



**CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (Autonomous)**  
**Kokapet (Village), Gandipet (Mandal), Hyderabad – 500 075**

**Syllabus**

**Computer Operators :**

**English Insight & Writing Ability:** The questions will be asked to test your knowledge of English Language, Comprehension and Writing Ability.

**Database Management System**

Data organization, File Management System, Database Concepts, Relational Data Model and Basic Concept of Database, Popular Database Management System- FoxPro and Oracle with SQL etc., Data Structures.

**PC software and Office Automation**

Office System and Procedure, The Need for Office Automation, Electronic Capture, Storage, Graphics and Graphic User Interface, Electronic Data Interchange.

**Programming in C**

**Workplace Productivity Tools**

Word Processing Tools, Electronic spread sheets, Electronic presentation tools. Microsoft Office (Word, Excel, Power Point, Access), Fundamentals of Operating Systems & Databases, Basics of Networking and Internet, Desktop Publishing Software, Open Office, Using these tools in English and official Indian languages (Windows, UNIX and Unicode Fonts), Exchange of Files across these platforms.

**Junior Assistant as Data Entry Operators :**

MS-Office, Fundamentals of Operating Systems, Basics of Networking and Internet, Desktop Publishing Software.

**Reasoning**

- Grouping Identical Figures
- Problems on Age Calculation
- Coding and Decoding
- Blood Relations
- Figure Matrix Questions
- Test of Direction
- Analogy
- Non-verbal Series
- Arithmetical Reasoning
- Alphabet Series
- Ven Diagram
- Number Ranking
- Inference
- Number Series

**Quantitative Aptitude**

- Time and Work Partnership
- Averages
- Simple Interest
- Problems on Numbers

- Probability
- Compound Interest
- Time and Distance
- Ratio and Proportion
- Percentages
- Problems on L.C.M and H.C.F
- Odd Man Out
- Quadratic Equations
- Simple Equations
- Profit and Loss
- Numbers and Ages
- Simplification and Approximation
- Permutations and Combinations

### **English**

- Rearrangement of a sentence in paragraph
- Sentence completion
- One word substitution
- Active and Passive voice
- Transformation
- Antonyms
- Direct and Indirect Speech
- A deriving conclusion from passage
- Double Synonyms
- Choosing the correct or incorrect sentence
- Spotting errors
- Comprehension
- Reconstruction of sentences
- Theme detection
- Common errors
- Idioms and phrases
- Sentence improvement
- Homonyms
- Choosing the appropriate filler
- Synonyms
- Passage completion
- Vocabulary test
- Spelling test
- Passage correction

### **Stenographers :**

#### **General Intelligence & Reasoning**

It would include questions of both verbal and non-verbal type - Analogies - Similarities and Differences - Space Visualization - Problem-solving - Analysis - Judgment - Decision Making - Visual Memory - Discriminating Observation - Relationship Concepts - Arithmetical Reasoning - Verbal and Figure Classification - Arithmetical Number Series - non-verbal Series, etc. The test will also include Questions designed to test the candidate's abilities to deal with abstract Ideas and Symbols and their Relationship, Arithmetical Computation and other Analytical Functions.

#### **English Language and Comprehension**

Vocabulary, Grammar, Sentence Structure - Synonyms - Antonyms and its correct usage, etc. his / her writing ability, would be tested.

### **Technician Grade - III in EEE :**

Basics of AC & DC Circuits, Ohm's law, KVL & KCL, Series & Parallel Circuits, Single Phase & three phase Circuits, Electrical Safety.

Basic working Principle and Parts of Electrical & Electronic Measuring Instruments, LCR Meters, Megger, Bridges, CRO, Function Generators.

Basics of (i) AC & DC Machines (ii) Power Electronic Devices (iii) Microprocessors (iv) Electronics Devices and Circuits (v) Diode Rectifiers (vi) Operational Amplifiers (vii) Digital Electronics, Logic Circuits (viii) Relays

### **Technician Grade - III in ECE :**

**ELECTRONIC DEVICES AND CIRCUITS:** Semiconductor Diodes - Varactor Diode - Zener Diode - Clippers and Clampers-Transistors— FETs - UJT (characteristics only) — Power Supplies — Rectifiers and Filters — HW, FW and Bridge type — RC, LC and CLC Filters Series and Shunt Regulators, IC regulators: - Transistor Amplifiers - CE, CC and CB Configurations. — Biasing Techniques-RC Coupled — Transformer Coupled Amplifiers Differential Amplifiers.

