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(21121) Roll No.

B.C.A.-IInd Sem.

18007 (CV-II)

B.C.A. Spl. and Back Paper Examination, Nov.-2021

DIGITAL ELECTRONICS AND COMPUTER ORGANISATION

(BCA-204)

Time : 1½ Hours] *[Maximum Marks : 75*

Note : Attempt **all** the sections as per instructions.

Section-A

(Very Short Answer Type Questions)

Note : Attempt any **two** questions. Each question carries **7.5** marks. Very short answer is required, not exceeding 75 words. 2×7.5=15

1. Prove that NOR and NAND gates are Universal gates.

2. Explain the working of half-adder with suitable block diagram.

3. Draw the logic diagram of a Master slave D flip-flop. Using NAND gates.

4. What do you know about K-map?

5. Make the truth tables of :

   (i) half adder

   (ii) half subtractor

Section-B

(Short Answer Type Questions)

Note : Attempt any **one** question out of the following **three** questions. Each question carries **15** marks. Short answer is required not exceeding 200 words. 1×15=15

6. Prove that $(A+\bar{B}+AB)\ (A+\bar{B})\ (\bar{A}B)=0$

7. Simplify the expression using Karnaugh map method.

$\bar{A}B\bar{C}-+AB\bar{C}+\bar{A}BC+ABC+A\bar{B}\bar{C}+\bar{A}\bar{B}\bar{C}$

8. Design a 3-bit binary down counter using S-R flip-flops.

Section-C

(Long Answer Type Questions)

Note : Attempt any **two** questions out of the following **five** questions. Each question carries **22.5** marks. Answer is required in detail. 2×22.5=45

9. Write short notes on following:

   (i) Virtual memory organization.

   (ii) Random access memories.

10. What do you mean by cache memory? How is the performance of a memory system improved by using cache?

11. Design the binary counters having the following repeated binary sequence. Use JK flip-flops.

   (i) 0, 1, 2

   (ii) 0, 1, 2, 3, 4

12. (i) Implement a full adder with the help of two half adders and an OR gate.

   (ii) Design a Combinational circuit whose input is a four-bit number and whose output is the 2's Complement of the input number.

13. State De-Morgan's theorems of Boolean Algebra and prove them. What is the physical significance of these theorems?