energy
4.13 Transmission of power by belt pulley drive
4.14 IHP of steam and petrol engine
4.15 Electrical Power & Energy

5. Moments, Lever and Centre of Gravity:

5.1 Moments – Its definition
5.2 Arm of Couple
5.3 Moment of Couple
5.4 Lever – Its definition, types, application and order
5.5 Bell Crank Lever
5.6 Application of the principle of moments
5.7 Centre of Gravity
5.8 Stable, Unstable and Neutral Equilibrium

6. **Heat & Temperature:**

- **6.1** Heat – Its definition
- **6.2** Temperature – Its definition
- **6.3** Difference between heat and temperature
- **6.4** Temperature scale (Celsius, Fahrenheit & Kelvin)
- **6.5** Relationship between Celsius, Fahrenheit & Kelvin Scales
- **6.6** Boiling point, Melting point and Specific heat
- **6.7** Transmission of heat, conduction, convection and radiation
- **6.8** Heat transfer in mixture, Calorimeter and latent heat of fusion, vapour
- **6.9** Thermos flask, Pyrometer, Thermocouple, thermoelectric pyrometer
- **6.10** Calorific values of fuel

7. **Friction:**

- **7.1** Definition
- **7.2** Advantages and Disadvantages of Friction
- **7.3** Normal Reaction, Limiting Friction and Laws of limiting friction
- **7.4** Co-efficient of Friction
- **7.5** Angle of Friction & Angle of Repose and its relationship
- **7.6** Force of Friction when the force is horizontal and when the force is inclined
- **7.7** Lubrication for the control of friction

Engineering Chemistry
Class XI

Examination Duration: 3 Hours

S. No.	Name of the Topic	No of Hours
1	**Introduction to Periodic Table**	14
2	**States of matter**	10
3	**Physical and Chemical changes**	14
4	**Air**	6
5	**Water**	10
6	**Acid, Base & Salt**	18
7	**Metals & Non-metals**	8
TOTAL NUMBER OF HOURS		80

1. Introduction to Periodic Table:

- **1.1** General Symbols, Atomic Numbers and Atomic Structure
- **1.2** Introduction to the different elements
- **1.3** General Plan for Periodic Table
- **1.4** Modern Periodic Table
- **1.5** Periodic trend in physical properties
- **1.6** Valence Electron, Valency, Variation of Atomic Size

2. States of matter:

- **2.1** Detailed study of substance
- **2.2** Molecular, atoms, solids- liquids- gases
- **2.3** Inter- conversion
- **2.4** Elements, compounds, mixture - separation, boiling, freezing, melting, condensation, evaporation, chromatography, distillation and uses

3. Physical and Chemical changes:

- **3.1** Different types of reactions- (exothermic, endothermic, combination, decomposition, displacement, oxidation and reduction)
- **3.2** Temporary and Permanent changes
- **3.3** Illustration & examples

4. Air:

- **4.1** Composition & Properties
- **4.2** Uses of components & its separation
- **4.3** Pollution& preventive measures

5. Water:

- **5.1** Pure & Impure water
- **5.2** Natural and Potable water
- **5.3** Distilled water
- **5.4** Soft and Hard water
- **5.5** Techniques of removing hardness
- **5.6** Uses of Water
- **5.7** Pollution
- **5.8** Contract measure & conservation

6. Acid, Base & Salt:

- **6.1** Introduction
- **6.2** Acids – Classification depending on different factors like source and chemical compound
- **6.3** General properties of an acid
- **6.4** Bases – Classification depending on different factors like acidity of bases and concentration
- **6.5** General properties of bases
- **6.6** Neutralisation
- **6.7** Some basic uses of acid and bases
- **6.8** Salts – Classification depending on different factors
- **6.9** Solubility of salts
- **6.10** Properties of Salts

7. Metals & Non-metals:

- **7.1** Introduction to the topic
- **7.2** Physical Properties of Metals and Non-metals
- **7.3** Chemical Properties of Metals & Non- metals
- **7.4** Occurrence of metals
- **7.5** Activity Series of metals
- **7.6** Extraction of metals
- **7.7** Iron & Steel – Introduction, Occurrence & Properties
- **7.8** Product from the Blast Furnace – Pig Iron
- **7.9** Cast iron and its occurrence
- **7.10** Alloy Steel
- **7.11** Different types of metals (Ferrous & Non-Ferrous) and its properties and household applications

7.12 Other Alloys – Composition & Uses

7.13 Some properties and uses of non-metals

Applied Mathematics
Class XI

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	Units	4
2	General Simplification	6
3	Ratio & Proportion	4
4	Percentage	5
5	Algebra	12
6	Logarithm	6
7	Indices	8
8	Equations	14
9	Factorization	10
10	Properties of Triangle, Circle & Polygons	6
11	Mensuration	20
12	Trigonometry (Ratio & Identities)	10
TOTAL NUMBER OF HOURS		105

1. **Units:**
   - **1.1** Introduction
   - **1.2** Definitions
   - **1.3** Classification of units
   - **1.4** Conversion of the basic mechanical units

2. **General Simplification:**
   - **2.1** Introduction
   - **2.2** Fractions & Decimal Fractions
   - **2.3** LCM & HCF
   - **2.4** Multiplication and division of decimals
   - **2.5** Conversion of fraction from one to another
   - **2.6** Multiplication of fraction with numbers like 10, 100, 1000
   - **2.7** Some more methods of converting fractions

3. **Ratio & Proportion:**
   - **3.1** Ratio

- **3.2** Proportion
- **3.3** Relationship between Ratio & Proportion

4. **Percentage:**
   - **4.1** Introduction
   - **4.2** Conversion of decimal to percentage and vice versa
   - **4.3** Profit & Loss

