Detailed Syllabus for TTA (Telecom Technical Assistant) Exam

Time Duration: 3 Hours

Number of Question: 200

Maximum Marks: 200

Detailed Syllabus: Part I, II and III

Part I:

General ability test (20 Marks)

The candidate's comprehension and understanding of General English shall be tested thorough simple exercises such as provision of **antonyms and synonyms, fill in the blanks** and multiple choice exercise etc. This shall also include questions on **current events & General knowledge** and such matters of everyday observation and experience as may be expected of Diploma holder.

Part II:

Basic Engineering (90 Marks)

Applied Mathematics:

- Co-ordinate Geometry
- Vector Algebra
- Matrix and Determinates
- Deferential Calculus
- Integral Calculus
- Differential equation of second order
- Fourier Series
- Laplace Transform
- Complex Number
- Partial Differentiation.

Applied Physics:

- Measurement-Units and Dimensions
- Waves
- Acoustics
- Ultrasonic

- Light
- Laser and its applications
- Atomic Structure and Energy Levels

Basic Electricity:

- Electrostatics
- Coulomb's law
- Electric field
- Gauss's theorem
- Concept of potential differences
- Concept of capacitance an capacitors
- Ohm's law
- Power and energy
- Kirchoffs voltage
- current laws and their applications in simple DC circuits
- Basic Magnetism
- Electro Magnetism
- Electromagnetic induction
- Concept of alternating voltage & current Cells and Batteries
- Voltage and Current Sources
- Thevenin's theorem, Norton's theorem and their applications.

Electronics Devices and Circuits:

- Classification of materials into conductor, Semi conductor insulator etc.
- Electrical properties
- Magnetic materials
- Various types of relays
- Switches and connectors conventional representation of electric and electronic circuit elements.
- Active and passive components semi conductor Physics
- Semiconductor Diode
- Bipolar Transistor & Their circuits
- Transistor Biasing and Stabilization of operating point
- Single stage transistor amplifier field effect transistor
- Mosfet circuits applications
- Multistage Transistor Amplifier
- Transfer Audio power Amplifiers
- Feedback in Amplifier
- Sinusoidal Oscillators
- Tuned Voltage Amplifiers
- Opto electronics Devices and their applications
- Operational amplifier
- Wave shaping and Switching circuits.
- Block diagram of I.C. timer (such as 555) and its working.

- Motivation Circuit
- Time base circuits
- Thyristory and UJT Regulated power supply.

Digital Techniques:

- Applications and advantages of digital systems
- Number system (binary and hexadecimal)
- Logic Gates
- Logic Simplification
- Codes and Parity
- Arithmetic Circuits Decoders
- Display Devices and Associated Circuits
- Multiplexers and De-multiplexers
- Latches and Flip Flops
- Counters
- Shift Register
- Memories
- A/D and D/A converters.

Part III:

Specialization (90 Marks)

1 . Electrical:

- 3 Phase VS
- Single-phase supply
- Star Delta connections
- Relation between phase & line voltage power factor and their measurements
- Construction and principles of working of various types of electrical measuring instruments. All types of motor and generator AC & DC transformers
- starters
- rectifiers
- inverters battery charges
- batteries
- servo and stepper motors
- contactor control circuits
- switchgear
- relays
- protection devices and schemes
- substation
- protective relaying
- circuit breaker
- generator protection transformer protection feeder and lightening protection
- feeder & bus bar protection

- lightening arrestor
- earthing
- voltage stabilizer & regulators
- power control devices & circuits
- phase controlled rectifiers
- inverters
- choppers dual converters
- cycloconverters
- power electronics application in control of drivers
- refrigeration & air-conditioning.

2. Communication:

- Modulation and demodulation - Principles and operation of various types of AM
- FM and PM modulators/demodulators. Pulse modulation TDM, PAM, PPM, PWM, Multiplexing.
- Principles and applications of PCM.
- Introduction of Basic block diagram of digital and data communication systems
- Coding error detection and correction techniques
- Digital Modulation Techniques - ASK, IGW, FSK, PSK
- Characteristics/ working of data transmission circuits
- UART, USART
- Modem
- Protocols an their functions
- Brief idea of ISDN interfaces
- Local Area Network
- Carrier Telephony - Features of carrier telephone system.
- Microwave Engineering
- Microwave Devices
- Wave guides
- Microwave Components
- Microwave Antennas
- Microwave Communication Systems - Block diagram & Working principles of microwave communication link.

3. Network Filters and Transmission Lines:

- Two port network
- Attenuations
- Filters
- Transmission Lines and their applications
- Characteristic impedance of Line
- Concept of reflection and standing waves on a transmission lines
- Transmission line equation
- Principle of Impedance matching Bandwidth consideration of a transmission line.

4. Instruments and Measurements:

- Specifications of instruments-accuracy
- Precision
- Sensitivity
- Resolution range
- Errors in measurement and loading effect
- Principles of voltage current and resistance measurements
- Transducers
- measurement of displacement & strain
- forces & torque measuring devices
- pressure measuring devices
- flow measuring devices
- power control devices & circuits.
- Types of AC mili voltmeters.
- Amplifier rectifier and rectifier amplifier. Block diagram explanation of a basic CRO and a triggered sweep oscilloscope
- Front panel controls
- Impedance Bridges and Q - Meters.
- Principles of working and specifications of logic probes. Signature analyzer and logic analyzer
- signal generator
- distortion factor meter
- spectrum analyzer.

5. Control Systems:

- Basic elements of control system
- open and closed loop system
- concept of feedback. Block diagram of control system
- Time lag
- Hysterisis
- Linearity concepts
- self - regulating and non - self regulating control systems
- Transfer function of simple control components
- Single feedback configuration
- Time response of system
- Stability Analysis-Characteristic equation
- Routh's table Nyquist criterion
- Relative stability
- Phase margin and gain margin
- Routh Hurwitz criterion
- Root locus technique Bode plot
- Power plot
- Gain Margin and phase margin.

6. Microprocessors:

- Typical organization of a microcomputer system & functions of its various blocks
- Architecture of a Microprocessor
- Memories and I/O Interfacing
- Brief idea of M/C & assembly language
- Machines & Mnemonic codes
- Instruction format and Addressing mode
- concept of Instruction set
- programming exercises in assembly language
- concept of interrupt
- Data transfer techniques - sync data transfer, interrupt driven data transfer
- DMA
- serial output data
- serial input data .

7. Computers:

- Computer and its working
- Types of computers
- Familiarization with DOS and Window concept of file directory
- Number system
- Data representation
- Programming Elements of a high level programming language
- PASCAL C: Use of basic data structures
- Fundamentals of computer architecture
- Processor design control unit design
- Memory organization
- I/O system Organization
- Microprocessors-microprocessor architectures
- Instruction set and simple assembly level programming
- Microprocessor based system design typical examples
- Personal computers and their typical uses
- Data Communication Principles
- Types and working principles of modems
- Network principles
- OSI model
- Functions of data link layer and network layer
- Networking components communication protocols as X-25, TCP /IP.
- Database Management System-basic concepts entity relationship model relational model DBMS based on relational model.