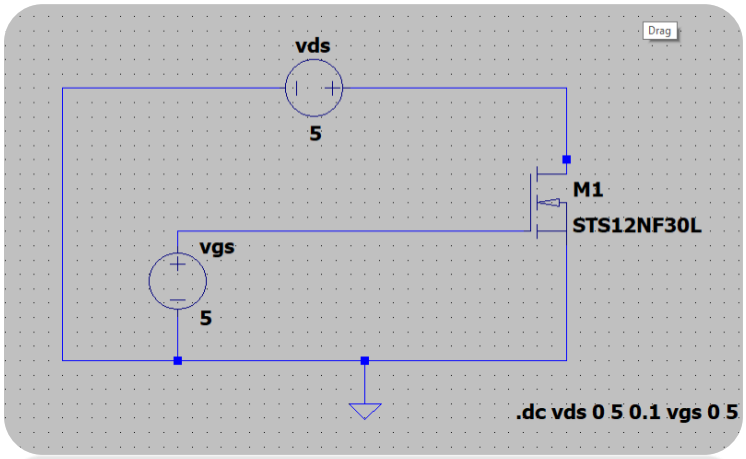
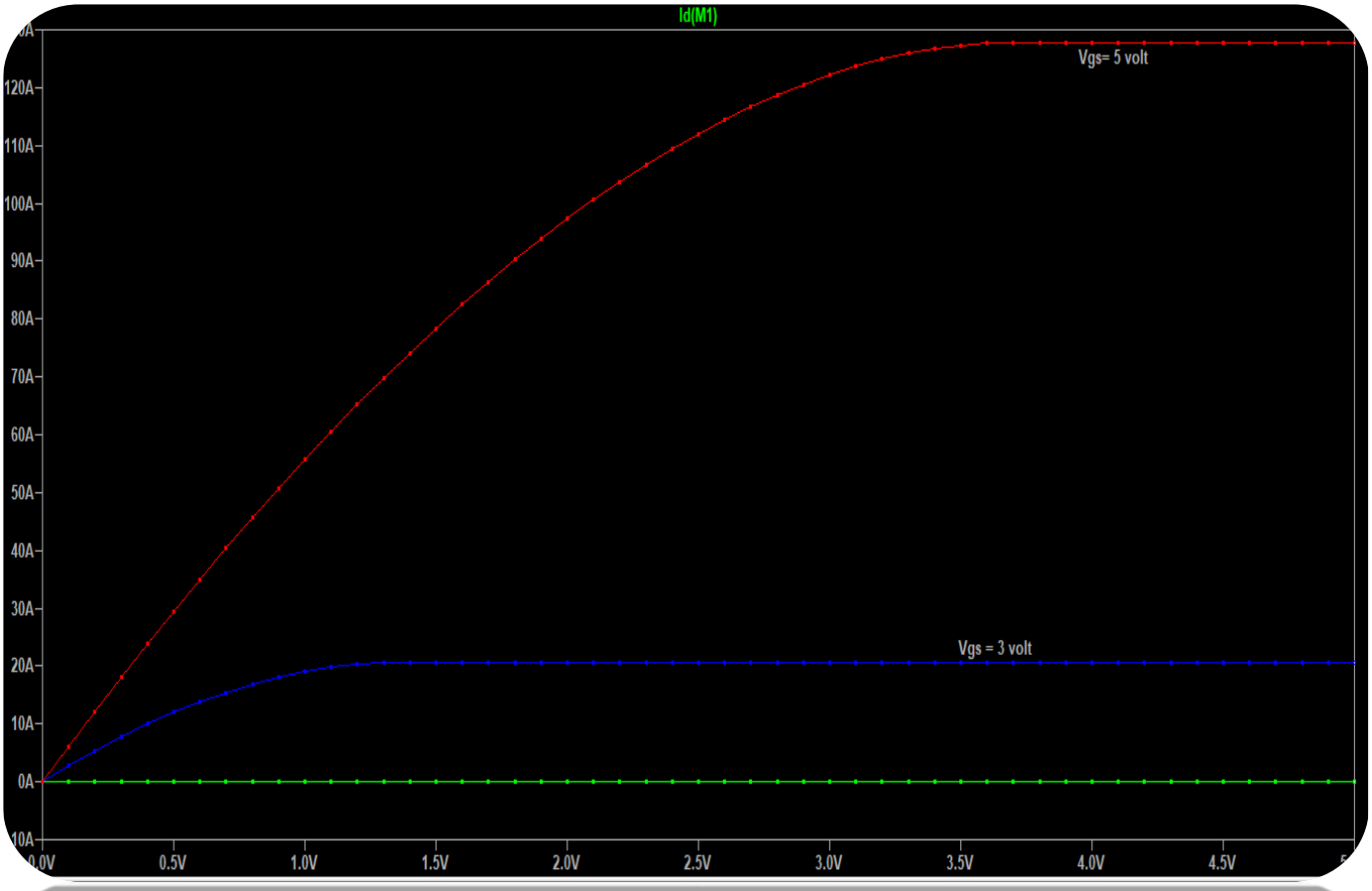
Homework #3: NMOS transistor analysis Assignment



The circuit we have to simulate it

The output simulation Diagram



To find β and VT, I took two points from the previous curve in the saturation region and I substituted the points in the saturation equation as following

The two points is

Point 1	**Point 2**
Vds = 4.9 volt	**Vds = 4.9 volt**
Ids = 20.6 Ampere	**Ids = 127.74 Ampere**
Vgs = 3 volt	**Vgs = 5 volt.**

$Ids = \frac{\beta}{2}(Vgs - VT)^2$ **The Sat Equation.**

$$4.9 = \frac{\beta}{2}(3 - VT)^2 \quad \Rightarrow \quad \frac{6.4}{\sqrt{\beta}} + VT = 3$$

$$127.74 = \frac{\beta}{2}(5 - VT)^2 \quad \Rightarrow \quad \frac{15.9837}{\sqrt{\beta}} + VT = 5$$

By solving the previous two Equations

β = 22.864

VT = 1.657 volt.