5. **Algebra:**
   - **5.1** Introduction
   - **5.2** Careful consideration of subject items
   - **5.3** Addition and Subtraction
   - **5.4** Multiplication and Division
   - **5.5** Algebraic formulae
   - **5.6** Proofs

6. **Logarithm:**
   - **6.1** Introduction
   - **6.2** Definition of different terms used in logarithms
   - **6.3** Laws of Logarithm
   - **6.4** How to refer to a log table
   - **6.5** Negative characteristic
   - **6.6** Relationship between log and antilog
   - **6.7** How to refer to Antilog table
   - **6.8** Rules while using logarithms
   - **6.9** Addition, subtraction, multiplication & division using indices

7. **Indices:**
   - **7.1** Exponent and multiplication
   - **7.2** The laws of indices
   - **7.3** Zero and negative integral indices
   - **7.4** Fractional Indices
   - **7.5** Exponential Equations

8. **Equations:**
   - **8.1** Equations & Root
   - **8.2** Solving linear equation with one variable
   - **8.3** Solving problems using equations
   - **8.4** Number Problems, Age Problems, Mensuration Problems
   - **8.5** Solving simultaneous linear equation
   - **8.6** Method of elimination by addition and subtraction

8.7 Word problem involving simultaneous equation

8.8 Quadratic Equations – Problems on Quadratic Equation

9. Factorization:

9.1 Factorizing polynomials

9.2 Factorization of a perfect square trinomial – e.g. $(4x^4 + 12x^2 + 9)$

9.3 Factorizing the difference of two squares

9.4 Trinomials

9.5 Factorization using the middle term factor

9.6 Problem solving based on factorization

10. Properties of Angle, Triangle, Circle and Polygons:

10.1 Introduction

10.2 Different properties related to the angular properties of the triangle

10.3 Different types of triangles

10.4 Median and Altitudes

10.5 Mid-Point theorem of the triangle

10.6 Circle - Elements

10.7 Properties of the circle – Arc, Sector, Segment, Chord, Tangent

10.8 Polygons – Types and Features

10.9 Method of finding the internal and external angle of polygons

11. Mensuration:

11.1 Introduction to the topic

11.2 Formulae for various Plane and irregular figures (Area, perimeter and volume)

11.3 Area and Perimeter of Plane Figures like Rectangle, Square, Area of four walls, Triangle, Parallelograms, Rhombus, Trapezium, Circle

11.4 Surface area of different solid figures

11.5 Volume of different Solid figures

11.6 Volume of the metal that is removed from different machining process

12. Trigonometry:

12.1 Introduction to Trigonometry

12.2 Notation for angle

12.3 Trigonometrical Ratio

12.4 Reciprocal ratios

12.5 Understanding of the different sides of the triangle based on the given angle

12.6 Understanding the use of Trigonometrical table for finding different angles

Principles of Electricity and Electronics
Class XI

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	Introduction to Electricity	4
2	Basic Electric Circuit	8
3	Electrical Heat, Work, Power & Energy (Joule's law)	10
4	Chemical effect of an Electric Current	8
5	Magnetism & Electromagnets (Solenoids, mmf, Flux, Flux density, Field Intensity, Reluctance &Retentivity)	12
6	Electromagnetic Induction	10
7	Simple AC Circuits (Peak value, Average value, RMS value, Form Factor & Crest factor)	10
8	Transformers	15
9	Series & Parallel R - L - C Circuits (Impedance, PF, Phase Angle, Current & Reactance)	20
10	Illumination	8
TOTAL NUMBER OF HOURS		105

1. **Introduction to Electricity:**
   - **1.1** Current
   - **1.2** Voltage
   - **1.3** Power
   - **1.4** Basic Electric Circuit Calculations

2. **Basic Electric Circuit:**
   - **2.1** Ohm's Law
   - **2.2** Resistance connections in series & parallel

3. **Electrical Heat, Work, Power & Energy (Joule's law):**
   - **3.1** Joule's law
   - **3.2** Effect
   - **3.3** Thermal efficiency
   - **3.4** Electric power
   - **3.5** Energy
   - **3.6** Units & Problems

4. **Chemical effect of an Electric Current:**
    - **4.1** Electrolysis
    - **4.2** Electrode Reactions
    - **4.3** Some definitions
    - **4.4** Faraday's Laws of Electrolysis
    - **4.5** EMF & Back EMF
    - **4.6** Electro chemical equivalent
    - **4.7** Storage cells & Lead Acid Cell
    - **4.8** Chemical changes

5. **Magnetism & Electromagnets:**
    - **5.1** Magnetic Field
    - **5.2** Pole Strength
    - **5.3** Field Intensity
    - **5.4** Flux, Flux density and mmf
    - **5.5** Reluctance, Retentivity, Permeability &Susceptibility
    - **5.6** Relation between B, H, I & K
    - **5.7** Solenoid

6. **Electromagnetic Induction:**
    - **6.1** Faraday's Law of Electromagnetic Induction
    - **6.2** Fleming's Right-Hand Rule
    - **6.3** Lenz's Law
    - **6.4** Induced EMF
    - **6.5** Self-Inductance, Mutual Inductance, Co-efficient of Coupling

7. **AC Circuits:**
    - **7.1** Single Phase
    - **7.2** Three Phase
    - **7.3** Generation of Three Phase voltage
    - **7.4** Star or Y Connection
    - **7.5** Delta or Mesh Connections
    - **7.6** Peak value, Average value, RMS value, Form Factor & Crest factor
    - **7.7** Cycles & Time periods
    - **7.8** Calculations

8. **Transformers:**
    - **8.1** Working Principle
    - **8.2** Core Type& Shell Type
    - **8.3** Ideal transformer
    - **8.4** EMF equation of Transformer
    - **8.5** Voltage Transformation Ratio 'K'
    - **8.6** Transformer with losses but no magnetic leakage

