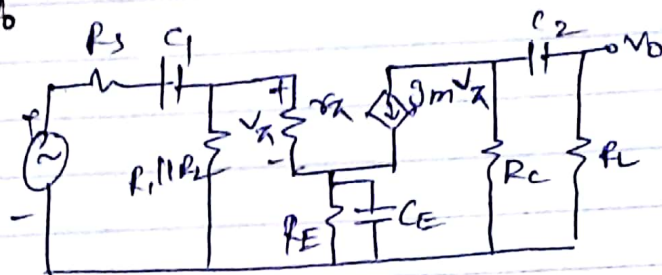
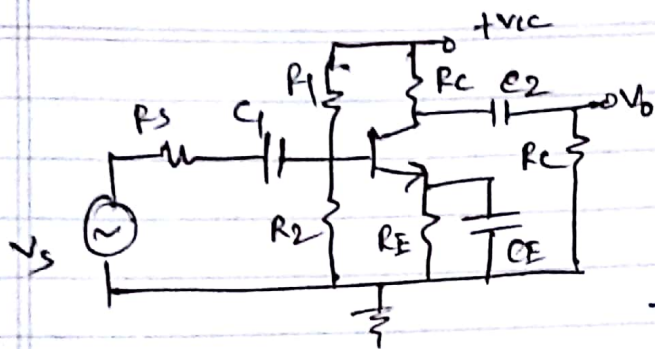
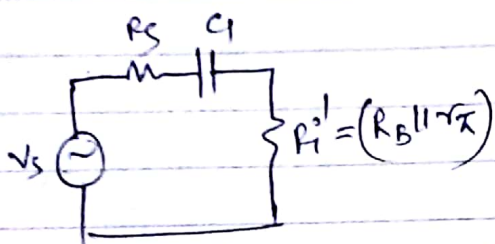


①

CE. BJT amplifier



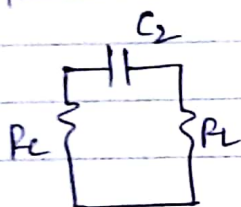
①



$$R_{C1} = R_s + (R_B || r_{\pi})$$

$$\tau_{C1} = R_{C1} \times C_1$$

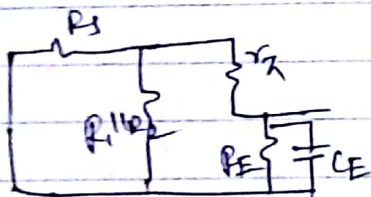
②



$$R_{C2} = R_c + R_L$$

$$\tau_{C2} = R_{C2} \times C_2$$

③

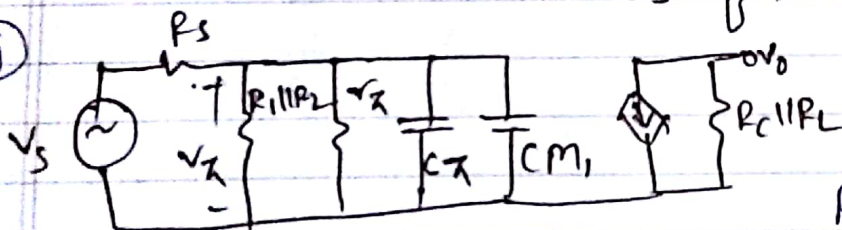


$$R_{EE'} = R_E || \frac{r_{\pi} + (R_s || R_B)}{1 + \beta}$$

$$\tau_{CE} = R_{CE} \times C_E$$

$f_L = \frac{1}{2\pi\tau}$ ← select Time constant which has lower value in time [highest freq] ie 'τs' of lower seconds.

