

Practice Quiz 3

Closed Book and Notes – TI 30II XS Calculator Allowed

Table 1. DC Characteristics of a Hypothetical Logic Family.

$V_{CC} = 5\text{ V}$	$V_{OH} = 3.50\text{ V}$	$V_{OL} = 0.50\text{ V}$	$V_{IH} = 2.50\text{ V}$	$V_{IL} = 1.00\text{ V}$
$V_{TH} = (V_{OH} - V_{OL})/2$	$I_{OH} = -5.0\text{ mA}$	$I_{OL} = 10\text{ mA}$	$I_{IH} = 500\text{ }\mu\text{A}$	$I_{IL} = -1.0\text{ mA}$

- A microcontroller designed to operate over a power supply range of **2 V to 5 V** and a clock frequency range of **0 to 100 MHz** dissipates a maximum of **500 mW**. If the supply voltage used is **2 V** and the clock frequency is **100 MHz**, the power dissipation of the microcontroller will be reduced to:

(A) 80 mW (B) 100 mW (C) 180 mW (D) 200 mW (E) none of these
- A microcontroller designed to operate over a power supply range of **2 V to 5 V** and a clock frequency range of **0 to 100 MHz** dissipates a maximum of **500 mW**. If the supply voltage used is **5 V** and the clock frequency is **1 Hz**, the power dissipation of the microcontroller will be reduced to:

(A) 80 mW (B) 100 mW (C) 180 mW (D) 200 mW (E) none of these
- When interfacing an **LED** that has a **forward voltage of 1.5 V** to the logic family described in Table 1 using a **current sourcing** configuration, **maximum brightness** will be achieved (within the rated specifications) using a current limiting resistor of the value:

(A) 200 Ω (B) 300 Ω (C) 400 Ω (D) 500 Ω (E) none of these
- When interfacing an **LED** that has a **forward voltage of 1.5 V** to the logic family described in Table 1 using a **current sinking** configuration, **maximum brightness** will be achieved (within the rated specifications) using a current limiting resistor of the value:

(A) 200 Ω (B) 300 Ω (C) 400 Ω (D) 500 Ω (E) none of these
- The **complement** of the function $F(X,Y,Z) = X' \cdot Y + X \cdot (Y' + Z)$ can be expressed as:

(A) $F'(X,Y,Z) = X \cdot Y + X' \cdot Y' \cdot Z$
 (B) $F'(X,Y,Z) = X' \cdot Y' + X \cdot Y \cdot Z'$
 (C) $F'(X,Y,Z) = X \cdot Y' + X' \cdot (Y + Z')$
 (D) $F'(X,Y,Z) = (X' + Y) \cdot (X + Y') \cdot (X + Z)$
 (E) none of the above