

CSL-542: ADVANCED COMPUTER ARCHITECTURE

CREDITS

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4	0	0

Total Marks: 100

Note for Paper Setter:

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

Note for Candidate:

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

UNIT – I

Introduction to Computers: Basic Computer Organization: System Buses, Instruction Cycles

CPU Organization: Design specifications for a Simple CPU, Fetching Instructions from Memory, Decoding Instructions, Executing Instructions, Design of a Simple ALU, Designing the Control Unit Using Hardwired Control and Microprogrammed control approach.

Memory Subsystem Organization and Interfacing, Types of Memories

I/O Subsystem Organization and Interfacing

UNIT – II

Parallelism in Uniprocessor Systems: Trends in parallel processing, Basic Uniprocessor Architecture, Parallel Processing Mechanism.

Parallel Computer Structures: Pipeline Computers, Array Computers, Multiprocessor Systems

Architectural Classification Schemes: Multiplicity of Instruction-Data Streams, Serial versus Parallel Processing, Parallelism versus Pipelining

Pipelining : An overlapped Parallelism, Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Tables

Principles of Designing Pipelined Processors: Instruction Prefetch and Branch Handling, Data Buffering and Busing Structures, Internal Forwarding and Register Tagging, Hazard Detection and Resolution

UNIT – III

Superscalar and Superpipeline Design: Superscalar Pipeline Design, Superpipelined Design

Structures and Algorithms for Array Processors: SIMD Array Processors, SIMD Computer Organizations, Masking and Data Routing Mechanisms, Inter-PE Communications

SIMD Interconnection Networks: Static versus Dynamic Networks, Mesh-Connected Illiac Network, Cube Interconnection Networks

UNIT – IV

System Interconnect Architectures: Network Properties and Routing, Static Connection Networks, Dynamic Connection Networks

Multiprocessor Architecture: Functional Structures: Loosely Coupled Multiprocessors, Tightly Coupled Multiprocessors

Interconnection Networks: Time Shared for Common Buses, Crossbar Switch and Multiport Memories.

References:

1. Computer Architecture and Parallel Processing, Faye A. Briggs, McGraw-Hill International Editions
2. Computer Systems Organization & Architecture, John d. Carpinelli, Addison Wesley