①



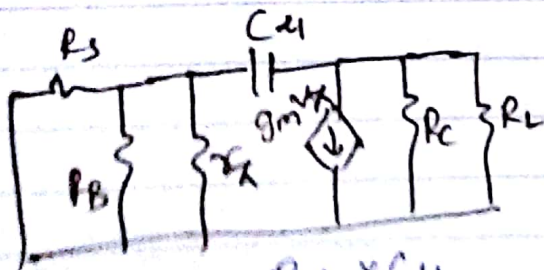
$$C_{M1} = C_{\mu} [1 + g_m (R_c || R_L)]$$

$$C_{M2} = C_{\mu}$$

$$R_{\pi} = r_{\pi} || R_s || R_B$$

$$\tau_{(C_{\pi} + C_{M1})} = R_{\pi} \times (C_{\pi} + C_{M1})$$

②



$$R_u = (R_c || R_L) + R_i [1 + g_m (R_c || R_L)]$$

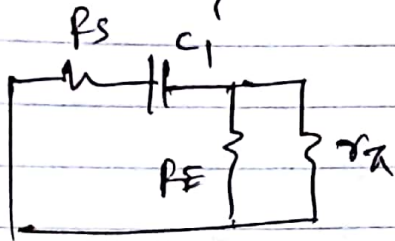
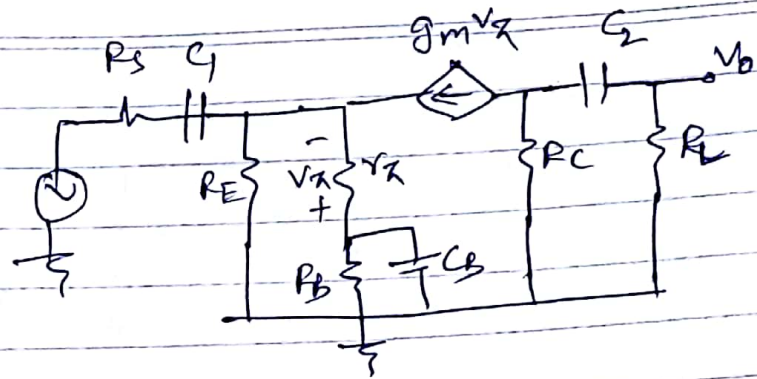
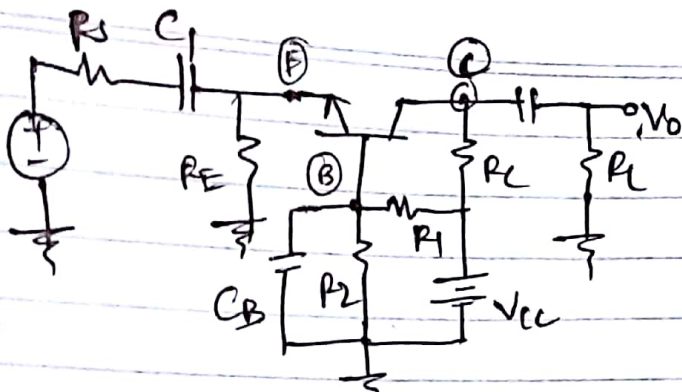
$$R_s || r_{\pi} || R_B$$

$$\tau_{C\mu} = R_u \times C_{\mu}$$

Select highest value of Time constant [lowest freq]

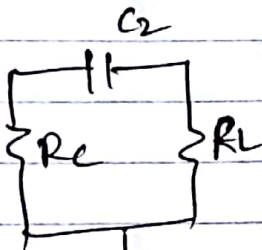
C.B. BJT amplifier

i/p to o/p multiply by $(1+\beta)$
o/p to i/p divide by $(1+\beta)$



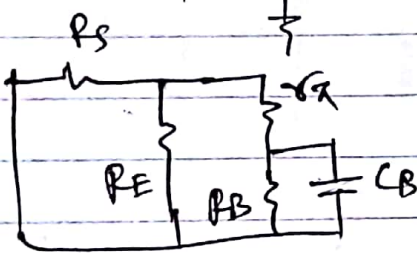
$$R_{C1} = R_s + (R_E \parallel r_{\pi})$$

