

Second Allied Paper II – DIGITAL CIRCUITS AND DESIGN

Unit I

Number Systems : Decimal System – Counting in the Binary System – Binary Addition and Subtraction – Binary Multiplication and Division – Converting Decimal Numbers to Binary – Use of Complements to Represent Negative Numbers – Binary Number complements – Binary – Coded – Decimal Number Representation – Octal and Hexadecimal Number Systems.

Unit II

Boolean Algebra and Gate Networks : Fundamental Concepts of Boolean Algebra – AND Gates and OR Gates – Complementation and Inverters – Evaluation of Logical Expressions – Basic Laws of Boolean Algebra – De Morgan’s Theorems – Sum of Products and Product of Sums – Derivation of Product – of – Sums Expressions – Derivation of Three – Input – Variable Expression – NAND Gates and NOR Gates – The Map Method for Simplifying Expressions – Sub – cubes and covering.

Unit III

Logic Design : Flip-Flops – Clocks – Flip-Flop Designs – Gated Flip-Flop – Master – Slave Flip-Flop – Shift Register – Binary Counter – BCD Counters – Integrated Circuits – medium, Large, and very Large Scale Integration.

Unit IV

The Arithmetic and Logic Unit : Construction of ALU – Binary Half – Adder – A Parallel Binary Adder – Addition and Subtraction in a Parallel Arithmetic Element – Full-Adder Designs – Binary – Coded – Decimal Adder – Addition and Subtraction in the 9s Complement System – Multiplexers.

Unit V

The Memory Element :

Random – Access Memories – Decoders – Connecting Memory Chips to a Computer Bus – Random – Access Semiconductor Memories – Static Random – Access Memories – Dynamic Random – Access Memories – Read – Only Memories – Magnetic Disk Memories – Flexible – Disk Storage Systems – The floppy Disk – Magnetic Bubble and CCD Memories.

Text Book :

“Digital Computer Fundamentals” by Thomas C. Bartee – Sixth Edition (TMH) 1991. (Chapters : 2, 3, 4, 5 & 6 only)

Reference Books:

1. Computer Fundamentals (Architecture and Organization) by B. Ram – Third Edition (New Age International Pvt. Ltd. Publishers)
2. Digital Principles and Applications by Albert Paul Malvino and Donald P. Leach – Fourth Edition (TMH) 1991.