

$$V_{DS} = V_D - V_S = 10 - (-2) = 12 \text{ Volt}$$

**Soal 4)**

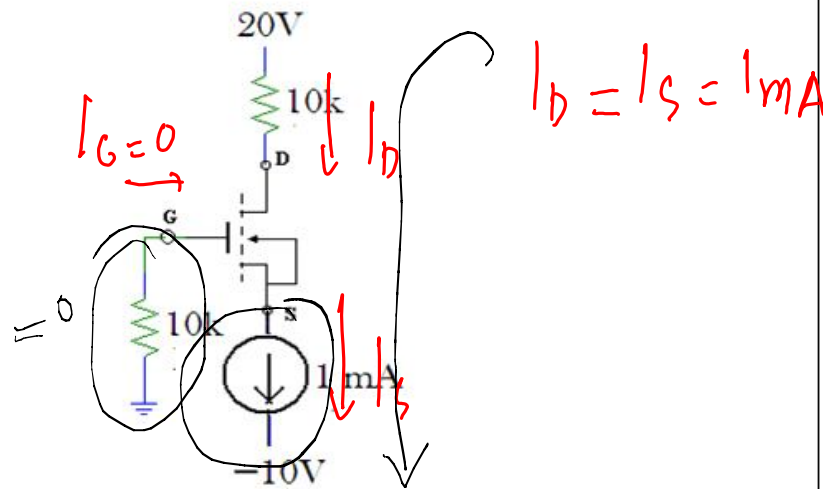
(a) Diketahui transistor MOSFET "Enhancement" dengan :

$$k = \frac{C_{ox} \mu_n W}{2L} = 1 \text{ mA/V}^2$$

$$V_t = 1 \text{ V}$$

Hitung berapa besarnya  $V_{GS}$  dan  $V_{DS}$ .

(b) Bila MOSFETnya diganti dengan tipe "Depletion", dan  $V_t = -3 \text{ V}$ , serta mempunyai  $k$  sama seperti diatas, maka hitunglah besarnya  $V_{GS}$  dan  $V_{DS}$ .