$$\tau_{C1} = R_{C1} \times C_1$$



$$R_{C2} = R_C \parallel R_L$$

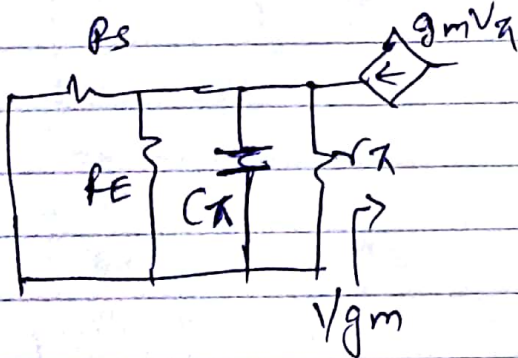
$$\tau_{C2} = R_{C2} \times C_2$$



$$R_{CB} = R_B \parallel [r_{\pi} + (1+\beta)(R_s \parallel R_E)]$$

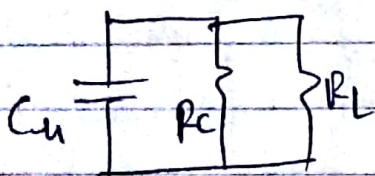
$$\tau_{CB} = R_{CB} \times C_B$$

Select lower time constant out of all.
ie [highest freq]



$$R_{\pi} = (R_s \parallel R_E) \parallel r_{\pi} \parallel \frac{1}{g_m}$$

$$\tau_{\pi} = R_{\pi} \times C_{\pi}$$

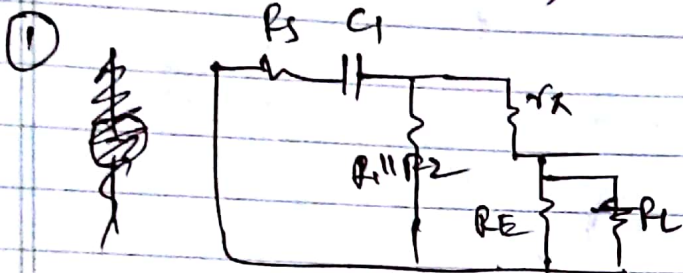
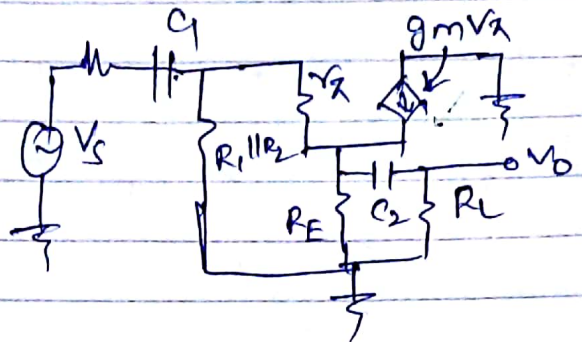
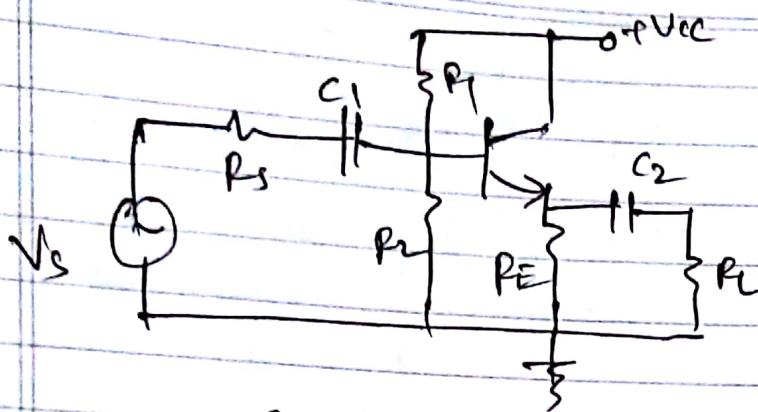