**CIRCUIT THEORY :** Mesh Current and Node Voltage Analysis - Crammers Rule — Network Theorems — Thevenin's, Norton's, Maximum Power Transfer, Superposition and Reciprocity Theorems Series and Parallel Resonance. Q- Factor - Selectivity — Bandwidth - Coupled circuits, Transient analysis-RC and RL, Linear wave shaping Circuits.

**ELECTRONIC MEASURING INSTRUMENTS :** Analog Instruments - Extension of range of Ammeter, Voltmeter and Ohmmeter - FET Voltmeter — Differential Voltmeter- Bridges-Wheatstone, Maxwell, Schering Digital Instruments. — Successive Approximation — Digital Frequency Meter Digital LCR Meter- CRO — CRT — Time Base Generator — Deflection Sensitivity — Triggered Sweep, Circuits - CRO Applications— Digital IC tester.

**INDUSTRIAL ELECTRONICS :** Thyristor Family—SCR, TRIAC, Power BJT—IGBT (Characteristics, working Principle and Applications).

**COMMUNICATION SYSTEMS :** Analog - Need for Modulation - Types of Modulation — AM, FM, PM — Modulation Index — Bandwidth — Power Requirements - Transmitters — Low level and High Level Types — Receivers — Super Heterodyne — AM and FM Receivers — Characteristics - Sensitivity, Selectivity, Fidelity — IMRR and Choice of IF — Wave Propagation — Ground, Sky and Space waves — Properties. Digital — Pulse Modulation — PCM, Delta Modulation — Data Codes - Synchronous and Asynchronous Transmission — Error Detection and Correction.

**DIGITAL ELECTRONICS:** Number Systems — Logic Gates — Boolean Algebra — Adders and Subtractors, Multiplexers; Demultiplexers – Encoders - Decoders, Comparators — Flip-Flops- Registers and Counters — Memories — RAM, ROM, Flash ROM, NVRAM, Cache. Memory, Virtual Memory, Associative Memory.

**MICROPROCESSORS & MICROCONTROLLERS:** Features of Microprocessors — Block Diagram 8085 — Pin diagram of 8085 — Functions of Various Registers — Instruction Set — Timing Diagram — Latest Processors used in Desktop / Laptop - 8051 Architecture — Instruction Set.

### **Technician Grade - III in Chemistry :**

1. **S-block elements** - Alkali Metals; Electronic Configurations; Atomic and Ionic Radii; Ionization enthalpy; Physical Properties; Chemical Properties Alkaline Earth Elements; Electronic Configuration; Ionization Enthalpy; Physical properties Chemical properties.

#### **2. CHEMICAL BONDING AND MOLECULAR STRUCTURE**

Ionic or Electrovalent Bond - General properties of Ionic Compounds, Bond Parameters – Bond Length, Bond Angle Valence Bond Theory, Strength of Sigma and Pi Bonds Hybridisation-different types of Hybridization involving s, p and d orbitals - Shapes of simple Covalent Molecules. Coordinate Bond – Definition with examples.

Molecular Orbital Theory – Formation of Molecular Orbitals, Linear Combination of Atomic Orbitals (LCAO) - Conditions for Combination of Atomic Orbitals.

### 3. ORGANIC CHEMISTRY

General Introduction. Tetravalency of Carbon: Shapes of Organic Compounds. Structural Representations of Organic Compounds. Classification of Organic Compounds. Nomenclature of Organic Compounds Nucleophiles and Electrophiles. Methods of Purification of Organic Compounds. Qualitative Elemental Analysis of Organic Compounds Quantitative Elemental Analysis of Organic Compounds.

#### HYDROCARBONS

Classification of Hydrocarbons.

**Alkanes** – Nomenclature, Preparation of Alkanes Properties – Physical Properties and Chemical Reactions.

**Alkenes** - Nomenclature Methods of preparation. Properties- Physical and Chemical Reactions, Markovnikov's Rule.

**Alkynes** – Nomenclature, Structure of Acetylene. Methods of preparation of Acetylene. Physical Properties, Chemical Reactions.

**Aromatic Hydrocarbons:** Nomenclature, Structure of Benzene, Resonance and Aromaticity. Preparation of Benzene. Physical Properties. Chemical Properties: Mechanism of Electrophilic Substitution. Electrophilic substitution reactions- Nitration, Sulphonation, Halogenation, Friedel - Craft' Alkylation and Acylation.

### 4. THERMODYNAMICS

Thermodynamic Terms. The system and the surroundings. Types of systems and surroundings. The state of the system. The Internal Energy as a State Function. Work, Heat, the first Law of Thermodynamics.

Enthalpy, H- a useful new state function, Extensive and Intensive Properties. Heat Capacity, The relationship between  $C_p$  and  $C_v$ . Enthalpy change, Hess's law of constant Heat summation. Spontaneity. Entropy and Spontaneity, the second Law of Thermodynamics. Gibbs Energy change and Equilibrium.

