

**DETAILED SYLLABUS FOR THE POST OF INSTRUCTOR
GRADE I (ENGINEERING COLLEGES) IN INFORMATION
TECHNOLOGY (Cat No.193/2020 AND INSTRUCTOR GRADE I
(ENGINEERING COLLEGES IN COMPUTER ENGINEERING
(Cat No.194/2020)**

Module I:

20 Marks

Data Communication: Components, LAN / MAN / WAN, Topologies, Analog, Digital Communication, ISO-OSI Architecture, TCP/IP, Transmission impairments, Media – Guided and unguided, Encoding techniques, Modulation, Error detection and correction, ARQ techniques, Multiplexing, FDM-TDM-WDM, Wireless communication, Switching techniques, Polling.

Computer Networks: Data Link Layer – MAC Sublayer, CSMA, CSMA/CD, Ethernet, IEEE Standards, LLC, ATM, Network layer – Routing algorithms, Congestion control algorithms, IPV4 and IPV6, Subnetting, Transport Layer – Services, Service primitives, Addressing, Application Layer – DNS, E-mail architecture, SMTP, POP3, MIME, Network Management Devices – Repeater, Hub, Switch, Router, Gateway, Wireless access point, UDP, HTTP, FTP, TELNET, VOIP

Information Security: Computer Security, CIA triad, OSI Security Architecture, X.800, Cryptography, Symmetric and asymmetric encryption, MAC, Hash function, Digital signature, User authentication – Token based, Biometric, Remote user authentication, Intrusion Detection Systems, Honey pots, Denial of Service, Firewall

Mobile Computing: Cellular systems, SDMA, FDMA, TDMA, CDMA, GSM, GEO, MEO, LEO, WLAN protocols, Bluetooth, WAP, VPN

Module II :

20 Marks

Digital Computer Principles: Number systems – Binary, Decimal, Octal and Hexadecimal Conversion, Arithmetic operations, Boolean algebra, Logic gates, SOP, POS, Minterm and maxterms, Boolean expression, simplification, Postulates and theorems, Simplifications, K-Map, Combinational logic circuits – Adder, Subtractor, Multiplexer, Demultiplexer, Encoder, Decoder, Sequential Circuits – SR, JK, T, D flip flops, Shift registers, Asynchronous, synchronous and Modulo n Counters.

Microprocessors: Architecture of 8086, Registers, Addressing modes, Isolated and memory mapped I/O, Instruction set of 8086, Programming, Interrupt mechanism, 8255 PPI, 8257 DMA, 8279 Keyboard/Display interface, CISC, RISC processors, Hyper threading.

Module III :

20 Marks

Computer Architecture: Multiprocessors and microcomputers, Assembly language, Assembler directives, Semiconductor memory – Internal organization, SRAM, DRAM, SDRAM, Rambus memory, ROM technology, Cache memory, virtual memory, working of magnetic disks and tapes, optical disks, Instruction

sequencing, Instruction execution, Hardwired control and microprogrammed control, micro instructions, Pipelining.

Operating Systems: Batch, microprogramming, time sharing, multi processor and real time systems, Process management, Process Control Block, Threading, multi-threading, CPU Scheduling, Schedulers, Context switching, Pre-emptive and non-preemptive scheduling, Scheduling algorithms – FCFS, SJF, Priority, RR, Multi-level and multilevel feed back queue, Race condition, Critical section problem, Deadlock – detection and prevention, Memory Management – Address bindings, logical and physical addresses, contiguous memory allocation – first fit, best fit, worst fit allocation, internal and external fragmentation, Paging and segmentation, Demand paging, Page replacement algorithms – FIFO, Optimal, LRU, Thrashing, File systems, Sequential and indexed file organization, Directory structures, Contiguous, linked and indexed allocations, Disk scheduling algorithms.

Module IV :

20 Marks

Object Oriented Programming through Java: OOPs concepts, POP and OOP, Benefits of OOP, objects, classes and methods, constructors, operator and function overloading, Inheritance and Polymorphism, Multi-threading and exception handling, Programming in Java – JAVA API, System package, Naming conventions, Creating and accessing packages, Threads in Java, Thread exception, Files in Java, String classes, Applet programming.

Data Structures: Stack – Array representation, Push and Pop operations, Infix, prefix and postfix conversion, Queue – insertion and deletion, circular queue, Priority queue, De-queue, Dynamic memory allocation, Linked lists, Insertion, deletion, traversal of Linked lists, Doubly linked lists and circular lists, Binary tree representation, Binary search tree, insertion, deletion, and traversal on BST expression tree and threaded binary tree, Graph – directed graph, Adjacency Matrix and Adjacency List representation, graph traversal algorithms – BFS and DFS.

Software Engineering: Software life cycle models, Project planning – LOC, COCOMO, PERT / CPM, Gantt Chart, SRS, Data flow diagrams, Testing – Black box and white box, Software reliability, Reliability metrics, ISO 9000, SEICMM, CASE.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper

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Module V :

20 Marks

Database Management Systems: Advantages over conventional file systems, Database users, Schema architecture, Data independence – physical and logical, Database models – Hierarchical, Network and Relational, DBMS architecture, DDL, DML and DCL, Centralized, 2 tier and 3 tier architecture, ER model, Relationship, ER diagram, UML – class diagram, Relational model concepts, Keys, Relational algebra, Selection, Projection, Union, Intersection, Cartesian product, join, Division, Domain and integrity constraints, Functional Dependency, Normalization – 1NF, 2NF, 3NF, BCNF, Transaction management, concurrent process, SQL – data types, Create, Drop, Select, Update, Insert, Delete commands, Integrity constraints, Grouping, Commit, Rollback, Views, Trigger, Cursors, Embedded and Dynamic SQL, ODBC and JDBC.

Web Technology: Server Softwares, HTML tags, Form controls, Embedding multimedia, Cascading Style sheets, inline, embedded and external style sheets, Building CSS menu, Creating user style sheets, Server side and client side scripting, Programming in Java Script, Event handling, Data validation, Server side scripting – configuration of Apache, MySQL and PHP, PHP – language elements, Functions, Classes and objects, Database connectivity, Session handling, Cookies, File uploading, Sending emails in PHP, Developing story board, Web optimization, Web hosting – Domain name registration, Server space hiring, FTP utilities, Web promotion techniques.