9. **Series & Parallel R – L-C Circuits:**
   - **9.1** Calculations of Impedance
   - **9.2** Power factor
   - **9.3** Phase Angle
   - **9.4** Current
   - **9.5** Reactance & Frequencies
   - **9.6** Wavelengths of different RLC Circuits

10. **Illumination:**
   - **10.1** Production of Light
   - **10.2** Laws of Illuminance for point sources
   - **10.3** Common types of Lamps, Candela, Lumen &Lux
   - **10.4** Fluorescent lamp circuits

Fundamentals of Computer
Class XI

Examination Duration: 2 Hours

S. No.	Name of the Topic	No. of Hours
1	**Introduction to Computer**	5
2	**Number System**	8
3	**Operating System**	4
4	**Introduction to MS Office**	2
5	**Microsoft Word**	10
6	**Microsoft Excel**	16
7	**Microsoft Power Point**	4
8	**Internet & Security**	8
9	**Project Work**	8
TOTAL NUMBER OF HOURS		65

1. Introduction to Computer:

- **1.1** Introduction & application of computers
- **1.2** History of the Computer – Evolution and generation of computers
- **1.3** Hardware & Software
- **1.4** Different Hardware devices with physical demonstration
- **1.5** Different types of software used with its areas of application
- **1.6** Storage devices – Evolution and its application in modern technology
- **1.7** Characteristics of the computer
- **1.8** Organization of the computer
- **1.9** Basic operation carried out by the computer
- **1.10** Understanding the day to day applications of the computer

2. Number System:

- **2.1** Introduction to the number system
- **2.2** Types of number systems used – Decimal, Binary, Octal and Hexadecimal
- **2.3** Conversion from Decimal to Binary and vice-versa
- **2.4** Conversion of Decimal to Octal and Vice-Versa
- **2.5** Conversion of Decimal to Hexadecimal and Vice-Versa
- **2.6** Conversion of Fractional Decimal to Binary, Octal and Hexadecimal
- **2.7** Logic Gate – Not, Or, And

3. **Operating System:**
   - **3.1** Introduction about Operating System and its uses
   - **3.2** Types of Operating System used
   - **3.3** Application of Operating System in our computer
   - **3.4** Method of Installing the Operating System
   - **3.5** Method of partitioning the hard disk during the installation of the Operating System
   - **3.6** Advantages and comparisons of different types of Operating Systems

4. **Introduction to MS Office:**
   - **4.1** Introduction to Microsoft Office Package
   - **4.2** Different applications available in the package
   - **4.3** Advantages and application of different applications available
   - **4.4** An overview on the available applications – MS Word, Excel, PowerPoint, Access, Outlook
   - **4.5** Process of Opening the Microsoft Office Package from the START BUTTON

5. **Microsoft Word:**
   - **5.1** Introduction
   - **5.2** Procedure of opening the Microsoft word Application
   - **5.3** Introduction to the Microsoft Word Screen/Page
   - **5.4** Understanding different options available
   - **5.5** Understanding different context menus available on the page with their application
   - **5.6** Understanding the **OFFICE BUTTON** – New, Open, Save, Save As, Print, Prepare, Publish, Close, Word Options and Recent Documents
   - **5.7** Understanding the **HOME** Menu – Clipboard Option, Font Options, Paragraph, Styles
   - **5.8** Understanding the **INSERT** Menu – Pages, Tables, different methods of inserting pictures, Links, Header& Footer, Text Formatting, Symbols
   - **5.9** Understanding the **PAGE LAYOUT** Menu – Different themes, Page Setup, Page Background, Paragraph Indentation, Alignment
   - **5.10** Understanding the complete process of Mail Merge (Letter)
   - **5.11** Understanding the Concept of viewing the pages in different styles, New windows, Split page option
   - **5.12** Practical work on the above content

6. **Microsoft Excel:**
   - **6.1** Introduction
   - **6.2** Procedure of opening the Microsoft Excel Application
   - **6.3** Introduction to the Microsoft Excel Screen/Page
   - **6.4** Understanding different options available
   - **6.5** Understanding the method of renaming, adding and removing the sheet

6.6 Understanding the method of copying and moving the sheet

6.7 Understanding different short cuts used on the application

6.8 Understanding the **HOME** menu – Clipboard Options, Font Options, Paragraphs, Styles,

6.9 Understanding the **INSERT** Menu – Table Creation, different methods of inserting pictures & shapes, Charts, Links and Method of formatting the text

6.10 Understanding the **PAGE LAYOUT** Menu – Themes, Page setup, Scale, Sheet Options, Alignment

6.11 Understanding the **FORMULAS** Menu – Insert function, Function Library (Auto Sum, Logical, Text, Lookup, Date & time)

6.12 Conditional Formatting

6.13 Basic Menu options like View, Data and Review

6.14 Practical work on the above content

7. Microsoft PowerPoint:

7.1 Introduction

7.2 Procedure of opening the Microsoft Power Point Application

7.3 Introduction to the Microsoft Power Point Screen/Page

7.4 Understanding different options available

7.5 Understanding different shortcuts used for the application

7.6 Understanding the **HOME** Menu – Clipboard, Slides, Font, Paragraph indentation, drawing tools, find & replace

7.7 Understanding the **INSERT** Menu – - Table Creation, different methods of inserting pictures & shapes, charts, link, method of formatting the text & methods of inserting movie clip & audio in the slide

7.8 Understanding the **DESIGN** Menu – Page Setup, different themes to be used as the background of the slides, colours, fonts, effects, background styles

7.9 Understanding the **ANIMATION** Menu – Custom Animation, different transition options for the slides, background music, transition speed, slideshow option (on mouse click or after time interval that is set)

7.10 Understanding the **SLIDE SHOW** Menu – Start & End of the slide show, slide show setup, monitoring the resolution and other factors

7.11 Understanding various options like Review and View

7.12 A presentation to understand the working of different options available in the application

8. Internet & Security:

8.1 Introduction to Internet & Security

8.2 Different types of connections that can be established in the system

8.3 Uses, advantages and disadvantages of the Internet

8.4 Security – Definition & Goals

8.5 Basic ISP (Internet Service Providers) Infrastructure

8.6 Virus – Definition and its different types

8.7 Firewall – Definition and applications

8.8 Understanding the basic security measures

9. Project Work:

The students will prepare a project work using the concepts taught in the 'Fundamentals of Computer'.

