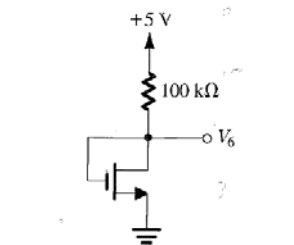


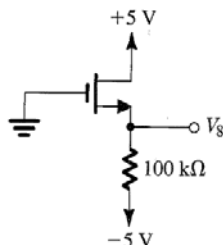
سوال 1

نقطه کار و ناحیه کار ترانزیستورها را به دست آورید.



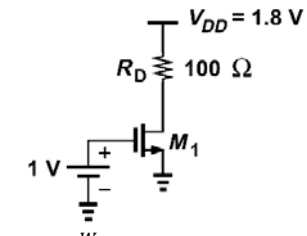
$\mu_n C_{ox} \frac{W}{L} = 2(\text{mA}/\text{V}^2)$ ,  $V_T = 2\text{V}$

(C)



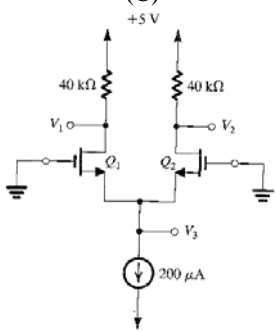
$\mu_n C_{ox} \frac{W}{L} = 0.06(\text{mA}/\text{V}^2)$ ,  $V_T = 1\text{V}$

(B)



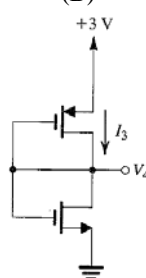
$\mu_n C_{ox} \frac{W}{L} = 4(\text{mA}/\text{V}^2)$ ,  $V_T = 0.5\text{V}$

(A)



$\mu_n C_{ox} \frac{W}{L} = 2(\text{mA}/\text{V}^2)$ ,  $V_T = 1\text{V}$

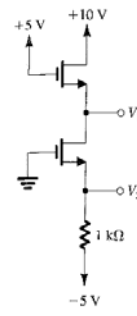
(F)



$\mu_p C_{ox} \frac{W}{L} = 2(\text{mA}/\text{V}^2)$ ,

$\mu_n C_{ox} \frac{W}{L} = 2(\text{mA}/\text{V}^2)$ ,  $|V_T| = 1\text{V}$

(E)



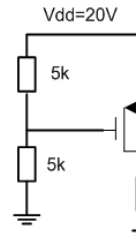
$\mu_n C_{ox} \frac{W}{L} = 4(\text{mA}/\text{V}^2)$ ,  $V_T = 2\text{V}$

(D)



(K)

$\mu_p C_{ox} \frac{W}{L} = 2(\text{mA}/\text{V}^2)$   
 $V_T = -3\text{V}$

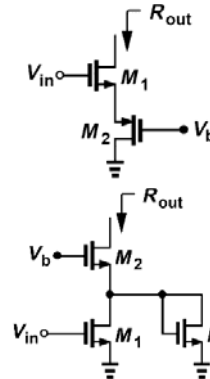
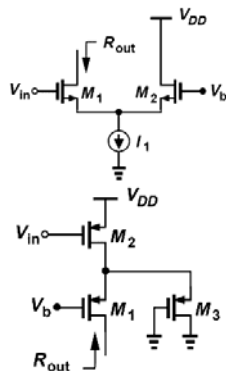


(J)

$\mu_p C_{ox} \frac{W}{L} = 2(\text{mA}/\text{V}^2)$   
 $V_T = -2\text{V}$

سوال 2

با فرض اینکه ترانزیستورها یکسان نیستند، مقاومت  $R_o$  را محاسبه کنید.



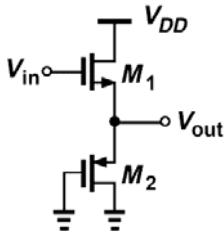
سوال 3

بهره ولتاژ، مقاومت ورودی و مقاومت خروجی تقویت کننده های شکل زیر را محاسبه کنید.

