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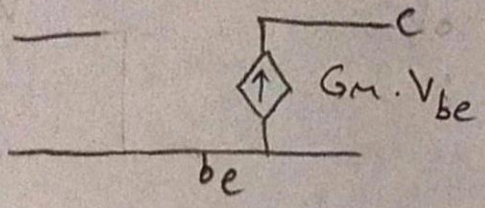
1-) A type of amplifier that its output voltage changes according to input current.

2-) Current amplifier.

3-)



4-) $V_G = 10V \cdot \frac{800}{1000} = 3V$ $\quad V_D = 10-4 = 6V$

$V_{GD} \leq V_T \rightarrow$ Saturation

$$I_D = \frac{\beta}{2}(V_{GS} - V_{th})^2 \cdot \left(1 + \frac{V_{DS}}{V_A}\right)$$

$$2 \cdot 10^{-3} = \frac{4 \cdot 10^{-3}}{2} \cdot (3 - V_S - 1)^2 \cdot \left(1 + \frac{6 - V_S}{80}\right)$$

$$1 = \underbrace{(2 - V_S)^2}_{4 + V_S^2 - 4V_S} \cdot \left(\frac{86 - V_S}{80}\right) = \frac{(344 - 344V_S + 86V_S^2) - (4V_S + V_S^3 - 4V_S^2)}{80}$$

$$0 = V_S^3 + 90V_S^2 - 348V_S + 264$$

$V_{S1} = 3,25 \quad V_{S2} = -94,11 \quad \boxed{V_{S3} = 0,86V}$

$\boxed{V_S = 0,86V}$