END SEMESTER EXAMINATION - OCTOBER 2024
SEMESTER 3 : INTEGRATED M.Sc. PROGRAMME COMPUTER SCIENCE - DATA SCIENCE
COURSE : **21UP3CRMCP10 : COMPUTER ORGANIZATION AND ARCHITECTURE**
(For Regular 2023 Admission and Improvement/Supplementary 2022/2021 Admissions)

Time : Three Hours   Max. Weightage: 30

PART A
Answer any 8

1. Write the instruction format of a vector processor.
2. Discuss a situation that causes the cache coherence problem.
3. Write the formula to calculate the effective address of an operand.
4. Storage devices that provide backup storage are called _____ memory.
5. Justify the statement :"AND instruction is also called a mask".
6. List any two applications of a Stack.
7. State the reason for including a cache memory in computer architecture.
8. Discuss the reason for having two or three levels in the memory hierarchy.
9. Write the reduced boolean expression for A (A + B).
10. Write an example of an assembly-level instruction.

(1 x 8 = 8 Weight)

PART B
Answer any 6

11. Discuss briefly on the match logic expressions in auxiliary memory.
12. In a 3-cube hypercube, suggest the path that is used for a packet to travel from the node 100 to the node 011.
13. Convert the following numerical arithmetic expression into reverse polish notation and show the stack operations for evaluating the numerical result:
    $(3 + 4)[10(2 + 6) + 8]$
14. Explain the process of pipelining in short terms.
15. A computer must have instructions capable of performing four types of operations. List the operations.
16. When implementing parallelism in computations, state the ways in which high performance can be acheived.
17. With a typical diagram of RAM chip, explain its components.
18. Find the 2's complement of the following numbers: 01100101 and 11101010.

(2 x 6 = 12 Weight)

PART C
Answer any 2

19. Represent the function F = A'BC + AB'C + ABC + ABC using universal gates alone.
20. Write short notes on any two auxiliary memories.
21. A stack can exist as a standalone unit in RAM. Discuss its operations and explain how it can be implemented.
22. Simplify the function $f(A,B,C,D) = \Sigma(0, 1, 2, 3, 5, 7, 11, 15)$ using k-map.

(5 x 2 = 10 Weight)