SYLLABUS FOR FINAL WRITTEN EXAMINATION FOR THE POST OF SCT SIs (COMMUNICATIONS)

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<td rowspan="3">G.O. No. 217, dt: 22.12.2012</td>
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PAPER I: ENGLISH (DESCRIPTIVE TYPE)

The candidate's understanding of the English language, its correct usage and his writing ability would be tested. Questions on short essay, comprehension, précis, letter writing, paragraph writing / report writing, translation from English to Telugu etc. would be included

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PAPER II: ARITHMETIC & TEST OF REASONING / MENTAL ABILITY(OBJECTIVE TYPE) (200 QUESTIONS)

Arithmetic: It will include questions on problems relating to number system, simple interest, compound interest, ratio & proportion, average, percentage, profit & loss, time & work, work & wages, time & distance, clocks & calendars, partnership, mensuration etc.

Test of Reasoning: It will include questions of both verbal & non-verbal type and include question on analogies, similarities and differences, spatial visualisation, spatial orientation, problem solving, analysis, judgment, decision making, visual memory etc

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PAPER III: TECHNICAL PAPER (OBJECTIVE TYPE) (200 QUESTIONS)

1. **Materials and Components**: Structure of properties of Electronic Engineering, materials, conductors, semiconductors and insulators, magnetic, ferroelectric, piezoelectric, ceramic, optical and superconducting materials. Passive components and characteristics, Resistors, Capacitors and Inductors; Ferrites, Quartz crystal, Ceramic resonators, Electromagnetic and Electromechanical components.

2. **Physical Electronics, Electron Devices and ICs** : Different types of diodes and their characteristics, Bipolar junction transistors, Field transistors, Field effect transistors, power switching devices like SCRs, CTOs, power MOSFETs Basics of ICs-bipolar, MOS and CMOS types, Basics of Opto- Electronics

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3. **Network Theory :** Network analysis techniques; Network theorem, transient and steady state sinusoidal response, Transmission criteria: delay and rise time Elmore's and other definition, effect of cascading. Elements of network synthesis.

4. **Electromagnetic Theory** : Transmission lines; basic theory, standing waves, matching applications, microstrip lines; Basics of wave guides and resonators; Elements of antenna theory.

5. **Electronic Measurements and Instrumentation** : Basic concepts, standards and error analysis; Measurements of basic electrical quantities and parameters; Electronic measuring instruments and their principles of working; analog and digital comparition, characteristics, applications. Transducers; Electronic measurements of non-electrical quantities like temperature, pressure, humidity etc. Basics of telemetry for industrial use.

6. **Power Electronics :** Power Semiconductor devices, Thyristor, Power transistor, MOSFETs Characteristics and operation, AC to DC convertors; 1– phase and 3 phase DC to DC convertors, AC regulators, Thyristor controlled reactors, switched capacitor networks, Invertors; Single-phase and 3 phase, Pulse width modulation, Sinusoidal modulation with uniform sampling, Switched mode power supplies.

7. **Analog Electronic Circuits** : Transistor biasing and stabilization, small signal analysis, Power amplifiers, Frequency response, Wide band techniques, Feedback amplifiers, Tuned amplifiers, Oscillators, Rectifiers and Power supplies, Operational Amplifier, other linear integrated circuits and applications, Pulse shaping circuits and waveform generators.

8. **Digital Electronic Circuits** : Transistors as a switching element; Boolean algebra; simplification of Boolean functions; Karnaught Map and applications; IC logic gates and their characteristics; IC logic families; DTL, TTL, ECL, NMOS, PMOS and CMOS gates and their comparison; Combinational logic circuits; Half adder; full adder, Digital Comparator; Multiplexer De-multiplexer; ROM and their applications; Flip-flops, R-S, JK, D and T flip-flops; Different types of counters and registers; waveform generators; A/D and D/G convertors; Semiconductor memories.

9. **Communication Systems and antennas**: Basic information theory, Modulation and detection in analogue and digital systems, Sampling and data reconstruction, Quantization & Coding, time division and frequency division multiplexing, Equalisation, Optical Communication; in free space & fiber optic; frequency spectrum analysis,

Propagation of signals at HF, VHF, UHF and microwave frequency; Satellite communication, and Mobile communications. Antennas, applications, cellular and PCS antennas.

10.**Microwave Engineering** : Microwave tubes and solid state devices, Microwave generation and amplifiers, Wave guides and other Microwave Components and Circuits, Micro-strip circuits, Microwave antennas, Microwave measurements, Masers Lasers Microwave propagation. Microwave Communication Systems- terrestrial and satellite based.

11.**Computer Engineering** : Number Systems; Data representation, Programming; Elements of a high level programming languages, use of basic data structures, Fundamentals of computer architecture processor design, Control unit design, Memory organization, I/O system organization, Personal computer and their typical uses. Mother board peripherals, accessories, windows operating system, PC assembly and software installation, processor management, storage management, file systems, networking & LAN, basics of WAN, WAN protocols, networking management, system administration, web applications. Data structures using C, data base management concepts of SQL, schema objects, Programming Languages C,C++, Visual basics.