راهنمایی:

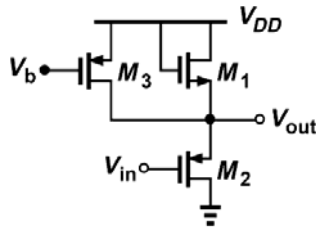
•  $V_b$  بیانگر ولتاژ بایاس dc است و در تحلیل AC بایستی اتصال کوتاه به زمین در نظر گرفته شود.

• به غیر از تقویت کننده های شکل های (I) و (G)، مابقی تقویت کننده ها یک طبقه می باشند.



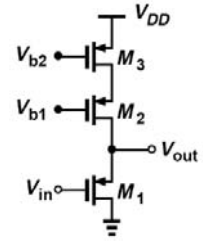
$$g_m = 2 \frac{mA}{V}, r_d = \infty$$

(C)



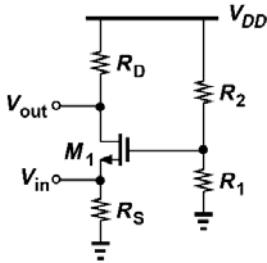
$$g_m = 3 \frac{mA}{V}, r_d = 10k$$

(B)



$$g_m = 1.5 \frac{mA}{V}, r_d = 10k$$

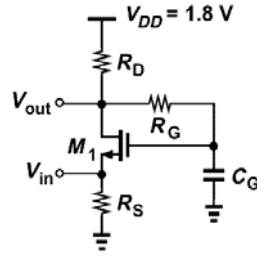
(A)



$$g_m = 1.5 \frac{mA}{V}, r_d = \infty$$

$$R_s = 0.5k, R_1 = R_2 = 200k, R_D = 8k$$

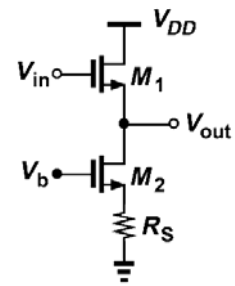
(F)



$$g_m = 0.15 \frac{mA}{V}, r_d = 100k$$

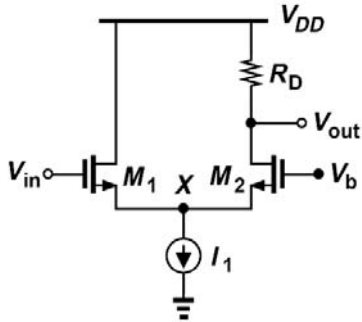
$$R_s = 1k, R_G = 20k, R_D = 500k$$

(E)



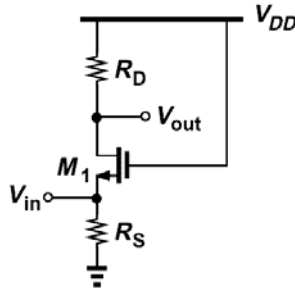
$$g_m = 1.5 \frac{mA}{V}, r_d = 10k, R_s = 0.1k$$

(D)



$$g_m = 0.25 \frac{mA}{V}, r_d = 80k, R_D = 500k$$

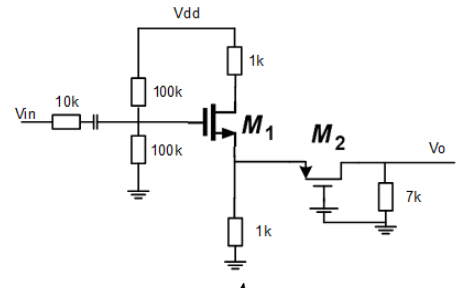
(I)



$$g_m = 0.15 \frac{mA}{V}, r_d = \infty$$

$$R_s = 0.1k, R_D = 80k$$

(H)



$$g_m = 2.5 \frac{mA}{V}, r_d = \infty$$

(G)