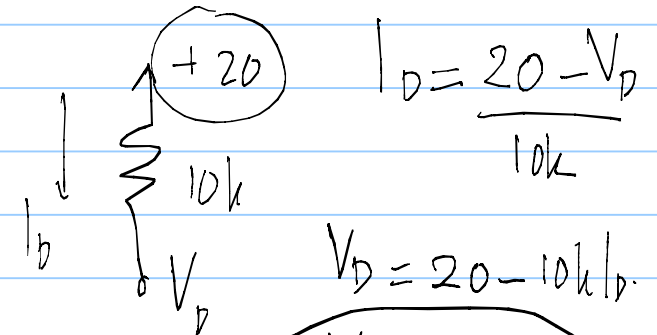


$$I_D = k (V_{GS} - V_t)^2$$

$$1 \text{ mA} = \frac{1 \text{ mA}}{V^2} (V_{GS} - 1)^2$$

$$V_{GS} = 2 \text{ Volt}$$

$V_{DS} ???$



$$I_D = \frac{20 - V_D}{10k}$$

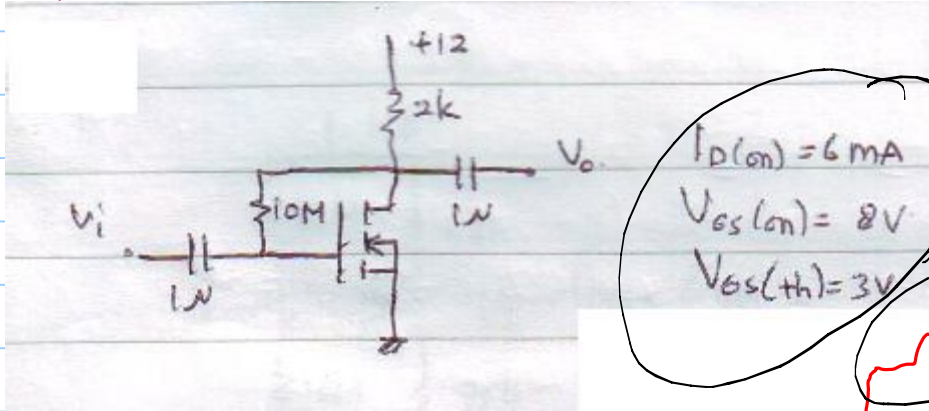
$$V_D = 20 - 10k I_D$$

$$V_D = 10 \text{ Volt}$$

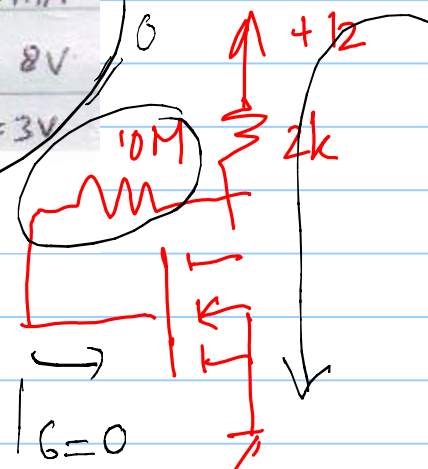
$$V_G = 0 \rightarrow V_{GS} = 2 \rightarrow V_S = -2$$

FET → prategy DC

$$I_G = 0 \rightarrow I_D = I_S$$



$I_D(\text{on}) = 6 \text{ mA}$   
 $V_{GS(\text{on})} = 8 \text{ V}$   
 $V_{GS(\text{th})} = 3 \text{ V}$



$$-12 + 2k I_D + V_{DS} = 0$$

$$V_{DS} = 12 - 2k I_D$$

$$V_{DS} = 12 - 2k (6 \text{ mA})$$

$$V_{DS} = 0$$

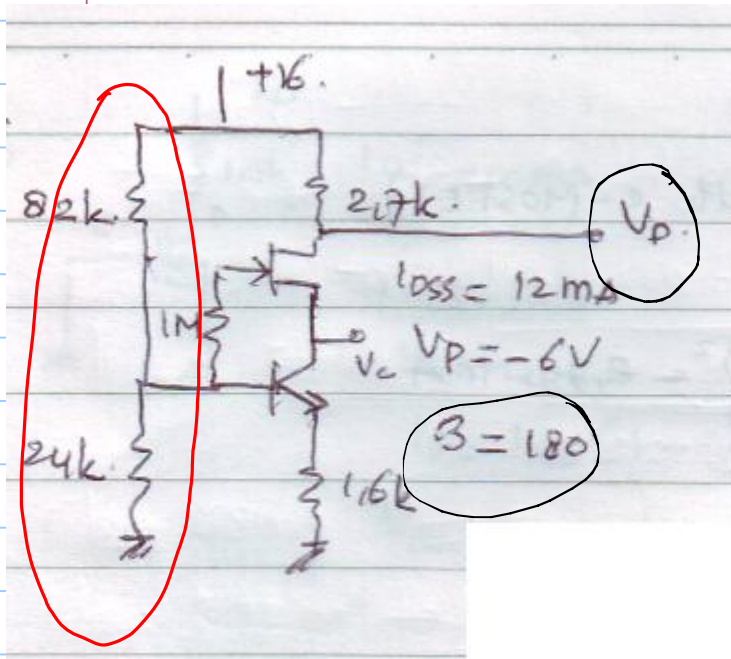
$$V_{DS} \geq V_{GS} - V_{th}$$

Asumsi n-MOSFET kanal n  
 why :