### 5. CHEMICAL EQUILIBRIUM

Equilibrium in Physical Process. Law of Chemical Equilibrium - Law of mass action and Equilibrium Constant. Homogeneous Equilibria, Equilibrium constant in Gaseous Systems. Relationship between  $K_p$  and  $K_c$  Heterogeneous Equilibria, Applications of Equilibrium constant. Buffer solutions-designing of buffer solution-Preparation of Acidic Buffer.

### 6. ELECTROCHEMISTRY

Electrochemical Cells, Galvanic Cells : measurement of Electrode potentials, Nernst Equation - Electrochemical Cell, Conductance of Electrolytic Solutions- measurement of the conductivity of

Ionic Solutions-Variation of Conductivity and Molar Conductivity with concentration-strong Electrolytes and weak Electrolytes-applications of Kohlrausch's Law Potentiometric acid-base Titrations and Potentiometric Redox Titrations-Principle Procedure and Graphs

## 7. CHEMICAL KINETICS

Rate of a Chemical Reaction, Factors influencing Rate of a Reaction : Dependence of Rate on Concentration - Rate Expression and Rate Constant - order of a Reaction, Molecularity of a Reaction, First Order Reactions.

## 8. COORDINATION COMPOUNDS

Werner's Theory of Coordination Compounds, Definitions of some terms used in Coordination Compounds, Nomenclature of Coordination Compounds-IUPAC Nomenclature bonding in Coordination Compounds. (a) Valence Bond Theory - (b) Crystal Field Theory, Crystal Field splitting in Octahedral Field.

### **Technician Grade - III in Civil Engineering :**

#### **General:-**

Knowledge of Terminology related to Laboratories of Civil Engineering (listed below)

- Various Equipment and Tools used in the Laboratories of Civil Engineering
- Operational and Maintenance Procedure used in Laboratories
- Maintenance and Updation of Stock Registers
- Knowledge of use of some of Special Equipment for Research & Consultancy
- Safety Norms / Precautions

#### **Focus may be on the following labs**

##### **1. Concrete Laboratory :-**

- Use and Maintenance of Compression Testing Machine, Concrete Mixer, Hot Air Oven, Workability Measuring Equipment, Compacting Equipment, Various Moulds & NDT equipment.

##### **2. Strength of Materials Laboratory:- (Material Testing Lab:)**

- Use and Maintenance of UTM, Hardness Test Equipment, Torsion Testing Machine, Extensometers & Dial Guages, Veriner Callipers, Materials and Tools required for Equipment Maintenance.

##### **3. Transportation Engineering Laboratory:**

- Operation and Maintenance of Universal Compression Testing Machine, CBR, Abrasion Testing Machine, Penetrometers, Ductility Testing Machine, Viscosity Meter etc., and preparation of Bitumen Samples.

##### **4. Hydraulic Machinery Laboratory:**

- Operation and maintenance of Turbines and Pumps ,Operation of Notches and Weirs in an open channel, Mouthpiece, O in Tanks, Impact of free Jets on Vanes, Ability to create Hydraulic Jump, Ability to take observations for all the above experiments.

## 5. Environmental Laboratory:

- Titration Procedures, Safely handling all the Chemicals, Preparation of required Reagents, Calibration of all Digital Equipments like DO Meter, Conductivity Meter, pH Meter, Turbidity Meter, Operation of all the above Equipment, Operation of Jar Test, BOD Incubator, COD Digester.

## 6. Surveying & Geomatics Laboratory:

- Operation of Conventional & Modern Instruments, Temporary and Permanent adjustments of Surveying Instruments like Compass, Plane Table, Levels, Theodolite, Total Station, GPS etc., and Maintenance

## 7. Soil Mechanics Laboratory:

- Operation and Maintenance of CBR Apparatus, Core Cutter, Vane Shear Apparatus, Direct Shear Box Apparatus, Confined Compression Testing Equipment, Consolidometer, Permeameter, Casagrande's Device (Liquid Limit Device) etc.,

## **Technician Grade - III in Mechanical Engineering :**

Central Workshop :