Telecommunication Technology – Paper I
Class XI

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	**Continuous Wave Modulation (AM &FM)**	10
2	**FM generation principles & PM**	8
3	**FM Transmitters**	8
4	**FM Receivers**	8
5	**Process of Converting Analog Signals to Digital Signals**	8
6	**Digital Modulation & Pulse modulation (PCM, DM, ADM& DPCM)**	15
7	**Digital Multiplexing (ASK, FSK, PSK) with Waveforms**	11
8	**Cellular Communications/Mobile Communications (Cells, Frequency Reuse, Hands Off, BS, MS, GSM/CDMA, GPRS)**	15
9	**Advanced Wireless Communications with 4G,5G, 6G along with equipment (Wi-Fi & HOTSPOT)**	15
10	**Different types of Electrical wires, Connectors & Sockets**	12
TOTAL NUMBER OF HOURS		**110**

1. Continuous Wave Modulation (AM &FM):

- **1.1** Need of Modulation
- **1.2** Low- Level & High-Level AM Modulation
- **1.3** De-Modulation
- **1.4** Square law Detector
- **1.5** Envelope Detector
- **1.6** Angle Modulation FM & PM Definitions
- **1.7** Waveforms, Equations & Generation

2. FM generation principles & PM:

- **2.1** NBFM
- **2.2** WBFM
- **2.3** Direct Methods
- **2.4** Indirect or Armstrong Methods
- **2.5** Drawbacks, advantages and disadvantages
- **2.6** Relation between FM & PM

3. FM Transmitters:

- **3.1** Block Diagram of FM
- **3.2** Transmitter, Carrier oscillator
- **3.3** Power Amplifier

4. **FM Receivers:**
    - **4.1** RF Amplifier
    - **4.2** IF Amplifier
    - **4.3** Local Oscillator & Mixer
    - **4.4** Super Heterodyne Receiver
    - **4.5** Selectivity & Sensitivity
    - **4.6** Image Frequency
    - **4.7** FM Detectors
    - **4.8** Balanced Slope Detector
    - **4.9** Foster Seeley Discriminator, Ratio Detector & PLL FM Detector

5. **Process of Converting Analog Signals to Digital Signals:**
    - **5.1** Sampling & Quantization
    - **5.2** Quantizer &Encoding
    - **5.3** Different Line Coding, Unipolar RZ, NRZ, Bipolar RZ, NRZ, AMI RZ, NRZ, Manchester and its waveforms
    - **5.4** Sampling theorem
    - **5.5** Nyquist Criteria
    - **5.6** Examples by Waveforms

6. **Digital Modulation & Pulse modulation (PCM, DM, ADM & DPCM):**
    - **6.1** PCM Transmitter & Receiver
    - **6.2** DM, ADM &DPCM
    - **6.3** Advantages & Disadvantages
    - **6.4** Comparisons
    - **6.5** Comparisons PAM, PPM &PWM waveforms

7. **Digital Multiplexing:**
    - **7.1** Need for multiplexing
    - **7.2** Techniques
    - **7.3** ASK, FSK& PSK comparisons with Waveforms

8. **Cellular Communications/Mobile Communications:**
    - **8.1** Cells
    - **8.2** Structures & Clusters
    - **8.3** Frequency Reuse
    - **8.4** Hands Off
    - **8.5** BS, MS & System architecture
    - **8.6** GSM/CDMA Protocols
    - **8.7** GPRS

9. **Advanced Wireless Communications:**
    - **9.1** 4G, 5G & 6G Technology with Equipment
    - **9.2** Wi-Fi & HOTSPOT Technology

10. Different types of Electrical wires, Connectors & Sockets:

- **10.1** Flexible cables
- **10.2** PVC cables
- **10.3** Communication Cable /LAN Cables (STP, UTP, Fiber Optics)
- **10.4** Metallic & Non-metallic Sheathed Cable
- **10.5** RCA–Male/Female Connectors
- **10.6** XLA Connectors Plug & Socket
- **10.7** BNC Connectors Plug & Socket
- **10.8** HDMI Connectors Plug & Socket

Telecommunication Technology – Paper II
Class XI

Examination Duration: 6 Hours

S. No.	Name of the Topic	No. of Hours
1	Identifying all sections of NOKIA 3310 through block diagram	15
2	Peripherals of all Mobile Phones	5
3	Block Diagram of Nokia 1110	10
4	Block Diagram of NOKIA 6600 or multimedia set & descriptions	20
5	Block Diagram of NOKIA advanced multimedia set & descriptions	20
6	PCB designing - Power supply, voltage regulator & basic circuits	40
7	Description of software – EAGLE & PROTEUS	10
8	Testing of different components	10
9	Assemble Battery Chargers, Power Supply, Oscillator, Signal Injector & Amplifiers	20
10	Design of Multivibrators using IC-555 & Calculating Duty Cycle	20
11	Design Comparator, Integrator, Differentiator & Schmitt Trigger by IC-741	30
TOTAL NUMBER OF HOURS		200

TELECOMMUNICATION ENGINEERING

TECHNICIAN

SYLLABUS FOR CLASS XII

English
Class XII

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
	GRAMMAR	
1	Direct & Indirect Speech	18
2	Phrases & Idioms	8
3	Letter Writing (Informal)	11
4	Report Writing, Essay Writing & Precis Writing	15
5	Comprehension & Story Writing	13
	LITERATURE	
1	Wright Brothers	8
2	Jamshedji Tata	8
3	Solar Energy	8
4	Thomas Edison	8
5	Henry Ford	8
TOTAL NUMBER OF HOURS		105

