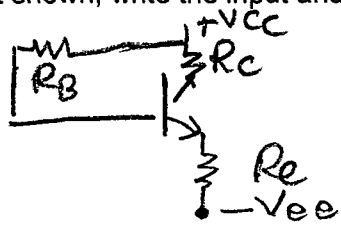
B.E / B.Tech (Part time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY2014
Department of Electronics and Communication Engineering

PTEC9202–Electronic circuits - I
(Regulation R2009.)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Why class C power amplifier offers high efficiency.
2. Draw the frequency response of CE amplifier with and without feedback.
3. In a differential amplifier Ad = 52 and Ac = 0.5, find CMRR.
4. Draw a simple MOS current mirror and write the expression for the output current.
5. Define Noise margin.
6. A common source amplifier has Rs = 200Ω and Rin = 10k and Av = -150. Calculate Avs.
7. Derive output resistance of common collector amplifier.
8. In a MOSFET amplifier g_m = 8mA/V and r_o = 2MΩ and R_D = 4.7KΩ. Calculate the voltage gain of the amplifier.
9. For the circuit shown, write the input and output loop equations.



10. What are the factors that affect the stability of the operating point.

Part – B (5 x 16 = 80 marks)

11.(i) Explain class B power amplifier and derive for its efficiency. **(10)**
(ii) Define and derive for feedback. **(6)**

12.a.(i) Draw a discrete common drain MOSFET amplifier and derive expressions for A_{VS}, R_{in} and R_o with equivalent circuits . **(10)**
.(ii) Briefly explain operation of CMOS inverter. **(6)**

(OR)

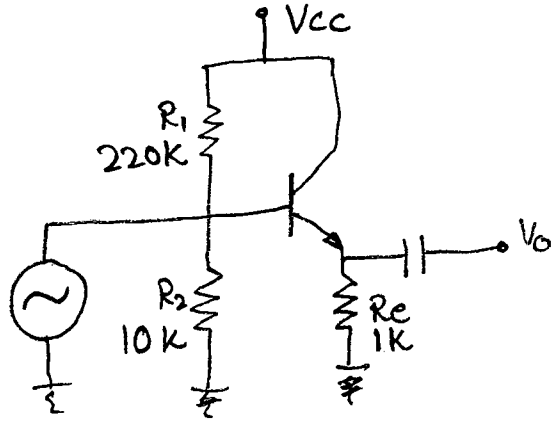
12.b. Draw a NMOS inverter with resistive load and derive for V_{IL}, V_{OL}, V_{IH} and V_{OH} and hence NM_L and NM_H.

13.a.(i) Draw a Cascode amplifier and with equivalent circuit derive for AV. **(8)**
(ii) Draw a JFET amplifier in common gate configuration and with equivalent circuit derive for A_V, R_{in} and R_o. **(8)**

(OR)

13.b.(i) For the circuit shown calculate the voltage gain A_V, R_{in} and R_o. **(8)**

(ii) Draw a Darlington amplifier and derive for A_V and R_{in} with equivalent circuit. **(8)**



hfe = 120

hie = 7.8K

14.a. Derive for stability factors S, S' and S" for voltage divider or self bias for BJT.

(OR)

14.b.(i) Briefly explain thermal stability. **(6)**

(ii) For the circuit shown calculate I_{CQ}, V_{CEQ} and I_{BQ} for hfe = 100, hfe = 300. Comment on the result. **(10)**

15.a.(i) Draw a NMOS common source amplifier with PMOS current source as active load. **(4)**

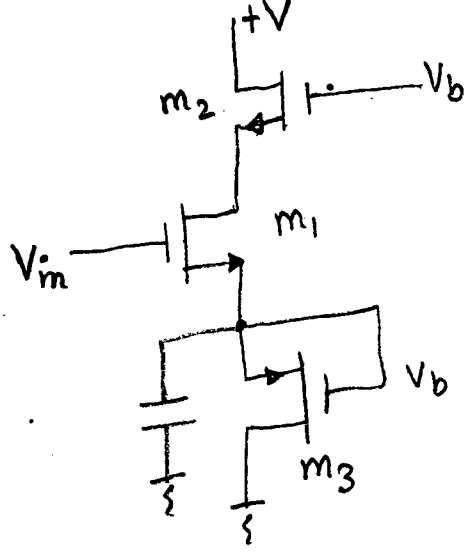
(ii) Draw the equivalent circuit of the active load and derive for the output impedance. **(6)**

(iii) Draw the equivalent circuit of amplifier and derive for its gain. **(6)**

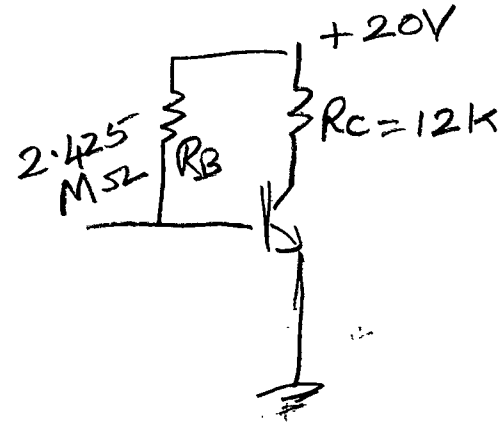
(OR)

15.b.(i) Draw a MOS current steering circuit with two sink and two source terminal and derive expressions for all terminal current s in terms of reference current. **(10)**

(ii) For the circuit shown, derive the expressions for resistances offered by M_2 and M_3 and hence write the expressions for the voltage gain offered. $\lambda \neq 0 \; \gamma \neq 0$ **(6)**



(Q.15b)



(Q14b)