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Roll No. _____

25/1658

B.C.A. (Second Semester)

Examination, 2025

Paper : Second

Digital Electronics & Computer Organization

Time : Two Hours] | *Maximum Marks : 75*

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

Section-A

(Very Short Answer Type Questions)

Note : Attempt all **5 (five)** questions. Each question carries **2(two)** marks and the answer of each question should not exceed 50 words. $5 \times 2 = 10$

1.   (i)   What is cache memory? Explain

     (ii)   What is Associate memory.

P.T.O.

     (iii)   Binary code and BCD code.

     (iv)   What is SOP and POS?

     (v)   What is Universal Gate?

Section-B

(Short Answer Type Questions)

Note : Attempt any **5 (five)** question out of total **8 (eight)** question. Each question carries **5 (five)** marks and answer of each question should not exceed 100 words. $5 \times 5 = 25$

2.   (i)   Describe the mode of working of an edge triggered S-R flip flop.

     (ii)   What are "Don't care conditions"? Discuss how they are handled, with the help of an example.

     (iii)   Draw the Truth Table and the symbol for the following gates:

         (a)   XNOR

         (b)   NAND

         (c)   XOR

(iv) Describe the working of full adder with the help of clear circuit diagram and truth table.

(v) Explain with formula, the De Morgan's Laws. Prove them with the help of truth table.

(vi) Describe and discuss the operation of a T-type Flip flop.

(vii) Minimize the given Boolean function using K-maps and implement the simplified function using NAND gates only.
$$F(A,B,C,D)=m(0,1,2,9,11,15)+d(8,10,14).$$

(viii) How is a RAM constructed? Discuss the different technology used in constructing the RAM of a computer, with their relative advantages and disadvantages.

Section-C

(Long Answer Type Questions)

Note : Attempt any **2 (two)** out of **4 (four)** questions. Each question carries **20 (twenty)** marks and the answer of each question should not exceed 400 words.

$2 \times 20 = 40$

3. (i) What do you understand by virtual memory? Explain the basic organization and working methodology of virtual memory.

(ii) Explain briefly:

(a) Race Around condition and its solution

(b) D Flip Flop using NAND gates

(iii) Distinguish between:

(a) Combinational and sequential Circuits

(b) Synchronous and Asynchronous counter

(c) T flip flop and D flip flop

(iv) Using the postulates of Boolean Algebra, simplify the following expression.

(a) AB+A(B+C)+B(B+C)

(b) AB(C+BD)+AB

(c) ABC+(A+B+C)ABCD

(d) AB+ABC+BCD+BE