विश्वजीवनामृतं ज्ञानम्

ABV- Indian Institute of Information Technology & Management, Gwalior

Computer Organisation and Architecture (IT202)

Major Examination (Session 2024–25)

Maximum Time: 3 Hours **Max Marks: 100**

Note: Answer all questions. Each question carries equal marks unless specified.

1. (a) Draw the block diagram of a computer system and explain the roles of each unit. (b) Discuss the concept of Application Binary Interface (ABI) with suitable examples. (10 Marks)

2. (a) Compare RISC and CISC architectures in detail. (b) Explain the various addressing modes with examples. (10 Marks)

3. (a) Represent $(-45)_{10}$ in 8-bit signed magnitude, 1's complement, and 2's complement. (b) Perform $(1010110)_2 + (1101011)_2$ using 2's complement arithmetic. (c) Explain Booth's Algorithm for multiplication with an example. (15 Marks)

4. (a) Differentiate between hardwired and microprogrammed control units. (b) Design the micro-operations for the execution of an "ADD" instruction. (10 Marks)

5. A cache memory of size 8 KB uses block size of 32 bytes. The main memory size is 256 KB. (a) How many blocks are in the main memory? (b) How many lines are in the cache? (c) Show the address format for direct mapping. (d) Compute the number of tag, line, and word bits. (15 Marks)

6. (a) Explain the concept of instruction pipelining. (b) Discuss hazards in pipelining and techniques to reduce them. (10 Marks)

7. (a) Explain different types of memory: RAM, ROM, Cache, Virtual Memory. (b) Describe associative memory and its applications. (10 Marks)

8. (a) Write short notes on: i. I/O mapped I/O vs. Memory mapped I/O ii. DMA (Direct Memory Access) (b) Explain the characteristics of peripheral devices with examples. (10 Marks)

9. Write short notes on any **two**: (a) Flynn's Classification (b) Instruction Format Design (c) Parallel Processing Techniques (10 Marks)