2124

B.E. (Electronics and Communication Engineering)
Seventh Semester
Elective – IV
EC-704: Computer Architecture and Organization

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit. Draw the block diagrams and wave forms wherever required.*

x-x-x

1. Answer the following:-

   a) Differentiate Between Computer Organization and Computer Architecture.

   b) What are the key characteristics of RISC and CISC architectures?

   c) Identify and explain the various states involved in instruction execution.

   d) What is a subroutine? Provide an example.

   e) In a direct-mapped cache, how is a main memory address structured? List and define its three components.

   f) What does parallel processing entail?

   g) How do software cache coherence schemes differ from hardware cache coherence schemes?

   h) What is an application of memory management hardware?

   i) What are the benefits of pipelining and superscalar operations?

   j) What advantages does Direct Memory Access (DMA) offer? (10x1)

UNIT - I

II. a) What are the key advancements in contemporary processors that contribute to increased processing speed, particularly in relation to multicore architectures and pipelining techniques?

   b) What is the significance of the instruction set architecture (ISA) in evaluating the performance of a computer system, and how do factors such as instruction count and clock cycles per instruction contribute to overall system efficiency? (5+5)

P.T.O.

III. a) What are the various methods used for transferring data between a computer's memory and external devices, and how do these methods impact the efficiency and performance of the overall I/O system?

b) Write the subroutines for parameter passing through registers.   (5+5)

IV. Give an overview of the basic functional units and bus structures of a computer. Discuss the generations of computers based on the development technologies used to fabricate the processors, memories and I/O units.   (4+6)

UNIT - II

V. a) What is the difference between a microprocessor and micro program? Is it possible to design a microprocessor?

b) Explain, how address sequencing is done in a micro programmed control unit?

(5+5)

VI. Derive speedup achieved by a pipeline unit over a non-pipeline unit. What are the pipeline conflicts that cause the instruction pipeline to deviate from?   (4+6)

VII. What are the critical design factors and architectural choices that influence the performance and efficiency of an arithmetic processor, particularly in relation to the implementation of the Arithmetic Processor Design and the handling of various data types and operations?   (10)

x-x-x