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Question Paper Code : 70438

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fourth/Fifth/Seventh Semester

Computer Science and Engineering

CS 8491 – COMPUTER ARCHITECTURE

(Common to : Computer and Communication Engineering / Electrical and Electronics Engineering / Robotics and Automation / Information Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw the basic functional units of a computer.
2. State Amdahl's law.
3. Do the following using 2's complement method. $(11011)_2 - (10011)_2$.
4. Write the multiplication rule for floating point numbers.
5. What are hazards? Write its types.
6. Write the formula for calculating time between instructions in a pipelined processor.
7. Differentiate in-order execution from out-of-order execution.
8. What is meant by speculation?
9. Define – TLB.
10. What is virtual memory?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the various components of computer System with neat diagram.

Or

(b) (i) Explain the differences between CISC and RISC. (7)

(ii) Write in detail about various addressing modes. (6)

12. (a) Using a 4-bit version of the algorithm to save pages, divide 7_{ten} by 2_{ten} , or $0000\ 0111_{two}$ by 0010_{two} .

Or

(b) Show the IEEE 754 binary representation of the number -0.75_{ten} in single and double precision.

13. (a) Find out the hazards in the following instructions and eliminate them by using stalls :
LW R1, 0(R2)
SUB R4, R1, R5
AND R6, R1, R7
OR R8, R1, R9

Or

(b) Describe in detail about the pipelined implementation of data path and control with diagrams.

14. (a) Explain about the Flynn's classification with neat diagrams.

Or

(b) Explain the simultaneous multithreading with example.

15. (a) Explain the various memory mapping schemes used in cache memory design.

Or

(b) Explain briefly about Direct Memory Access (DMA).

PART C — (1 × 15 = 15 marks)

16. (a) Compute the following problems using BOOTH'S ALGORITHM

$$(+13) \times (-6)$$

$$(-13) \times (-6)$$

$$(+13) \times (+6)$$

$$(-13) \times (+6)$$

Or

(b) Calculate $8/3$ using Restoring Division method.