$$R_u = R_C \parallel R_L$$

$$\tau_u = R_u \times C_u$$

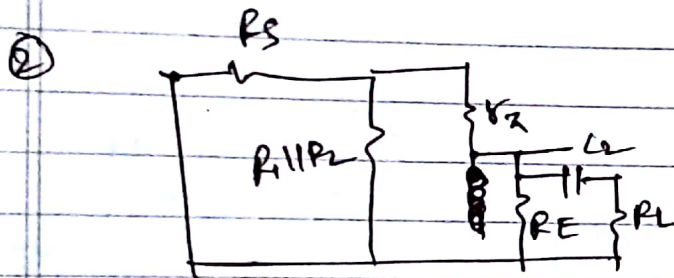
Select higher time constant out of all.
ie [lowest freq.]

CC. BJT amplifier



$$R_{C1} = R_s + [R_B || (r_x + (1+\beta)(R_E || R_L))]$$

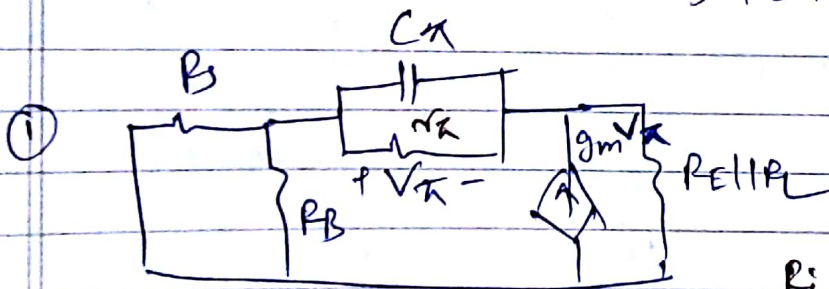
$$\tau_{C1} = R_{C1} \times C_1$$



$$R_{C2} = R_L + [R_E || \frac{r_x + (R_s || R_B)}{(1+\beta)}]$$

$$\tau_{C2} = R_{C2} \times C_2$$

Select smallest time const. [ie highest freq]

