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**Question Paper Code : 20415**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Four/Five/Seven 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. What are the functions of control unit?
2. List the various instruction formats with an example.
3. What is Carry Save addition?
4. Draw the full adder circuit and give the truth table.
5. What is locality of reference?
6. Write the single precision binary representation of -0.45.
7. Define Multicore processors.
8. What are the Advantages of register renaming?
9. Distinguish between memory mapped I/O and I/O mapped I/O.
10. What is the need to implement memory as a hierarchy?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Discuss in detail about Basic Operational concepts of a computer. (9)
- (ii) If computer A runs a program in 10 seconds and computer B runs the same program in 15 seconds how much faster is A than B? (4)

Or

- (b) Explain the different addressing modes with suitable examples.
12. (a) Discuss in detail about how the division (11/3) is performed. Elaborate on the algorithm used in detail with a sketch.

Or

- (b) Briefly explain the function of Carry look-ahead adder with a neat diagram.
13. (a) State and explain the different types of hazards that may occur in a pipeline.

Or

- (b) Describe in detail about the pipelined implementation of data path with diagrams.
14. (a) Explain shared memory multiprocessor architecture with a neat diagram.

Or

- (b) Explain in detail about Flynn's classification with neat diagrams.
15. (a) Elaborate on the virtual memory address translation and TLB with necessary diagram.

Or

- (b) Explain in detail about interrupts with diagram.

PART C — (1 × 15 = 15 marks)

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

Or

- (b) Solve the following problems using BOOTH'S ALGORITHM

$$\begin{array}{ll} (+13) \times (-11) & (+13) \times (+11) \\ (-13) \times (-11) & (-13) \times (+11) \end{array}$$