

SYLLABUS FOR TTA DIRECT RECRUITMENT EXAM

The standard part in General ability test will be such as may be expected of an engineering diploma holder. The standard of the paper will approximately be that of Diploma level of an Indian Polytechnic. There shall be a single multiple choice objective type paper of three hours duration as per details give below :-

Part Marks

Part- I General Ability Test 20

Part- II Basic Engineering 90

Part- III Specialization 90

Note: The candidate is required to obtain minimum qualifying marks in each of these parts.

Part-I:-General Ability Test : 20 Marks:

The Candidate's comprehension and understanding of General English shall be tested through

simple exercises such as provision of antonyms and synonyms, fill in the blanks and multiple-choice

exercises 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 :

1. **Applied Mathematics:** Co-ordinate Geometry; Vector Algebras, Matrix ad Determinant; Differential

calculus; Integral calculus, Differential equation of second order; Fourier series; Laplace Transformer;

Complex Number; Partial Differentiion.

2. **Applied Physics:** Measurement- Units and Dimensions; Waves, Afcoustics, Ultrasonics; Light; :azer

and its Applications; Atomic Structure and Enerty Levels.

3. **Basic Electricity:** Electrostatics, coulomb's law, Electric field, Gauss's theorem, concept of potential

difference; concept of capacitance and capacitors; Ohm's law, power and energy, Kirchoff's 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.

4. Electronic 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; Semi Conductor Diode; Bipolar Transistor & their circuits; Transistor Biasing & Stabilisation of operating point; Single stage transistor amplifier field effect transistor, Mosfet circuit applications, Multistage Transistor Amplifier; Transistor 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; Multivibrator circuits; Time base circuits; Thyristors and UJT; Regulated Power supply

5. Digital Technique: Applications and advantages of digital systems; number system(binary and hexadecimal); Logic Gates; Logic simplifications; 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

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 & schemes, substation, protective relaying, circuit breaker, generator protection, transformer

protection, feeder & lightning protection, feeder & bus bar protection, lightning 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.

Communication:- Modulation and demodulation- Principles and operation of various types of AM, FM and PM modulators / demodulator; 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, ICW, FSK, PSK; Characteristics / working of data transmission circuits; UART: USART: Modems; Protocols and their functions, brief idea of ISDN interfaces, local area Network; Carrier Telephony- Features of carrier telephone system. Microwave Engineering: Microwave Devices; Waveguides; Microwave Components; Microwave antennas; Microwave communications Systems- Block diagram & working principles of microwave communications link.

Network, Filters and Transmission Lines:- Two ports network; Attenuators; Filters; Transmission Lines and their applications; characteristic impedance of line; concept of reflection and standing waves on a transmission line; Transmission line equation; Principle of impedance matching; Bandwidth consideration of a transmission line.

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 a strain, force & torque measuring devices, pressure measuring devices, flow measuring devices power control devices & circuits. Types of AC mill-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, signal analyzer and logic analyzer, signal generator, distortion factor meter, spectrum analyzer.

Control system:- Basic elements of control system, open and closed loop system concepts of feedback, Block diagram of control system. Time lag, hysteresis linearity concepts; Self regulating and non self regulating control systems. Transfer functions of simple control components, single feedback configuration. Time response of systems; Stability Analysis: Characteristic equation Routh's table Nyquist Criterion, Relative stability, phase margin and gain margin. Routh Hurwitz criterion, Root Locus technique, Bode Plot, Polar plot, gain margin and phase margin.

Microprocessor- Typical organization of a microcomputer system & functions of its various block; Architecture of a Microprocessor; Memories and I/o interfacing; Brief idea of M/s assembly languages, machines & Mnemonic codes; Instructions format and Addressing mode; concept of Instruction set; programming exercises in assembly language; concept of interrupt; Data transfer techniques- sync data transfer, async data transfer interrupt driven data transfer, DMA serial output data, serial input data.

Computers:- Computer and its working, types of computers, familiarization with DOS and windows-concept of file, directory, folder, Number systems; Data Communication. Programming Elements of a high level programming language. PASCAL, c; USE OF BASIS DATA STRUCTURES Fundamentals of computer architecture, Processor design, Control unit design; Memory organization. I/O system Organization. Microprocessor architecture; 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; communications protocols-X-25,
TCP/IP Database Management
System-basic concepts, entity relationship model, relational model, DBMS
based on relational model.