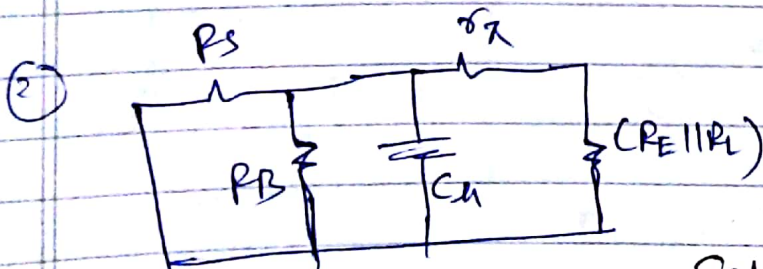


$$R_x = r_x || \frac{(R_i + R_L')}{[1 + \frac{(R_i + R_L')}{r_x} + g_m R_L']}$$

$$R_i = R_s || R_B$$

$$R_L' = R_E || R_L$$

$$\tau_x = R_x \times C_x$$



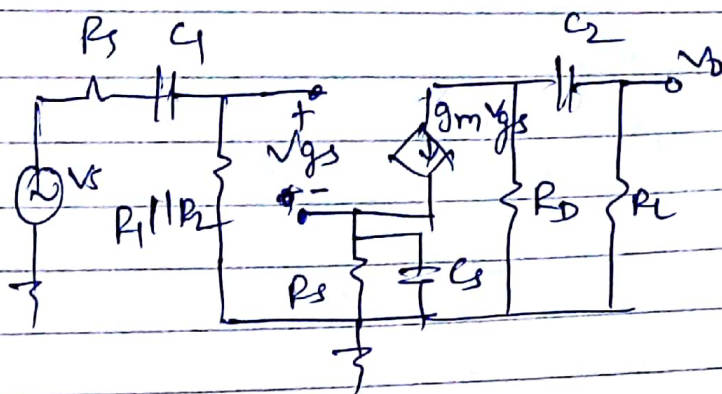
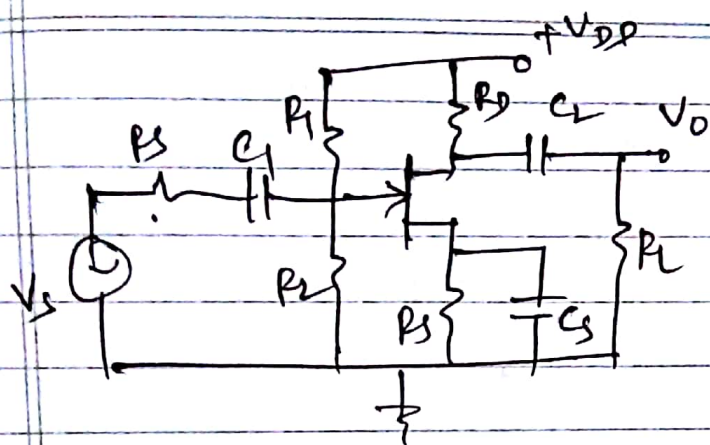
$$R_u = (R_s || R_B) || [r_x + (R_E || R_L)(1+\beta)]$$

$$\tau_u = R_u \times C_u$$

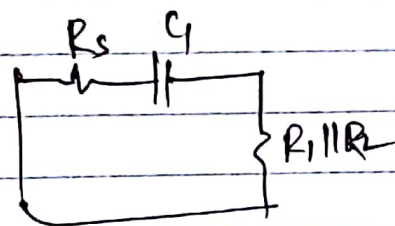
Select highest time const. [ie lowest freq.]

①

CS FET amplifier



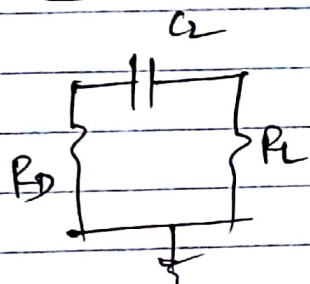
①



$$R_{C1} = R_s + (R_1 || R_2)$$

$$\tau_{C1} = R_{C1} \times C_1$$

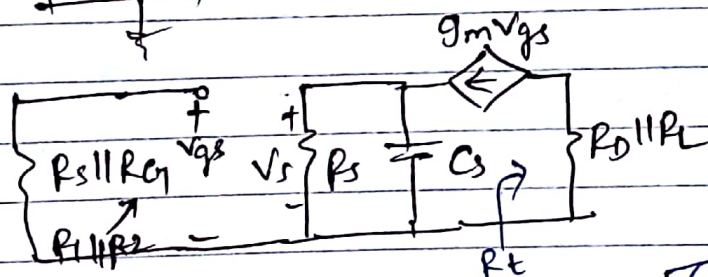
②



$$R_{C2} = R_D || R_L$$

$$\tau_{C2} = R_{C2} \times C_2$$

③



$$R_{C3} = R_s || R_t$$

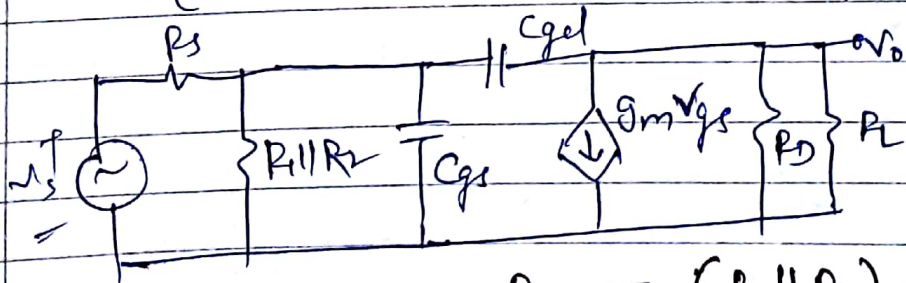
$$R_t = V_s / g_m v_{gs} = 1/g_m$$

$$\therefore R_{C3} = (R_s || 1/g_m)$$

$$\tau_{C3} = R_{C3} \times C_S$$

(select lowest time const. i.e. highest freq.)

