

# EE, EC, CS & IT ENGINEERING

Digital Logic



Comparator

DPP Solution 1

Discussion



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## TOPICS TO BE COVERED

01 Questions

02 Discussion

Q.1

Let  $x = x_1x_0$  and  $y = y_1y_0$  be unsigned 2-bit numbers. The function  $F = 1$  if  $x > y$  and  $F = 0$  otherwise. The minimal sum of product expression for  $F$ , is

- A.  $\overline{y_1}y_0 + \overline{x_0}y_0 + \overline{x_1}\overline{x_0}y_1$        $x > y \Rightarrow x_1\overline{y}_1 + (x_1 + \overline{y}_1)x_0\overline{y}_0$   
 $\Rightarrow \overline{y}_1x_1 + \overline{y}_0x_1x_0 + \overline{y}_1\overline{y}_0x_0$
- B.  $x_0\overline{y}_1 + y_1\overline{y}_0 + x_1\overline{x}_0$
- C.  $y_1\overline{x}_1 + y_0\overline{x}_1\overline{x}_0 + y_1\overline{y}_0\overline{x}_0$
- D.  $\overline{x_1}\overline{y}_1 + \overline{x_0}\overline{y}_0y_1 + x_0\overline{x}_1\overline{y}_0$

**Q.2**

The two 4 - bit numbers  $A_3 A_2 A_1 A_0$  and  $B_3 B_2 B_1 B_0$  are applied to a comparator circuit shown below. A pair of correct input numbers forcing the output  $y = 0$ , will be

A.

 $A: 1100, B: 1100$ 

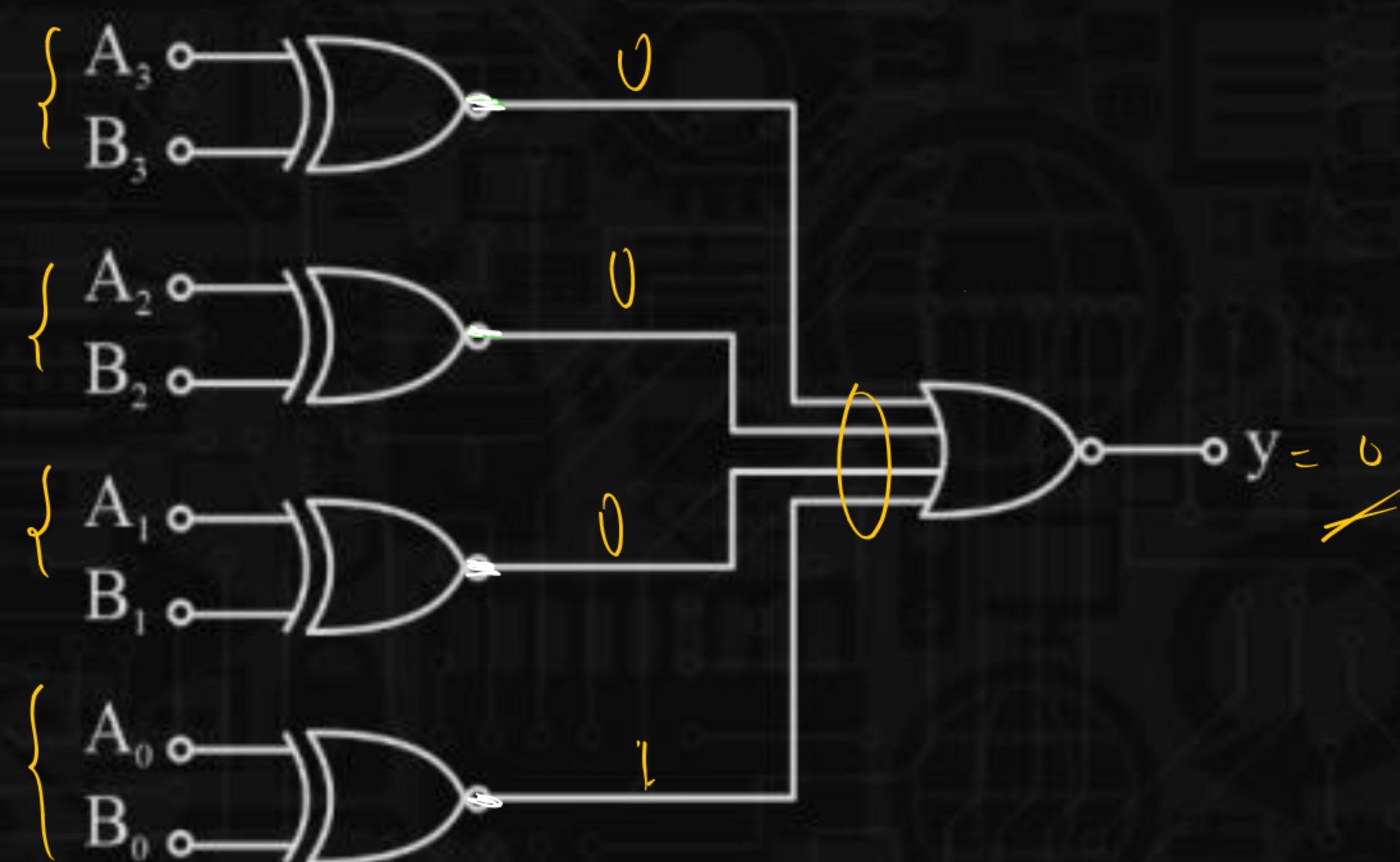
B.

 $A: 0111, B: 0111$ 

C.

