BCA(N)-120

1st Semester Examination, 2023 (Dec.)

Digital Electronics

Time : 2 Hours]   **[Max. Marks : 70**

Note : This paper is of Seventy (70) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION—A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of nineteen (19) marks each. Learners are required to answer any two (02) questions only.   2×19 = 38

1. How will you convert R-S flip flop into J-K flip flop? Also discuss characteristic table of J-K Flip flop.

2. A process is described by the logical expression : Z = ABC + AC + AB'C

   Find the expression for the minimal sum of products using K-map and implement the result with the logic gates diagram.

3. Develop the truth table for the half-subtractor and write the logical expressions for the difference and borrow terms. Also suggest a circuit for this kind of function.

4. What is a ring counter? What type of flip-flop is used in such counters? Write one application of this counter.

5. Explain operation of a 4 bit left shift register. Also draw its timing diagram.

SECTION—B

(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only.

$$4 \times 8 = 32$$

1. What is a binary code? Represent the decimal number 2934 in :

   (a) BCD   (b) Excess-3 code

2. Draw the logic diagram for the logic function

   Z = (A + B + C).D

3. Differentiate between flip-flop & latches.

4. Explain the working of 4 * 1 multiplexer with the help of logic diagram and function table.

5. Differentiate between Asynchronous and Synchronous counter.

6. Perform the following subtraction : 100010 – 100110

   (a) Using the 2's complement

   (b) Using the 1's complements

7. What is a memory unit? Discuss the working of RAM and ROM using block diagram.

8. Minimize the following Boolean function using k map

   $F(A, B, C, D) = \Pi(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$

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