④



$$R_{eqs} = R_s || R_1 || R_2$$

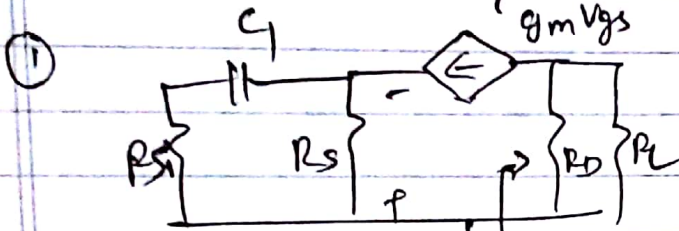
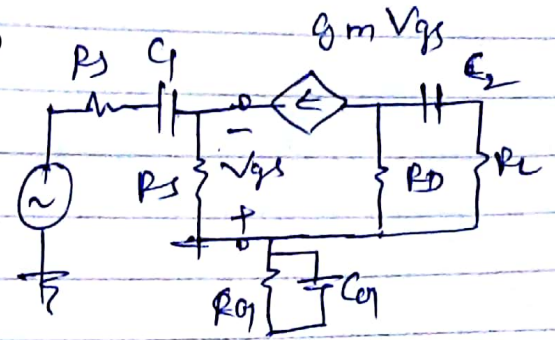
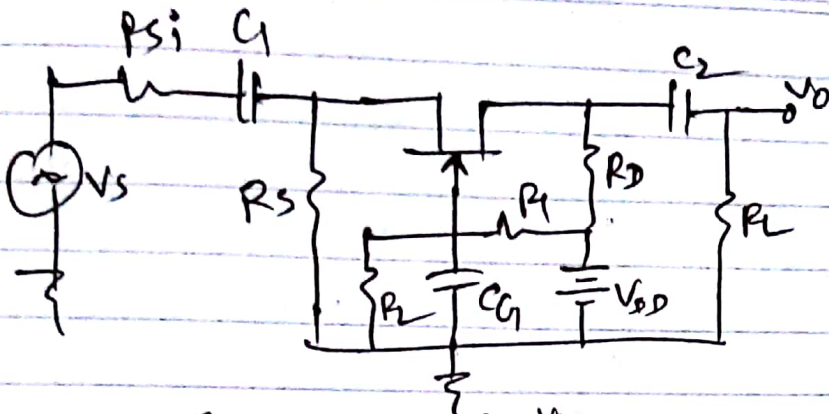
$$\tau_{Cgs} = R_{eqs} \times C_{gs}$$

$$R_{eqd} = (R_D || R_L) + R_i [1 + g_m (R_D || R_L)]$$

$$\tau_{Cgd} = R_{eqd} \times C_{gd}$$

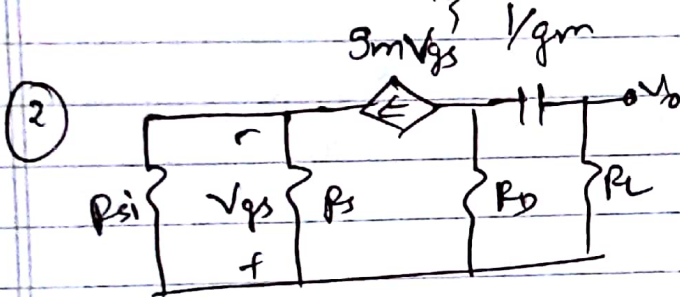
(Select Highest time const. i.e. lowest freq.)

