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The hole diffusion coefficients in silicon $12.5 \text{ cm}^2/\text{s}$. The hole about *
(2 Points)

- 448 $\text{cm}^2/\text{V.s}$
- 480 $\text{cm}^2/\text{V.s}$
- 487 $\text{cm}^2/\text{V.s}$
- 1350 $\text{cm}^2/\text{V.s}$
- 1357 $\text{cm}^2/\text{V.s}$

POWERUNIT

2

Let n , and p be the electron and hole concentration. At thermal equilibrium, for a piece of silicon doped with a p-type material *

(2 Points)

$n \gg p$

$p = n_i$

$p \approx n$

$p \gg n$

$p \ll n_i$



3

The parameters of the transistors in the circuit shown are

$K_n = 0.5 \text{ mA/V}^2$, and $V_{TN} = 1.2 \text{ V}$. Determine V_{GS} and V_{DS} when $I_Q = 1 \text{ mA}$. *

(2 Points)

$V_{GS} = 2.614 \text{ V}$, $V_{DS} = 2.614 \text{ V}$

No finite values due to non-saturation


$V_{GS} = 2.614 \text{ V}$, $V_{DS} = 1.414 \text{ V}$

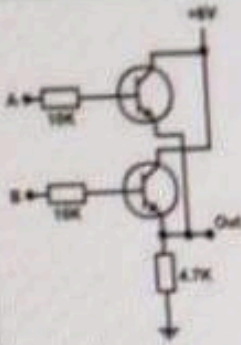
Due to cutoff both equal 5 V.

None.

4

15

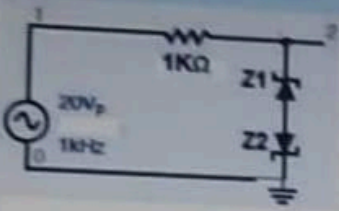
what logic function does the following circuit implement? * 
(2 Points)



 POWERUNIT 

- AND
- XOR
- NOR
- NAND
- OR

Consider the circuit shown Where the $V_{\gamma}=0.7V$, and $r_z=0\Omega$ for both diodes, $V_{z1}=8V$, and $V_{z2}=6V$. Note that the input maximum amplitude is 20V. The clipping levels are *



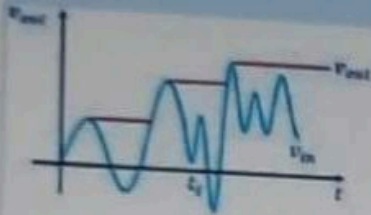
POWERUNIT

- 5.3V, and -8.7V.
- 8.7V, and -6.7V.
- 6V, and 8.7V.
- 5.3V, and 7.3 V.
- 8.7 V, and -6.7 V

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Consider the circuit shown. The circuit acts as. *

(2 Points)



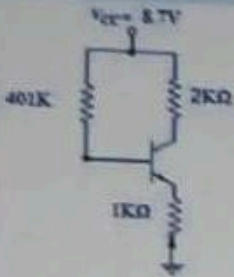
POWERUNIT

- A 3-diode rectifier.
- A regulator with capacitor.
- A peak detector.
- A clamper with capacitor
- Another circuit for voltage multi-multiplication.

Consider the circuit shown where $V_{BE(on)} = 0.7V$, $\beta = 89$. Assuming $I_{CQ} = I_{EQ}$.

Calculate I_{CQ} , and V_{CEQ} . *


(3 Points)



POWERUNIT

- 2 mA , 3.98V
- 1.45mA, 4.35V
- 4.35 mA , 1.54 V
- 1.568mA , 3.98V
- .584mA, 0.2V due to saturation

6

For a certain diode at room temperature, the saturation current is 5 fA. What is the diode voltage when the diode current is 2 mA? * 
(2 Points)

0.7071 V

0.7422 V

0.69458 V

0.7V


None

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particular n-channel MOSFET, $K_n=0.5 \text{ mA/V}^2$, $V_{TN}=1 \text{ V}$. A 12 V voltage source is connected to the drain terminals, while the MOSFET source terminal is grounded. The gate-source voltage is 10 V.

3

The parameters of the transistors in the circuit shown are

$K_n = 0.5 \text{ mA/V}^2$, and $V_{TN} = 1.2 \text{ V}$. Determine V_{GS} and V_{DS} when $I_Q = 1 \text{ mA}$. * 

(2 Points)

- $V_{GS} = 2.614 \text{ V}$, $V_{DS} = 2.614 \text{ V}$
- No finite values due to non-saturation
- $V_{GS} = 2.614 \text{ V}$, $V_{DS} = 1.414 \text{ V}$
- Due to cutoff both equal 5 V.
- None.

4

The diode cut-in voltage for each diode in the circuit shown is 0.7 V and $r_f = 0 \Omega$. Determine the value of R such that $I_{D1} = 0.25 I_{D2}$. *