

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.

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(1)

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- (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 :

$$AB' + A'B$$

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- (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.

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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.

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