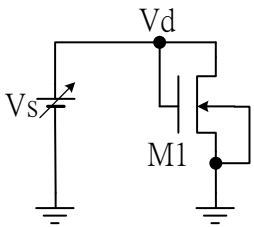


國立彰化師範大學電子系 109 學年第二學期隨堂考考卷

課目：VLSI 設計導論 日期：2021/3/24(Wed.) 時間：08:30~09:00am 地點：E406 老師：黃宗柱

學號：_____ 姓名：_____ 得分：_____

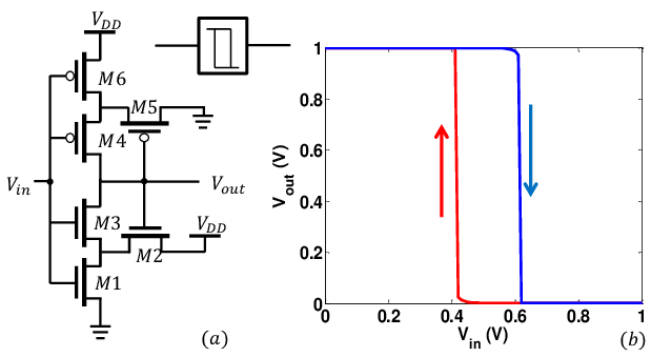
Question 1. Write the SPICE program (netlist) for drawing the characteristic curve of a self-biased nMOS in the model .MODEL nch NMOS using a DC simulation from -1V to 3V. Note to define the model of nMOS M1 to a basic type model NMOS.



```

** Question 1
Vs Vd 0 DC 0
.MODEL NCH NMOS (...)
M1 Vd Vd 0 0 NCH W=0.5u L=0.18u
.DC -1 3 0.01
.PROBE
.END
    
```

Question 2. Write the SPICE program (netlist) to draw the characteristic curve of a Schmitt inverter using a slow triangle transient simulation from 0V to 1V then back to 0V. Note to define the models of nMOS and pMOS transistors to a basic type models.



```

** Question 2
VDD VDD 0 1.8
Vin Vin 0 PWL(0 0 1u 1 2u 0)
.MODEL NCH NMOS (...)
.MODEL PCH PMOS (...)
M1 N Vin 0 0 NCH W=0.22u L=0.18u
M2 Vout Vin N 0 NCH W=0.22u L=0.18u
M3 VDD Vout N 0 NCH W=0.22u L=0.18u
M4 Vout Vin P VDD PCH W=0.5u L=0.18u
M5 0 Vout P VDD PCH W=0.5u L=0.18u
M6 P Vin VDD VDD W=0.5u L=0.18u
.TRAN 1n 2u
.PROBE
.END
    
```