

7. Explain the working of asynchronous (ripple) counters. Discuss the operation of a 4-bit ripple counter with the help of a circuit diagram and timing waveforms.
8. Describe the working of a Serial-In Serial-Out (SISO) shift register. Include its circuit diagram, timing diagram, and truth table.
9. Write short notes on the following :
- (a) Ring Counter
 - (b) Cache Memory

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Roll No. :

BCA-3004

BCA (Semester-III) (NEP) Examination, 2025-26

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

[Paper : Fourth]

Time : 2 Hours]

[Maximum Marks : 75

Note :1. Attempt questions from **all** sections as directed.

2. The candidates are required to answer in serial order only. If there are many parts of a question, answer them in continuation.

3. "B" Copy will not be provided.

Section-A

(Short Answer Type Questions)

Note : All questions of this section are **compulsory**. Each question carries **5** marks. [9×5=45]

1. (a) What is a Truth Table? How is it useful in logic gate?
- (b) State and prove De-Morgan's Theorem using Truth Table.
- (c) Explain half subtractor with block diagram and truth table.
- (d) Differentiate between combinational and sequential circuit.
- (e) What do you understand by De-Multiplexer?
- (f) Why is RAM called volatile memory?
- (g) Convert into equivalent binary $(125)_{10} \rightarrow (?)_2$.
- (h) What do you understand by Counter? Define its types.
- (i) What do you understand by Flip/Flop?

Section-B

(Long Answer Type Questions)

Note : This section consists of four questions. Attempt **any one** question. Each question carries **15** marks.

[1×15=15]

2. (a) What do you understand by Decoder? Explain with an example.
- (b) Explain Logic gates (OR, AND, NOT, NAND, NOR, XOR) with diagrams and truth tables.
3. Simplify the SOP using K-map -

$$F(A,B,C,D) = \sum m (0,2,4,5,6,7,8,10,11,12,14,15)$$
4. Describe the construction and operation of a 4-to-1 multiplexer. Draw the logic circuit, truth table, and derive its Boolean expression.
5. Define full adder with logic circuit diagram and truth table.

Section-C

(Long Answer Type Questions)

Note : This section consists of four questions. Attempt **any one** question. Each question carries **15** marks.

[1×15=15]

6. Explain the working of JK flip/flop with logic diagram and characteristic table and also define toggle condition in flip/flop.