3) COMPUTER SCIENCE & ENGINEERING
Syllabus & Model Question Paper
Syllabus

Engineering Mathematics: Mathematical Logic: Propositional Logic, First Order Logic.

Probability: Conditional Probability, Mean, Median, Mode and Standard Deviation, Random Variables; Distributions; uniform, normal, exponential, Poisson, Binomial.

Set Theory & Algebra: Sets; Relations, Functions; Groups; Partial Orders; Lattice; Boolean algebra.

Combinatorics: Permutations; Combinations; Counting; Summation; generating functions; recurrence relations; asymptotic.

Data Structures and Algorithms : Notion of abstract data types, Stack, Queue, List, Set, String, Tree, Binary search tree, Heap, Graph;

Tree and graph traversals, connected components, Spanning trees, shortest paths; Hashing, Sorting, Searching; Design techniques (Greedy, Dynamic Programming, Divide-and-conquer);

Asymptotic analysis (best, worst, average case) of time and space, Upper and Lower bounds on the complexity of specific problems, NP-completeness.

Logic Design and Computer Organization : Logic functions, Minimization, Design and synthesis of Combinational and Sequential circuits; Number representation and Computer Arithmetic (fixed and floating point); Machine instructions and addressing modes, ALU and Data-path, hardwired and micro-programmed control, memory interface, I/O interface (Interrupt and DMA mode), Serial communication interface, Instruction pipelining, Cache main and secondary storage.

Formal Languages and Automata Theory : Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Un-decidability;

System software : Lexical analysis, Parsing, Syntax directed translation, Runtime environment, Code generation, linking (static and dynamic);

Operating Systems : Classical concepts (concurrency, synchronization, deadlock), Processes, threads and Inter-process communication, CPU scheduling, Memory management, File systems, I/O systems, Protection and security.

Databases : Relational model (ER-model, relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B+ trees), Transactions and concurrency control;

Computer networks : ISO / OSI stack, Data encoding and transmission, data link control, sliding window protocols, LAN architecture, LAN systems, Ethernet, Token ring, routing protocols, Packet switching, Network devices - switches, gateways, TCP / UDP, application layer protocols and systems (http, smtp, dns, ftp), network security.

Web technologies : Three tier web based architectures; JSP, ASP, J2EE, .NEET systems; html, XML

Model Question Paper

PART - I

Each question carries One Mark   **50 x 1 = 50 Marks**

1) Six boys and six girls sit in a row randomly. The probability that the boys and girls sit alternatively is:

a) $\dfrac{1}{462}$ b) $\dfrac{7}{462}$ c) $\dfrac{2}{462}$ d) None of these

2) Which one is not Divide and Conquer algorithm?

a) Merge sort   b) Quick sort
c) Heap sort   d) None of the above

3) Which of the following Boolean algebra expression is incorrect?
a) A+0 = A   b) A. 1=1
c) A + A' = 1   d) A.A'=1

4) A hub-in network is
a) a multiport signal repeater or concentrator

b) a multiplug like device to allow many computers to be connected
c) the server which serves every mode
d) the central power supply

5) What is an ASP?

a) This is a language   b) This is a scripting language

c) This is a package   d) This is a testing tool

PART – II

Each question carries 2 marks   **25 x 2 = 50 Marks**

1) A four variable Boolean function is given by
$F(w,x,y,z)=\sum(1,2,3,4,5,6,7,8,9,10,11,12,13,)+\sum d(0,14,15)$ the simplified form of this function is

a) W   b) 0   c) 1   d) wxy +wxy

2) If in a point-to -point network, 5 systems require 10 connections then how many connections are required for connecting 10 devices so that each device can communicate with another

a) 100   b) 20   c) 45   d) 30

3) In sampling a large number of parts manufactured by a machine, the mean number of defectives in a sample of 20 is 2. Out of 1000 such samples, how many would be expected to contain at least 3 defective parts?

a) 0.332   b) 332   c) 0.323   d) 323

4) The value of 6 to base 8 when expressed as a Gray code is

a) 0011   b) 0101   c) 1010   d) 1100

5) The Group $(z,*)$ where $a*b = a+b+7$, find $(-7)^{-1}$

a) 7   b) 1/7   c) -7   d) -1/7