General Foundation, Industrial Sociology and Entrepreneurship
Class XII

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	The Constitution of India	5
2	An Ideal Supervisor	5
3	Industrial Safety, First Aid and Hygiene	10
4	Entrepreneurship	10
5	Labour Laws	16
6	Environmental Science	10
7	Estimation & Costing	12
8	Project Plan	12
TOTAL NUMBER OF HOURS		80

1.The Constitution of India:

- **1.1.** Salient Features
- **1.2.** Preamble to the Constitution
- **1.3.** Fundamental Duties
- **1.4.** Directive Principles of State Policy
- **1.5.** Difference between Fundamental Rights and Directive Principles

2.An Ideal Supervisor:

- **2.1** Qualities of an ideal supervisor

3. Industrial Safety, First Aid and Hygiene:

- **3.1.** Concept of Safety
- **3.2.** Safety Consciousness
- **3.3.** Necessity of safety
- **3.4.** Safety Measures

4. Entrepreneurship:

- **4.1.** Introduction
- **4.2.** Definition of Entrepreneurship
- **4.3.** Need for Self-Employment
- **4.4.** Advantages of Entrepreneurship
- **4.5.** Roles and responsibilities of an Entrepreneur
- **4.6.** Qualities of a good Entrepreneur

5. Labour Laws:

- **5.1.** Factories Act 1948
- **5.2.** Apprentices Act
- **5.3.** Employees State Insurance (ESI) Act
- **5.4.** Payment of Wage Act 1936
- **5.5.** Minimum Wages Act & Rules
- **5.6.** Employees Provident Fund Act (EPF)
- **5.7.** Workmen's Compensation Act

6. Environmental Science:

- **6.1** Effect of pollution on Human Health
- **6.2** Impact of technology on Environment
- **6.3** Impact of pollution on Environment
- **6.4** Waste Management

7. Estimation & Costing:

- **7.1** Introduction to Estimation and Costing
- **7.2** Importance and Aims of Estimation & Costing
- **7.3** Functions of Estimating Department
- **7.4** Qualities of an Estimator
- **7.5** Estimating Procedures and Errors in Estimation
- **7.6** Constituents of Estimation
- **7.7** Advantages of Standard Costing
- **7.8** Differences between Estimation and Costing
- **7.9** Procedures of Costing & Costing methods
- **7.10** Cost Control and Advantages of Efficient Costing
- **7.11** Elements of Cost
- **7.12** Components of Cost and the process of calculating material cost & labour cost
- **7.13** Block diagram of Components of Cost
- **7.14** Methods of calculating indirect expenses and depreciation cost
- **7.15** Repairs and Maintenance Costing
- **7.16** Basic numerical on Estimation and Costing

8. Project Plan:

- **8.1** Introduction
- **8.2** Definitions of Working Capital, Fixed Capital Budget
- **8.3** Market Survey
- **8.4** Project Planning
- **8.5** Project Capacity
- **8.6** Selection of Site and Plant Layout
- **8.7** Product design and development
- **8.8** Factors considered while designing a product
- **8.9** Product drawings and designs specification
- **8.10** Product Development
- **8.11** Material Requirement
- **8.12** Operation Planning
- **8.13** Equipment Requirement
- **8.14** Material Handling
- **8.15** Break-Even Point
- **8.16** Preparation of Project

Principles of Electricity and Electronics
Class XII

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	**DC Generator & Motor**	15
2	**The AC Motor**	12
3	**Wires, Cables & Electrical wiring**	8
4	**Electrical Accessories**	8
5	**Basic Electronics Devices (Capacitor, Inductor, Resistors & Units)**	8
6	**Diodes & Triodes**	10
7	**Different types of Transistors**	11
8	**Power Electronics (SCR, JEFT, MOSFET & GTO)**	20
9	**Different types of Transistor Amplifiers**	10
10	**Sinusoidal Oscillators**	5
11	**Electronic Measuring Instruments**	8
TOTAL NUMBER OF HOURS		115

1. **DC Generator & Motor:**
   - **1.1.** Generator Principle
   - **1.2.** Types
   - **1.3.** Generated EMF equation
   - **1.4.** Loss
   - **1.5.** Condition for Maximum Efficiency & Commutation
   - **1.6.** Motor Principle, EMF & Back EMF
   - **1.7.** Voltage equation of the motor
   - **1.8.** Torque, Armature Torque &Shaft Torque
   - **1.9.** Speed of a DC motor
   - **1.10.** Speed regulation

2. **The AC Motor:**
   - **2.1.** Ideas of single Phase
   - **2.2.** Three Phase Induction Motor
   - **2.3.** Stator, Rotor & Slip
   - **2.4.** Squirrel Cage, Slip Ring & Double Cage Induction Motor

3. **Wires, Cables & Electrical wiring:**
    - **3.1.** Construction of various types in domestic & industrial use
    - **3.2.** Brief description in wiring systems
    - **3.3.** Switch in phase line & dual switching of lamps
    - **3.4.** Effects of over loading
    - **3.5.** Protection of circuits by fuses
    - **3.6.** Earthing of metal & mechanical protection of cables
    - **3.7.** Regulations for wiring in bathrooms & avoiding dangerous practices (simple testing)

4. **Electrical Accessories:**
    - **4.1.** Structure & uses of various types of switches
    - **4.2.** Power outlets & Lamp holders
    - **4.3.** Ceiling Roses & Junction Boxes
    - **4.4.** MCBs, ELCBs, DOL starter &S tar-Delta Starter

5. **Basic Electronics Devices:**
    - **5.1.** Capacitor, Inductor &Resistors
    - **5.2.** Functions, Uses &Units