- 1) Carpentry: Tools, types of joints, types of wood, operations, Specifications of tools, planning different types of joinings.
- 2) House Wiring: Different types of wires, specification of wires, different types switches, types of wiring, tools required, different experiments, phase & neutral wires, function of fuse wire and materials of house wire specifications
- 3) Fitting: Materials used, types of tools, different types of bit.
- 4) Plumbing: Materials used, joints, different types of tools used
- 5) Machine shop: Specifications of Lathe, drilling, milling, shear operations
- 6) Electrical & Electronics: Different types of wiring, operations, tools, specifications of tools
- 7) Applied Thermodynamics: Classification of IC engines, Combustion of SI engine and CI engine, Performance analysis of I.C Engines, heat balance, Morse test, IC Engine fuels, Ratings, Reciprocating Compressors: Operation of a single stage reciprocating, compressors, Work input through p-v diagram and steady state steady flow analysis, Effect of Clearance and Volumetric efficiency, Adiabatic, Isothermal and Mechanical efficiencies, Inter-cooling,
- 8) Welding Shop: Working principles, Arc Welding, Gas Welding, TIG welding, MIG welding
- 9) Casting: Sand Casting - Mold Preparation with Single pattern, Mold Preparation with Split or 2 piece pattern, Usage of Silicon Rubber Mold to make components
- 10) Plasting Moulding & Glass Cutting: Plastic Moulding - Injection Moulding, Glass Cutting Demonstration
- 11) Tinsmithy: Forging - Open Die, or Closed Die Forging, developing of surfaces

- 12) CAD/CAM: Introduction to computer Aided Design, Solid works Software - Part Modeling and options-Extruded, Revolved, swept Boss / Base, Extruded, Revolved, Swept cut, Mirror, Pattern, Generation of Assemblies and Automated Drafting in Solid works, Introduction to Computer Aided Manufacturing, CNC Machine Specifications, Milling and Turning coordinate systems, specifying tool offsets, CNC Part Programming - G & M -Codes (Turning and Milling), Contour Milling, CNC Pocketing cycles, CNC Turning operations (Step Turning, Taper Turning, Multiple Turning)
- 13) Heat Transfer: Principle of Conduction , Convection and Radiation, Expression for Fourier's of law of conduction and Concept of Conductivity, Newton's law of cooling, Concept of Free Convection and Forced Convection, Concept of Steffen boltzman Principle and Emissivity, Heat Exchanger: Parallel flow, Counter flow and Energy Conservation Principle, Concept of black body and Non black body.
- 14) Machine Tools: Super Finishing Processes: Abrasive Processes- Grinding Wheel – Specifications And Selection, Types of Grinding Process – Cylindrical Grinding, Surface Grinding, Centre less Grinding–Super finishing process- Honing, Lapping, Super Finishing, Polishing And Buffing, Jigs and Fixtures Definition-Need of Jigs and Fixtures Drill Jig-Locating devices.
- 15) Non Conventional Machining Process: Unconventional Machining Process - Classification, Electron Beam Machining, Laser Beam Machining, Electric Discharge Machining, Ultrasonic Machining, Abrasive Jet Machining. Additive manufacturing-Concept – Various applications of Additive manufacturing
- 16) Metal Casting and Welding: Casting: Integrated Moulding Sand, parts of mould, gating system purpose of raiser. Sand testing GCS, GSS, DCS, DSS, Shatter index, grain fineness number.
- 17) Metrology and Instrumentation: Limits, Fits and Tolerances, Nominal size, Fundamental deviation, Unilateral and bilateral tolerances, Types of fits Hole and shaft basis systems. Linear and Angular Measurement: Line and end standards, Slip gauges, Sine bar, Taylor's Principle for plain limit gauges, Use of Plug, Ring and Snap gauges. Dial indicator, Optical Measuring Instruments: Optical projector principle and its uses, Tool maker's Microscope principle and its uses Flatness and Roundness Measurement: Definitions. Surface roughness measurement by, Taylor Hobson Talysurf, Spur Gear nomenclature, Basic terminology of screw thread.
- 18) Computational Fluid Dynamics: ANSYS Workbench tools types, Advantages, applications, Fluent steps involved for solving the flow problems, Simulation of laminar/turbulent flow in Flat plates pipes and spear base on Reynolds number. Study/unsteady flow of temperature in pipe/elbow/T section, compressible flow through a nozzle, Flow over a Aerofoil for different wind velocities.
- 19) Material Science & Metallurgy: Study of Metallurgical Microscope - Procedure for specimen preparation. Observations for Specimens: Low Carbon Steel, Medium Carbon Steel, High Carbon Steel, Stainless Steel, Case Carburized Steel, High Speed Steel, White Cast Iron, Gray Cast Iron, Malleable Cast Iron, Spheroidal Cast Iron, Al-Si alloy.  
  
Preparations of the specimens:  $\alpha$ - $\beta$  Brass, Normalized Steel, Medium Carbon, Steel, Nodular Cast Iron, Gray Cast Iron.



Dr. P. RAVINDER REDDY  
PRINCIPAL, CBIT.