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(21121)
B.C.A.-IIInd Sem.

(Printed Pages 4)

Roll No.

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. $2 \times 7.5 = 15$

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. $1 \times 15 = 15$

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

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7. Simplify the expression using Karnaugh map method.

$$\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + \bar{A}BC + A\bar{B}\bar{C} + A\bar{B}C + A\bar{B}C + A\bar{B}\bar{C}$$

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. $2 \times 22.5 = 45$

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?