CG FET amplifier



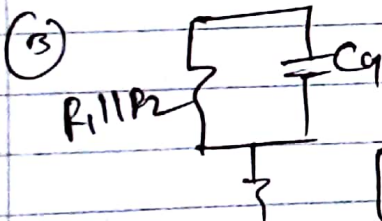
$$R_{C1} = R_{si} + [R_s || \frac{1}{g_m}]$$

$$\tau_{C1} = R_{C1} \times C_1$$



$$R_{C2} = R_D + R_L$$

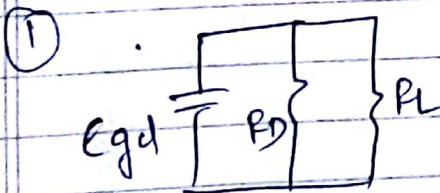
$$\tau_{C2} = R_{C2} \times C_2$$



$$R_{C3} = R_1 || R_2$$

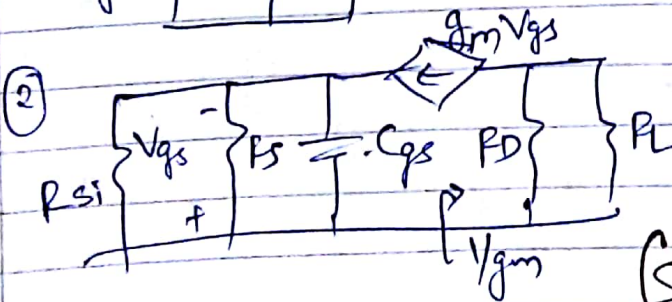
$$\tau_{C3} = R_{C3} \times C_3$$

[Select lowest value of time Const. i.e. highest freq.]



$$R_{C4} = R_D || R_L$$

$$\tau_{C4} = R_{C4} \times C_{gs}$$

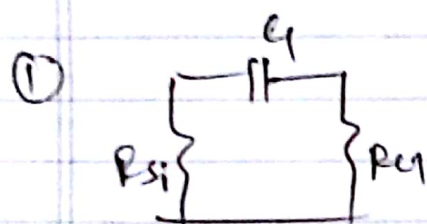
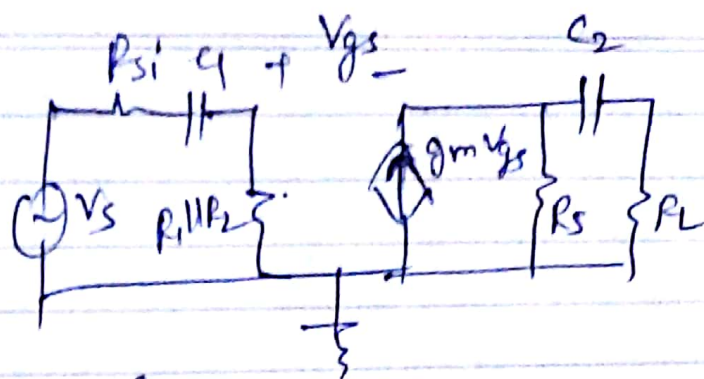
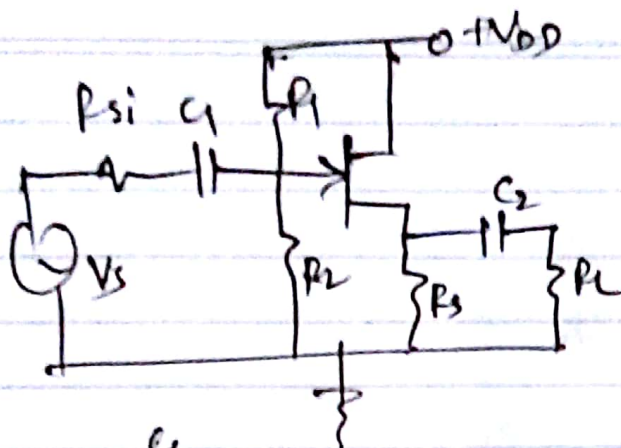