6. **Diodes, Triode:**
    - **6.1.** Semiconductor diode
    - **6.2.** Diode Characteristics
    - **6.3.** Half Wave &Full wave Rectifier
    - **6.4.** Structure of Triode, the Control grid &Triode Parameters
    - **6.5.** Voltage amplifier & Anode Resistance
    - **6.6.** Mutual conductance & Amplification factors
    - **6.7.** Bias Voltage
    - **6.8.** Cathode Resistor & Cathode Bypass capacitor

7. **Different types of Transistors:**
    - **7.1.** Construction
    - **7.2.** PNP & NPN
    - **7.3.** CE, CB, CC Modes & Characteristics
    - **7.4.** α, β Relationship/ Gains
    - **7.5.** Need of Biasing
    - **7.6.** Different biasing circuits & uses

8. **Power Electronics:**
    - **8.1.** Thyristors
    - **8.2.** SCR
    - **8.3.** Construction
    - **8.4.** Latching Current & Holding Current
    - **8.5.** SCR Characteristics
    - **8.6.** Half Wave Power Control
    - **8.7.** Commutation
    - **8.8.** FET & its operations
    - **8.9.** Characteristics of JEFT, MOSFET, GTO & Applications

9. Different types of Transistor Amplifier:

- **9.1.** CB, CE &CC amplifier
- **9.2.** Phase Relationship
- **9.3.** Comparison between Voltage & Current
- **9.4.** Power gain
- **9.5.** Negative Feedback

10. Sinusoidal Oscillator:

- **10.1.** Idea of oscillator
- **10.2.** Feedback
- **10.3.** Barkhausen Criterion
- **10.4.** Tuned, Hartley, Collpitt's Oscillator & Phase shift oscillator
- **10.5.** Wein bridge oscillator

11. Electronic measuring Instruments:

- **11.1.** Analog & digital multi meter
- **11.2.** Voltmeter
- **11.3.** Ammeter
- **11.4.** Signal Generator
- **11.5.** CRO
- **11.6.** Clamp Meter Use & Care

Engineering Science
Class XII

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	**Expansion of Solid, Liquid & Gases**	15
2	**Magnetism**	15
3	**Simple Stress & Strain**	22
4	**Angular Motion**	10
5	**Pressure**	16
6	**Simple Machine**	18
7	**Electricity**	24
TOTAL NUMBER OF HOURS		120

1. **Expansion of Solid, Liquid & Gases:**
   - **1.1** Expansion of Solid
   - **1.2** Coefficient of Linear Expansion
   - **1.3** Superficial expansion of solid
   - **1.4** Cubic expansion of solid and liquid
   - **1.5** Cubic expansion of gases
   - **1.1** Ideal Gases

2. **Magnetism:**
   - **2.1** Magnetic Properties & Parameters
   - **2.2** Magnetic Properties of Iron & Steel
   - **2.3** Magnetic Field
   - **2.4** Flux Density
   - **2.5** Magnetic Moment, mmf, Reluctance, Permeability & Susceptibility
   - **2.6** Magnetic Circuits
   - **2.7** Electromagnet
   - **2.8** Solenoid & its Application

3. **Simple Stress & Strain:**
   - **3.1** Introduction – Stress & Strain with application and units
   - **3.2** Different types of stresses
   - **3.3** Hooke's Law

3.4 Young's Modulus or Modulus of Elasticity

3.5 Tensile strength, Yield Point, Ultimate Stress and Working Stress

3.6 Factor of safety and its application

3.7 Stress-Strain Graph, Modulus of Rigidity, Poisson's Ratio, Proof Stress and Bulk Modulus

3.8 Relationship between three moduli of a given material

4. Angular Motion:

4.1 Angular Displacement

4.2 Angular Velocity

4.3 Angular acceleration

4.4 Relationship between linear and angular motion

4.5 Equations of angular motion

4.6 Torque & Angular motion

4.7 Moment of inertia

5. Pressure:

5.1 Atmosphere

5.2 Atmospheric pressure

5.3 Pressure - its definition

5.4 Pressure in liquid

5.5 Absolute pressure

5.6 Gauge Pressure and Vacuum pressure

5.7 Measurement of atmospheric pressure and pressure inside the boiler

5.8 Simple Barometer

5.9 Different Laws and its applications

6. Simple Machine:

6.1 Machines – Definition and its types

6.2 Effort and Load

6.3 Mechanical Advantage & Velocity Ratio – its definition and unit

6.4 Efficiency of machine

6.5 Relationship between Efficiency, Mechanical Advantage and Velocity Ratio

6.6 The lever

6.7 Pulley Block

6.8 Wheel & Axle

6.9 The Screw and Screw jack

6.10 Belt and chain drive

6.11 Gear Wheel

7. **Electricity:**

- **7.1** Introduction and its uses
- **7.2** Molecule, Atom and Particles in Atoms
- **7.3** How to produce electricity
- **7.4** Electric Current – Ampere
- **7.5** Ohm's Law - Resistance, Voltage and Current
- **7.6** Electromotive forces
- **7.7** Potential Difference
- **7.8** Conductor, Insulator and Switch Fuse
- **7.9** Electrical Circuits
- **7.10** Electromotive Forces (EMF)
- **7.11** Types of connection – Series and parallel
- **7.12** Electrical Power & Horse Power
- **7.13** Types of current – AC & DC
- **7.14** Electrical Energy

Electronics and Computer Mathematics
Class XII

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	**Statistics & Histogram**	15
2	**Number Systems - Calculations & Conversions including 1's & 2's complements (Binary, Octal & Hexadecimal)**	5+5
3	**Boolean Algebra & Logic Gates**	14
4	**Limits**	12
5	**Introduction to Calculus**	14
6	**Differential Equations (1st Order & 2nd Order)**	20
TOTAL NUMBER OF HOURS		85