12.**Microprocessors**: Microprocessor Architecture-Instruction set and simple assembly, language programming, Interfacing for memory and I/C, Applications of Microprocessor in Telecommunications and power system.

13.**Television Engineering** : Picture tube construction and working principle. Deflections Camera tubes, Basic T.V. system. Scanning, Synchronization, Composite Video Signals, aspect ratio, resolution, flickering, pictures, sound broad casting in F.M., V.H.F. and U.H.F. Channels, typical response of video I.F. amplifiers, use of wave traps, video amplifiers, nature of video signals. Sync Pulses and blanking pulses in the video signals, differentiating circuit used for pulse separation. Horizontal deflection principle. Principle of video cameras, video cassette recorder. Principle of closed circuit T.V. system. Video Conferencing.

14.**Radars and Landing systems** : Principles of operation of Radar, Radar range equation, modification of Radar range equation considering receiver noise and radar frequencies. Working of Pulsed radar, function of duplexer and modulator, Radar beacon. Principle of C.W radar, Doppler frequency shift, FMCW radar, FM altimeter, display systems, Basic principles of MTI radar and Tracking radar. Aircraft landing systems, ILS, GCA, ARSR and SRA.

	15.**Control systems :** Transient and steady state response of control systems, effect of feedback on stability and sensitivity, Root locus techniques; Frequency response analysis, concepts of gain and phase margins, Constant-M and Constant-N Nichol's chart, Approximation of transient response from closed loop frequency response, Design of Control Systems, Compensators Industrial controllers. 16. **Telephone Systems**: PSTN telephone network, Local Loops, signals and noise in telephone systems, telephone instruments, FDM, Digital transmission, digital Local loops, EPABX, FAX, internet telephony. GSM and CDMA phone system **Multiplexing and multiple access techniques**: digital subscriber line, Frequency Division multiplexing and access, Time division multiplexing and multiple access, spread- spectrum, Code division multiple access. Teleconferencing.

SYLLABUS FOR FINAL WRITTEN EXAMINATION FOR THE POST OF SCT ASI (FINGER PRINT BUREAU)

G.O. No. 217, dt: 22.12.2012	**PAPER I: ENGLISH (DESCRIPTIVE TYPE)** The candidate's understanding of the English language, its correct usage and his writing ability would be tested. Questions on short essay, comprehension, précis, letter writing, paragraph writing / report writing, translation from English to Telugu etc. would be included **PAPER II: ARITHMETIC & TEST OF REASONING / MENTAL ABILITY (OBJECTIVE TYPE) (200 QUESTIONS)** **Arithmetic**: It will include questions on problems relating to number system, simple interest, compound interest, ratio & proportion, average, percentage, profit & loss, time & work, work & wages, time & distance, clocks & calendars, partnership, mensuration etc. **Test of Reasoning:** It will include questions of both verbal & non-verbal type and include question on analogies, similarities and differences, spatial visualisation, spatial orientation, problem solving, analysis, judgment, decision making, visual memory etc **PAPER III: TECHNICAL PAPER (OBJECTIVE TYPE) (200 QUESTIONS)** **1. Computer Hardware:** a**. Computer Architecture**: Fundamentals of Computers, PC Assembling, Installation, Trouble Shooting, Viruses. b. **The Memory System**: Memory Hierarchy, ROM, RAM, DRAM, Storage Devices, Secondary memory and RAID and its Levels; Concepts of high speed memories, CPU, NIC cards.

	c. **Computer Peripherals**: Keyboard, Mouse, Video Cards, Monitors, Liquid Crystal Displays (LCD), Digital Camera, Sound Cards, Printers, Modems, Scanners, Power Supply and etc.

2. Computer Software:

i) **Operating Systems**: Computer fundamentals, DOS Commands, windows accessories & utilities.

ii) **Windows**: Windows Generations – Installation and maintenance, File management, Creating user accounts and passwords, Administrative tools, Control panels, Services, Settings, Multimedia, printers.

iii) Data Base Management, basic concepts, RDBMS, Data types, tables, views, transactions, concurrency, reports

3. Application Software: (MS-Office)

i) **MS- Word** : Basics, file operations, formatting & editing text, tables, inserting objects and page design, macros and mail merge, creating documents and printing.

ii) **MS-Excel**: Cell formatting, graphic objects and charts, database, pivot tables, data validation. Maths functions and calculations, templates, file protection and printing

iii) **MS Power Point:** Essential elements of presentation, creating and adding slides, format, design, layout, slide show presentations and printing.

iv) **MS Access**: Database, Tables, Data sheets, Queries, Forms, Date Entry and Editing. Reports.

4. Networking & Security Management:

The Topologies – Types of Networks: Local Area Networks (LAN), Metropolitan Networks (MAN), Wide Area Networks (WAN) – Firewall Policy, Packet filters, Application Gateway, Advanced authentication mechanism. Anti virus concepts, Encryption, VPN, Internet, Intranet.