

Roll No. : .....

Total No. of Questions : 9 ] [ Total No. of Pages : 4

**67007-N**

**M.C.A. (Regular) 1st Semester (2 Year Programme)**  
**Examination, April-2021**  
(w.e.f. 2020-2021)

**DIGITAL DESIGN AND COMPUTER**  
**ARCHITECTURE**  
Paper-20MCA21C4

*Time : Three Hours ] [ Maximum Marks : 80*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :-** Question No. 1 is compulsory with eight parts, of 2 marks each. In addition to Q. No. 1, attempt *four* more questions by selecting at least *one* question from each Unit. All questions carry equal marks.

1. (i) What do you mean by radix of the number system ? Mention different components of a number in any number system.

- (ii) What is the importance of Alphanumeric Codes in Digital Processing ?
- (iii) Write down the procedure (various steps) to design a combinational circuit.
- (iv) What important role does Excitation table plays in designing the digital circuit ?
- (v) Differentiate between instruction code and operation code. <https://www.mdustudy.com>
- (vi) List down various applications of superscalar architecture (any *four*).
- (vii) Why usage of interface becomes mandatory while working with peripherals ?
- (viii) Discuss how IOP can be used to improve the efficiency of a computer.

**Unit-I**

2. (i) Perform the following subtractions using 2's complement method :
- (a) 0011.1001-0001.1110
- (b) 01100-00011
- (ii) Explain in detail the register configuration required for the Floating Point arithmetic Operations.
3. (i) What do you mean by realization of a digital circuit ? Realize the following logical expression by using only NAND gates :

$$AB' + A'B$$

- (ii) Define SOP and POS simplification methods and simplify the following Boolean Function in both SOP and POS format :

$$f(a, b, c, d) = \Sigma(0, 1, 2, 5, 8, 9, 10)$$

#### Unit-II

4. (i) Elaborate the working of Parity Generator/Comparator with the help of labelled diagram.
- (ii) How edge triggered flip-flops work differently from level triggered flip-flops ?
5. (i) Explain the working and importance of shift registers. Also discuss any *two* applications of shift registers.
- (ii) What are the specific features of a Binary Counter ? Explain how a binary counter works with a parallel load with an apt diagram.

#### Unit-III

6. (i) Demonstrate the concept of direct and indirect address with the help of appropriate example and diagram.
- (ii) Explain the following in the context of RTL : Selective Clear, Selective Complement, Mask and Selective Set.

7. (i) Define microprogram and micro-instruction. Discuss how computer instruction code is mapped into microinstruction code.
- (ii) By using different performance evaluators, compare the performance of Scalar and Pipeline architecture.

#### Unit-IV

8. (i) Demonstrate how by using Strobe and Handshaking can be helpful in transferring data asynchronously (with the help diagram). <https://www.mdustudy.com>
- (ii) How interrupt initiated I/O is more efficient than programmed I/O ?
9. (i) How pipeline architecture supports parallel processing ? Explain the working and implementation of arithmetic pipeline to support your answer.
- (ii) Detail out how serial communication is carried out while using character oriented protocol for transferring data in computer.