1 Statistics & Histogram:

- **1.1.** Measure of locations for ungrouped data & grouped data in equal interval classes
- **1.2.** Find arithmetic MEAN, MEDIAN, MODE & explain central tendency
- **1.3.** Arithmetic MEAN for ungrouped Data & Grouped Data
- **1.4.** Estimate the mode of grouped data using HISTOGRAM in Graph
- **1.5.** Determine the Median, Quartiles (1st, 2nd& 3rd) from Cumulative frequency data
- **1.6.** Problems based on content

2. Number Systems:

- **2.1** Binary Addition, Subtraction, Multiplication & Division
- **2.2** Conversion of Binary & Decimals from HEX, Octal & vice-versa
- **2.3** Use a sign bit to denote a negative number
- **2.4** Find 1's & 2's Complement of binary number
- **2.5** Define 8421 BCD system & derive the BCD equivalents of binary numbers
- **2.6** Convert between binary numbers & their BCD equivalents
- **2.7** Perform simple addition & subtraction using BCD & Hexadecimal integer numbers
- **2.8** Problems based on content

3 Boolean Algebra & Logic Gates:

- **3.1** Details of Boolean Laws
- **3.2** Basic Boolean Operations, Simplifications & Complements
- **3.3** Using logic gates, design different logical expressions & showing the output with Truth Table

3.4 De-Morgan's Theorem with proofs
3.5 All proofs of Boolean Laws

4 Limits:

4.1 Limit Properties & Laws
4.2 Problems based on content

5 Calculus:

5.1 Gradient of Curves
5.2 Meaning of dy/dx
5.3 Use of Derivates on functions--- (Ax^n, Sin ax, Cos ax, tan ax, loge^{ax})
5.4 Differential property of the exponential function
5.5 Basic Rules of Differential Calculus (Sum, Product, Quotient & function of a function)
5.6 Determining the derivatives of various combinations of any function

6 Differential Equations:

6.1 State the notation for second derivatives (d^2y/dx^2 or d^2x/dy^2)
6.2 State that ds/dt & d^2s/dt^2 expresses velocity &acceleration
6.3 Calculate Velocity & Acceleration at a given time from an equation for displacement
6.4 Solve problems &evaluate Y (Dependent variable)
6.5 Introduction to Integral Calculus
6.6 Determine gradient of chord & tangent to a simple curve
6.7 Determine the ratio y/x as tends to Zero & define it as dy/dx
6.8 Derive the limit of y/x as y tends to Zero & define it as y/x
6.9 Determine indefinite integrals of functions involving sin ax, cos ax&e^{ax}
6.10 Determine definite integrals of functions involving sin ax, cos ax&e^{ax}
6.11 Define Boundary condition
6.12 Solve differential equation of the type dy/dx=f(x), given a boundary condition
6.13 Differentiate Y=Ae^{kx} (where A & K is constant)
6.14 Verify that Y=Ae^{kx}satisfies dy / dx = ky by substitution
6.15 Derive equations of the form dy/dx from problems arising in technology

Telecommunication Technology – Paper I
Class XII

Examination Duration: 3 Hours

S. No.	Name of the Topic	No. of Hours
1	Transmission Lines (VSWR, Characteristics Impedance, Propagation Constant, Matching Transformer &Losses)	15
2	Network Theorems (Thevenin's Theorem, Norton's Theorem, Max Power Transfer theorem & Milliman's theorem)	12
3	Antennas (Different types, Equations, Radiation Patterns, Calculations &Reciprocity Theorem)	20
4	Fiber optic communications (Optical Fiber Construction, NA, Dispersion, Single/Multi mode, Step Index, Graded Index, Optical Connector, EDFA &Fiber Optic Amplifier)	16
5	Microwaves Systems & Devices (Klystron, Magnetron & TWT)	12
6	Microwaves Diode/ RF Diodes	10
7	Satellite Communication Systems (Orbits, Uplink, Down Link, Cross Link, Geo-synchronous, Geo-Stationary, GEO, MEO & LEO Satellites)	15
8	Television	15
TOTAL NUMBER OF HOURS		115

1. **Transmission Lines:**
   - **1.1** Characteristic Impedance
   - **1.2** Load Impedance
   - **1.3** Reflection Constant (K)
   - **1.4** VSWR & Propagation Constant
   - **1.5** Matching Transformer
   - **1.6** Relation between VSWR &K
   - **1.7** Distortions in Transmission Line

2. **Network Theorems:**
   - **2.1** Thevenin's Theorem
   - **2.2** Norton's Theorem
   - **2.3** Max Power Transfer theorem & Milliman's theorem
   - **2.4** Calculations

3. **Antenna:**
    - **3.1** Dipole
    - **3.2** Folded Dipole
    - **3.3** Monopole, Turnstile, Horn
    - **3.4** Yagi Uda / Parasitic Array
    - **3.5** LPDA and Dish
    - **3.6** Antenna parameters like Beam Width, Resolution, Radiation Resistance, Effective Aperture, Effective Height, Gain, Directivity and Efficiency
    - **3.7** Relations between Gain, Directivity & Efficiency
    - **3.8** Equations & Radiation patterns
    - **3.9** Calculations & Reciprocity Theorem

4. **Fiber optic communications:**
    - **4.1** Optical Fiber Construction
    - **4.2** Advantages
    - **4.3** NA, Intra modal & Inter modal dispersion
    - **4.4** Single/Multi mode
    - **4.5** Step Index and Graded Index
    - **4.6** Optical Connector, EDFA & Fiber Optic Amplifier

5. **Microwaves Systems & Devices:**
    - **5.1** Microwaves
    - **5.2** Klystron, Magnetron & TWT cavities
    - **5.3** Transit Time, Electron Bunching &Parametric Amplifier

