LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **COMPUTER SCIENCE**

FIRST SEMESTER – **APRIL 2022**

16/17/18UCS1MC02 – COMPUTER ORGANIZATION AND ARCHITECTURE

Date: 24-06-2022 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART A

Answer All the questions: **(10 x 2= 20)**

1. What are the two functional entities of a Computer System? Notify their responsibilities.
2. State the major difference between RS and JK flip flop.
3. Stress the need for Decoders.
4. what are parallel registers.
5. Give an example for indirect addressing.
6. List down the types of ROM memory.
7. Mention the significance of Interrupt Cycle.
8. Give 4 examples for Memory reference instructions.
9. What is Index addressing mode?
10. How the overflow of previous operation is handled in CPU?

PART B

Answer ALL questions: **(5 x 8=40)**

11 a) Simplify the following functions using k -variable map method:

i)$F(A, B, C) = \sum (0,2,3,4,6)$

ii) $F(A, B, C, D) = \sum (0,2,4,5,6,7,8,10,13,15)$

OR

b) Explain the design of SR and D flip-flops.

12 a) Illustrate the design of bidirectional shift register with parallel load.

OR

b) Analyze and prove that JK flip flop can be converted into D-flip flop with an inverter between J and K inputs via a truth table.

13. a) Differentiate between instruction fetch cycle and interrupt cycle.

OR

b) Compare and contrast the advantages of direct and indirect addressing.

14 a) Illustrate the Instruction cycle steps with neat diagram.

OR

b) Explain Interrupt cycle with relevant diagram,

15 a) Explain various addressing modes with suitable examples.

OR

b) Describe Logical and Bit manipulation instructions.

PART C

Answer any Two question: **(2 x 20= 40)**

16 With neat logic diagram and tables, explain the design, rules and the steps to solve the following using k map:

$F(A,B,C,D) = \Sigma(0,1,2,5,8,9,10)$

17 Illustrate the design of a 4-to-16-line decoder and explain its truth table.

18 With suitable examples, Explain the data transfer and manipulation operations.

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