IMPORTANT NOTE:

1. All questions are compulsory.
2. Marks distribution of each question is shown as per the rules of HSC Board Exam.
3. **Solve it on paper and send the PDF copy of the same on our WhatsApp Group**.

Ques 1: Fill in the blanks: **(1+1+1+1+1=5)**

1) When any one input terminal of AND gate = 0, its output is _____.
2) When both inputs of an OR gate = 1, its output will be _____.
3) When both inputs of an Ex-OR gate are equal to logic-1 then its output will be _____.
4) Which gate is called as universal building block?
5) The output of a NOT gate is equal to _____ when its input is = 1.

Options: (0, 1, 10) (1, 0, 11) (0, 1, none of these)

(AND gate, NOR gate, Ex-OR gate) (1, 0, 10)

Ques 2: How NAND gate is used as universal building block? Draw the necessary circuit diagrams and truth tables and write the derivation of each output equation.   **(1+1+1=3)**

Ques 3: Explain the working of 4-bit binary adder using half and full adder circuits. Draw the necessary block diagram and explain the working by taking any one input combination.   **(1+3=4)**

Ques 4: Draw correct logic diagrams for the given logic equations:

$Y = AB\bar{C} + A\bar{B}C + \overline{CD}$ and $Y = A\bar{B} + \bar{A}B$ **(2+2=4)**

Ques 5: Define and prove De Morgan's both theorems.   **(2+2 =4)**