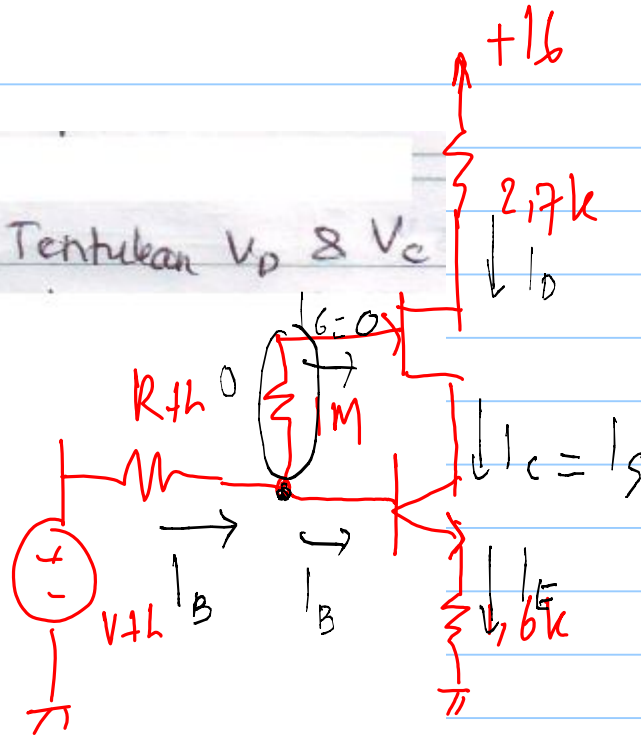
$$I_D = k (V_{GS} - V_{th})^2$$

$$6 \text{ mA} = k (8 - 3)^2 \rightarrow k = ???$$

Praktikum DC → BJT & JFET kanal n.

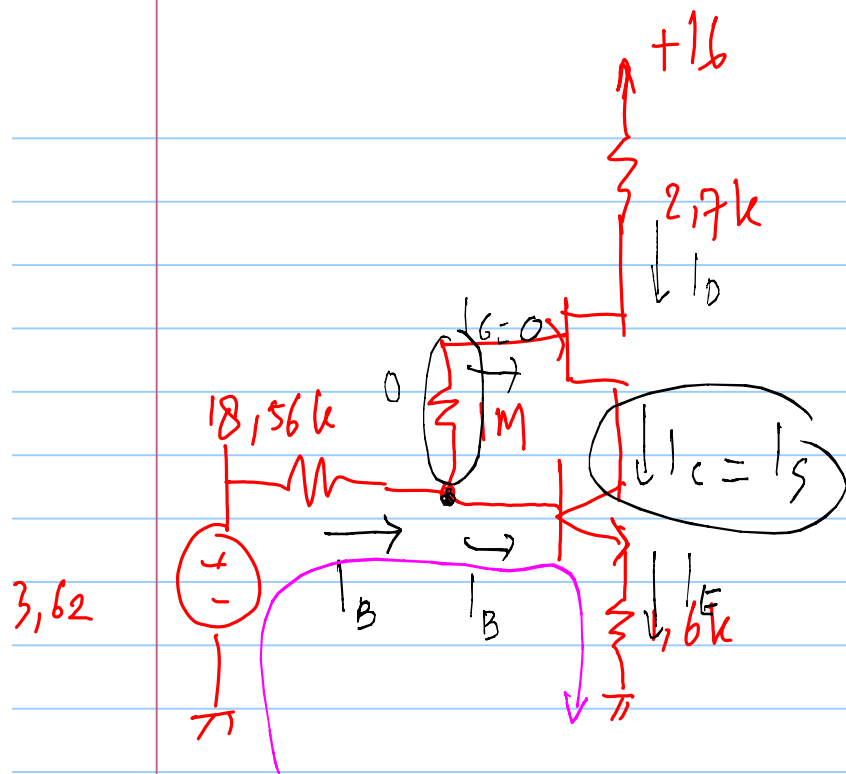


Tentukan  $V_p$  &  $V_c$



$$V_{th} = \frac{24k}{24k + 82k} \times 16 = 3,62 \text{ Volt}$$

$$R_{th} = 82k // 24k = \frac{82 \times 24}{82 + 24} = 18,56k$$



$$-3,62 + 18,56k I_B + V_{BE} + 1,6k I_E = 0$$

$$-3,62 + 18,56k I_B + 0,7 + 1,6k(1+180)I_B = 0$$

$$I_B = \frac{3,62 - 0,7}{18,56k + 181 \cdot 1,6k} = 0,00947 \text{ mA}$$

$$I_C = \beta I_B = 180 \times 0,00947 \text{ mA} = 1,74 \text{ mA}$$

$$I_C = I_S = I_D = 1,74 \text{ mA}$$

$$V_D = 16 - 2,7k I_D = 16 - 2,7k \cdot 1,74 \text{ mA} = \underline{\underline{11,302 \text{ V}}}$$