 $A: 1011, B: 1011$ 

D.

 $A: 1100, B: 1101$ 

Q.3

The output  $y$  of a 2-bit comparator is logic-1 whenever the 2-bit  $A$  is greater than 2-bit  $B$ . The number of combination for which the output is logic-1 is \_\_\_\_?

A. 6

B. 2

C. 1

D. 7

(A > B)

2 bit

$$2^{2 \times 2} = 2^4 = 16$$

$$(A > B) = \frac{2^{2 \times 2} - 2^2}{2}$$

$$= \frac{16 - 4}{2} = 6$$

$$T.C = 2^{2n}$$

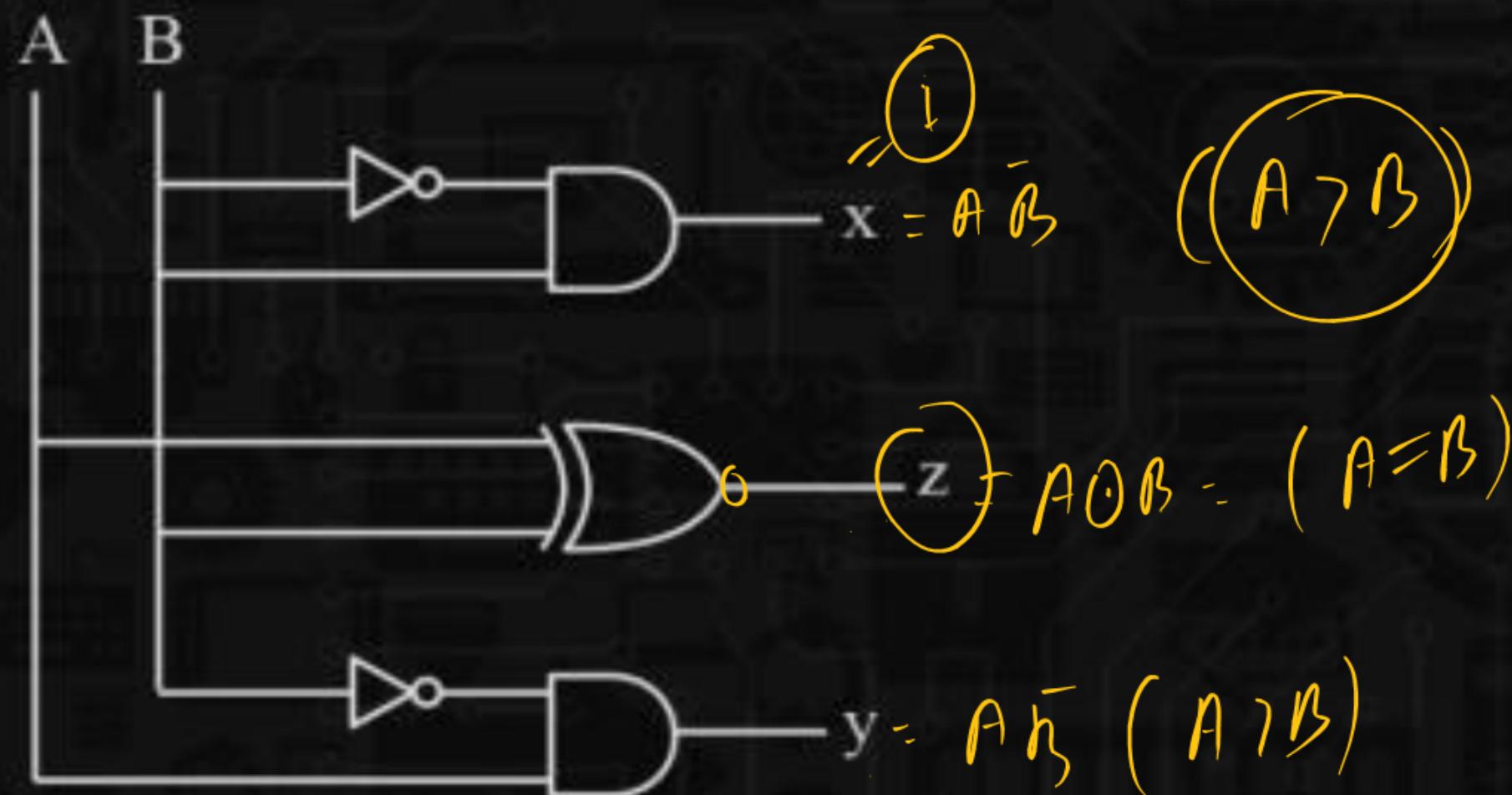
$$E = 2^n$$

$$UE = 2^{2n} - 2^n$$

$$\text{Greater-Less} = \frac{2^{2n} - 2^n}{2}$$

# Statement for question 4 & 5.

A logic Circuit is given



**Q.4**

A pair of correct input number (AB) forcing the output x = 1, will be

- A.  $\begin{matrix} A & B \\ 1 & 0 \end{matrix}$
- B.  $\begin{matrix} A & B \\ 0 & 1 \end{matrix}$
- C.  $\begin{matrix} A & B \\ 1 & 1 \end{matrix}$
- D.  $\begin{matrix} A & B \\ 0 & 0 \end{matrix}$

$A \geq B$

**Q.5**

A pair of correct input number (AB) forcing the output  $X = 1$ , will be

- A. ~~00, 11~~
- B. 01, 10
- C. 00, 10
- D. 11, 01

$A > B$	$A < B$	$A = B$
0	0	1
0	1	0
1	0	0
1	1	1

