Date: 21.04.2022

Advt No. C-DACS /GrB/01/2021 dated 13.11.2021
SYLLABUS FOR WRITTEN TEST
Post: Technical Assistant (Level 6)

Section A: English and Aptitude: 20 marks

Section B: Domain Area: 80 marks for each domain

Total : 100 marks

Domain Embedded System

Network Theory: Ohm's law, Kirchoff's laws, nodal & mesh analysis, voltage & current sources, network theorems- superposition, Thevenin's, Norton's and maximum power transfer theorems. Waveforms of alternating voltages and currents, instantaneous, average and RMS values, form factor & peak factor, forms of representation of alternating quantities.

Semiconductor Devices and Circuits: The open circuited pn junction, space charge region, the biased p-n junction, I-V characteristics, Diode resistance, Capacitance, Avalanche breakdown, Zener breakdown. Half wave and Full wave single phase rectifiers, filtering and their analysis, peak inverse voltage, Zener diode as voltage regulator, Types of Memories, PNP and NPN junction transistors, various configurations of BJT and their input & output characteristics, different modes of operation, BJT as a switch and amplifier, Oscillator, Multivibrator.

Digital Circuits: Data and number system: Binary, Octal and Hexadecimal representations and their conversion, BCD, Gray codes, code conversion, Representation of Signed binary numbers with 1's and 2's complement methods, Binary arithmetic. Boolean algebra: DE Morgan's Theorem, Various logic gates and their truth tables and circuits, Representation in SOP and POS forms, Canonical forms, Minimization of logic expressions by algebraic method. Combinational logic circuit design using truth-table, Different Adders and Subtractors, Comparator, Encoder, Decoder, Multiplexer, Demultiplexer, SR, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, shift registers. DTL, TTL, ECL, MOS and CMOS families and their comparison based on Parameters: fan-in, fan-out, propagation delay, speed-power product, etc.

Microprocessor and Microcontroller: Architecture of Microprocessors, Memory, Programming of 8085, Interfacing devices like 8255, 8254, 8257, 8279 and their applications.
Intel 8051 Architecture, Memory Organization, Different addressing modes supported by 8051, 8051 Instruction Set and Programming, Different addressing modes supported by 8051, 8051 Instruction Set and Programming, 8051 timers, 8051 interrupts, 8051 serial ports, 8051 interface examples.

Electronic Measurements: Measuring Systems, Basic principles of measurement, range extension methods, CRO, LCD, LED panel, Transducers.

FPGA: Organization of FPGAs, FPGA Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, Programmable I/O blocks in FPGAs.

Python: Introduction to Python, python variables and data types, Operator, Exception, Testing and Debugging, Classes and OOP Concepts, Algorithm and Data Structure.

Internet of things: Introduction to IoT: Importance of IoT, applications and technologies, connecting terminologies and network configurations, Sensors and transducers, Actuators, Basics of Networking, Communication Protocols, Sensor Networks, Machine-to-Machine Communications, UAV networks

Domain: Software Technology

- Programming with C
- Object Oriented Programming with C++
- Basics of internet
- Client Server Communication
- Web Programming Basics
- HTML
- XML
- CSS
- JavaScript
- Java
- JSP
- Python
- Basics of DBMS and SQL
- MySQL

Domain: Web and Software Application Security

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Operating System:

Processes, Threads, inter-Process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O systems, Protection and security.

Database Management:

DBMS, RDBMS, ER-model, Relational Model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Structure Query languages(SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency Control No SQL Databases,

Web Technologies & cybersecurity:

webserver, proxy server, web application development, web service, HTML5, CSS3, XML, basic concept of client-server computing, frontend technologies, Secure programming techniques, OWASP top10 vulnerabilities, concepts on IoT, Block-chain, Cryptography, Image Water marking, Techniques in modern image cryptography.

Domain Computer Networks & System Administration and Network Security

1. OSI and TCP/IP , LAN technologies, Flow and error control techniques, Routing algorithms, Congestion control

2. Basics of Transport layer, Data Link layer, Network layer

3 . IP(v4), IP(v6), Application layer protocols, (ICMP, DNS, SMTP, POP, FTP, HTTP, HTTPS), Basic concepts of hubs, switches, gateways and routers**.**

4. Wireless technologies, Network security -basic concepts of public key and private key cryptography, digital signature, firewalls**.**