6. **Microwaves Diode/ RF Diodes:**
    - **6.1** GUNN Diode
    - **6.2** Tunnel Diode
    - **6.3** Schottky Diode
    - **6.4** RF diode characteristics

7. **Satellite Communication Systems:**
    - **7.1** Orbits
    - **7.2** Uplink, Down Link & Cross Link
    - **7.3** Geo-synchronous & Geo-Stationary Satellite
    - **7.4** Orbital Period & Velocity
    - **7.5** Kepler's' Law of Motion
    - **7.6** GEO, MEO & LEO satellites

8. **Television:**
    - **8.1** Scanning Principles
    - **8.2** Deflection Systems
    - **8.3** Video Pictures
    - **8.4** Blanking & Synchronizing pulses

8.5 VSB Transmission
8.6 Receiver Block Diagram
8.7 Tuner & IF amplifier
8.8 Automatic Gain Control, the Video Amplifier & Sound Carrier
8.9 Synchronizing Circuit
8.10 Colour Sub Carrier Modulation & MTS
8.11 TV stereo
8.12 LED & LCD TV

Telecommunication Technology - Paper II
Class XII

Examination Duration: 6 Hours

S. No.	Name of the Topic	No. of Hours
1	Identifying mobile sets	10
2	Chinese make & other sets	8
3	Software IOS, Windows & Android	8
4	Flashing	7
5	Trouble shooting of Mobile (Insert SIM, Network Problems, Camera, Memory IC)	40
6	Set Top Box	12
7	Cable TV	15
8	Trouble shooting of Television	80
9	10 Individual Projects + 1 Final Group Project	100
TOTAL NUMBER OF HOURS		280

LIST OF KITS, TOOLS & EQUIPMENT

KITS

1. Combination Pliers 15 cm	1 set per trainee
2. Long Nose Pliers 15 cm	1 set per trainee
3. Diagonal Cutting Pliers 15 cm	1 set per trainee
4. End Cutting Nipper 15 cm	1 set per trainee
5. Tweezers 10 cm	1 set per trainee
6. Heat Sink Pliers	1 set per trainee
7. Neon Tester	1 set per trainee
8. Knob screw driver	1 set per trainee
9. Screw Driver set	1 set per trainee
10. Alignment Kit	1 set per trainee
11. Wire stripper	1 set per trainee
12. Soldering Iron 25W	1 set per trainee
13. De-Soldering Pump	1 set per trainee
14. Battery Eliminator	1 set per trainee
15. Digital Multimeters	1 set per trainee
16. Radio Receivers	1 set per trainee

TOOLS

1. Fire Extinguisher	2 Nos
2. First Aid Kit	1 No
3. Rubber Gloves Pairs	8 Nos
4. Steel Rule	8 Nos
5. Work Bench	2 Nos
6. Scriber	8 Nos
7. Centre Punch	4 Nos
8. Hammer Ball Pein	4 Nos

9. Tongs	1 No
10. Spanner set	4 Nos
11. Allen key Set	4 Nos
12. Hand shear Metal Cutting	2 Nos
13. Bradwal	2 Nos
14. Instrument Files Set L 12	1 No
15. Electric Drill 10mm	1 No
16. Hack Saw	8 Nos
17. File Set	4 Nos
18. Bench Vice	6 Nos
19. Grinder Bench Electric	1 No
20. Taps & Dies Set	5 Nos

EQUIPMENT

1. Bread Board, Vero Board	1 Set Per Trainee
2. SMD Rework Station	2 Nos
3. Liquid Flux	1 Container Per Trainee
4. Ball maker kit	2 Boxes
5. PCB Holder /PCBs	15 Nos
6. Vibrator Cleaner	1 No
7. NOKIA -3310, NOKIA-1110, NOKIA-6600 Mobile Handsets	2 Nos Each
8. Samsung Hand Sets, China Mobile sets	2 Nos
9. Smart Phone	2 Nos
10. Circuit Maker Software (EAGLE, PROTEUS, etc.)	1 Set Per Trainee
11. IC-555, IC-741, IC-810	1 Set Per Trainee
12. USB-4	2 Nos
13. Dongle (UFS-3)	1 No
14. USB cable	1 Set Per Trainee
15. Dragon(Dongle)	1No
16. Wire Gauge Set	2 Nos
17. Soldering Iron 250W	2 Nos
18. Soldering Iron 60W	15 Nos
19. Soldering Iron 10W	15 Nos

20. Feeler Gauge Set	2 Nos
21. Electric Cells DC 15 To 30V	4 Nos
22. Battery Storage 6V	2 Nos
23. Hydrometer	2 Nos
24. Battery Charger	1 No
25. Electric Belts	8 Nos
26. Rheostats	8 Nos
27. Potentiometer	20 Nos
28. Coil winding Machine	1 No
29. Micro-Ammeter/50,100, 500 &1000	1 No
30. Milli - Ammeter/10,50, 100 & 1000	3 Nos
31. Power Meter	2 Nos
32. Amplifier 20W or Above	2 Nos
33. Radio Receivers	2 Nos
34. Loud Speaker	30 Nos
35. Micro Phone	6 Nos
36. Insulation Tester	2 Nos
37. Head & Ear Phones	10 Nos
38. Service Oscillator	2 Nos
39. Signal Tracer	2 Nos
40. Function Generator	2 Nos
41. Output Meter	2 Nos
42. Regulated Power Supply	2 Nos
43. Pattern Generator B/W	2 Nos
44. Pattern Generator Colour	2 Nos
45.TV Camera (Colour)	1 No
46. LED TV (Black & White/ Colour)	1 No Each
47. LCD TV	1 No
48. TV Receivers B/W	2 Nos
49. CR Oscilloscope	2 Nos
50.TV Receivers Colour	2 Nos
51. AM/FM Signal Generator	2 Nos
52. Distortion Meter	2 Nos