

(3 Hours)

[Total Marks :80

- N.B. : (1) Question No.1 is compulsory
(2) Solve any three from remaining five questions.
(3) Figure to the right indicates full marks.
(4) Assume suitable data if necessary.

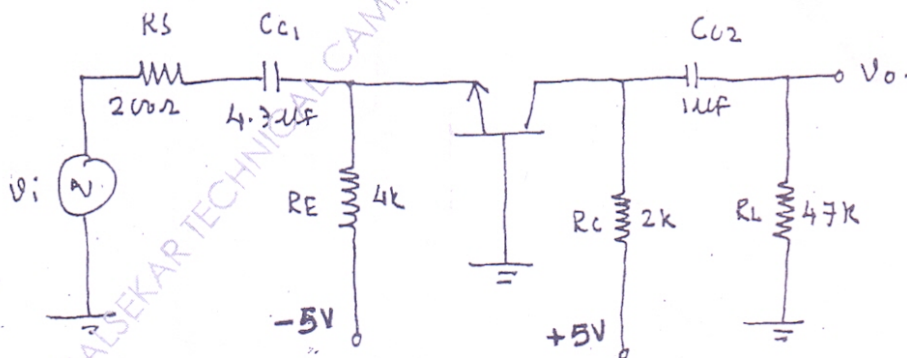
1. Solve Any four:-

20

- In case of CE amplifier, Why does the bandwidth of amplifier decrease with increase in gain? Support the answer with relevant mathematical equation.
- Instead of single Power Supply, why we use Dual power supply biasing for differential amplifier?
- Why Efficiency of class A power Amplifier is less than class B.
- What is the drawback of current mirror circuit using MOSFET? How it is overcome?
- Why we prefer series voltage Regulator over shunt voltage Regulator? Explain in detail.

2. (a) The Parameters of transistor are $V_{BE} = 0.7V$ and $\beta = 100$, $V_A = 0V$, Determine 10

- Q point of BJT
- Time constant associated with C_{C1} and C_{C2}
- Lower cut-off freq. due to C_{C1} and C_{C2}

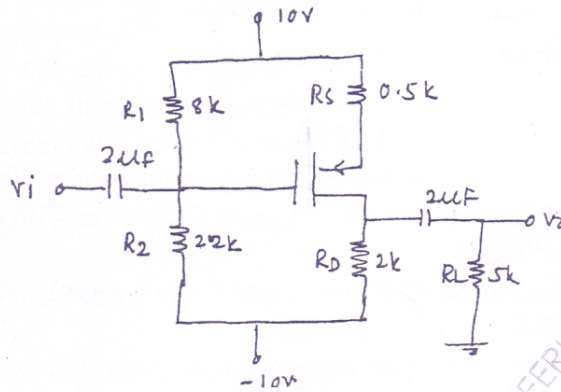


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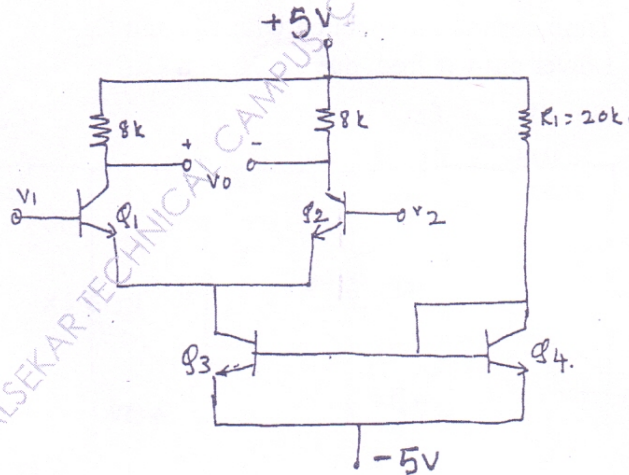
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- (b) For the PMOS CS amplifier, transistor parameters are $V_{TP} = -2V$, $K_p = 1$ mA/V², $\lambda = 0$, $C_{gs} = 15$ pf, $C_{gd} = 3$ pf 10
 Determine (a) Equivalent Miller capacitance
 (b) upper 3dB frequency



3. (a) For the given circuit, Determine 10
 (i) Differential mode gain A_d
 (ii) Common mode gain A_c
 (iii) CMRR
 For BJT $\beta = 100$, $V_{BE} = 0.7V$, $V_A = 100V$.

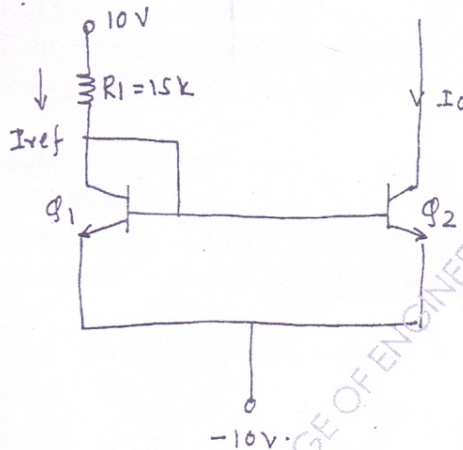


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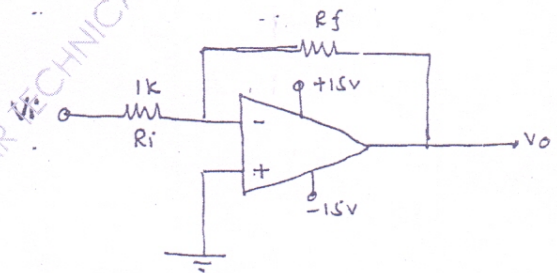
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- (b) Draw and explain the working of class A power amplifier (Transformer coupled). Derive the expression for efficiency. 10
4. (a) Draw and explain current mirror circuit using MOSFET, for the given circuit determine the value of I_{ref} and I_o . 10



- (b) Draw the circuit diagram of darlington pair using BJT, and derive the expression for A_v , A_i , Z_i and Z_o . 10
5. (a) For the given circuit, derive the equation for voltage gain A_f and find V_o for given cor 10



V_i	V_o	R_i	R_f
+1VDC	?	1K	10k
+1VDC	?	1K	100K
+1VDC	?	1k	1M

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- (b) Draw the circuit diagram of MOS differential amplifier and derive the expression for A_d , A_{cm} and CMRR. 10
6. Write short notes on (Attempt any Four.) 20
- (a) High pass and low pass filter using OPAMP
 - (b) Cascode amplifier using BJT.
 - (c) Widlar current source using MOSFET.
 - (d) Transistor shunt voltage regulator
 - (e) High frequency hybrid- π model of BJT.
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