$$R_{C5} = \frac{1}{g_m} || R_{si} || R_s$$

$$\tau_{C5} = R_{C5} \times C_{gs}$$

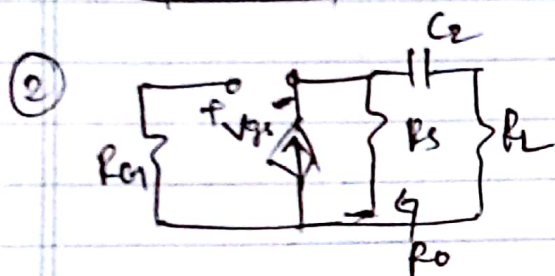
(Select highest value of time Const. i.e. lowest freq.)

CD FET amplifier



$$R_{C1} = R_{si} + R_{g1} \quad (R_{g1} = R_1 || R_2)$$

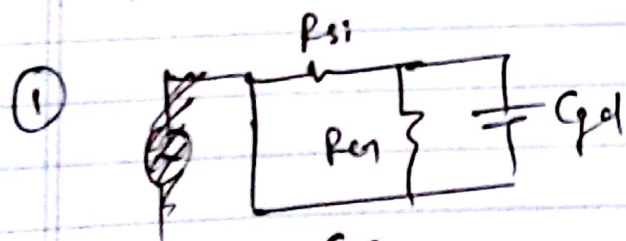
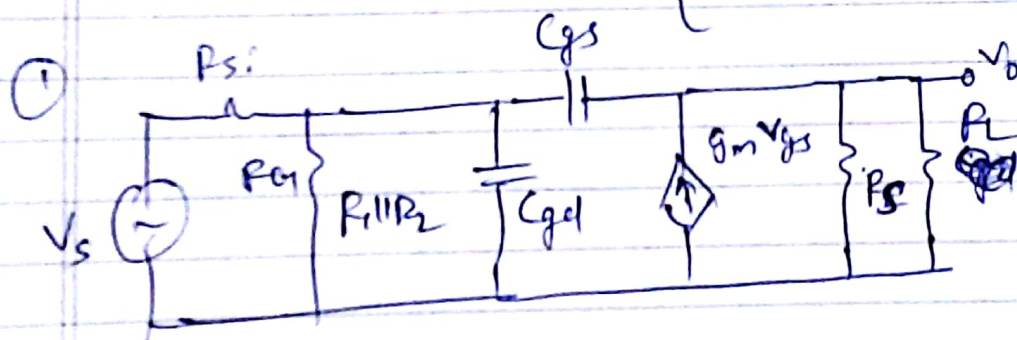
$$\tau_{C1} = R_{C1} \times C_1$$



$$R_{C2} = \left(\frac{1}{g_m} || R_S \right) + R_L$$

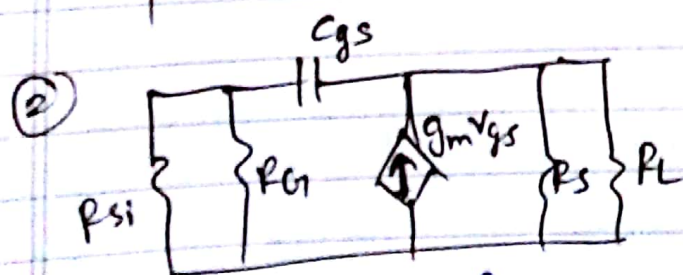
$$\tau_{C2} = R_{C2} \times C_2$$

[Select ~~lowest~~ lowest time constant. i.e. highest freq.]



$$R_{Cgd} = R_{si} || R_1 || R_2$$

$$\tau_{Cgd} = R_{Cgd} \times C_{gd}$$



$$R_{Cgs} = (R_{si} || R_{g1}) + \left(\frac{1}{g_m} || R_S || R_L \right)$$

$$\tau_{Cgs} = R_{Cgs} \times C_{gs}$$

[Select highest time constant. i.e. lowest freq.]