

(REVISED COURSE)

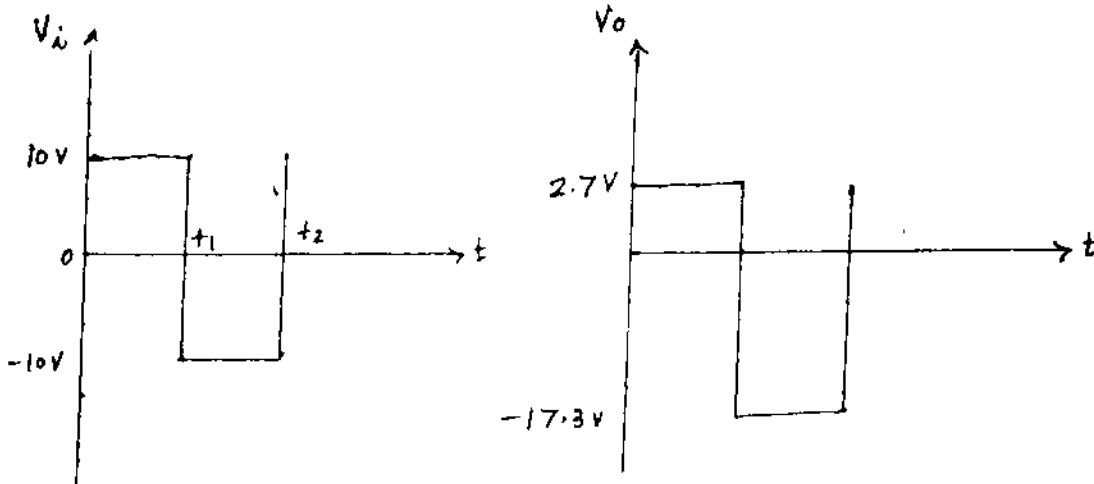
(3 Hours)

[ Total Marks : 100

- B.: (1) Question No. 1 is compulsory.  
 (2) Attempt any four questions from remaining six questions.  
 (3) Assume suitable data wherever necessary.

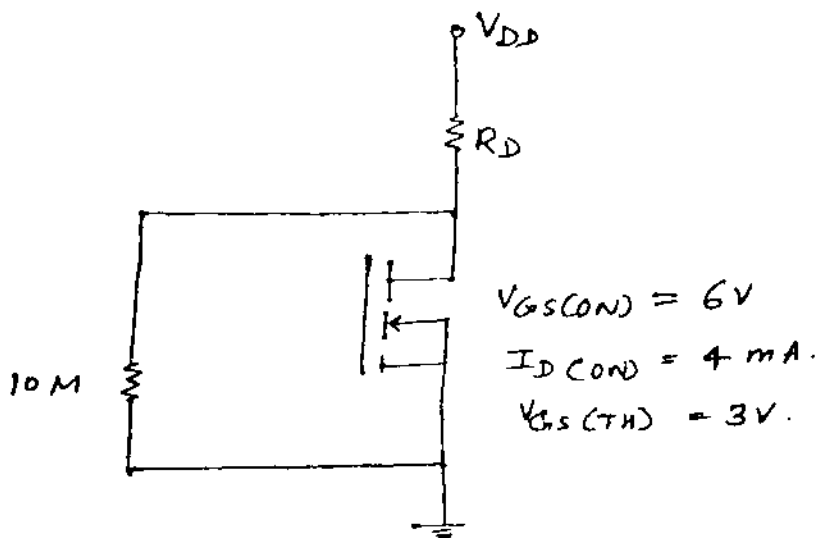
1. Answer the following :

- (a) Compare CB, CE and CC configurations of BJT. 5  
 (b) Give reason. Thermal runaway is of importance in BJT amplifier but not so in FET amplifier. 5  
 (c) Design a clamper to perform the following fun. 5

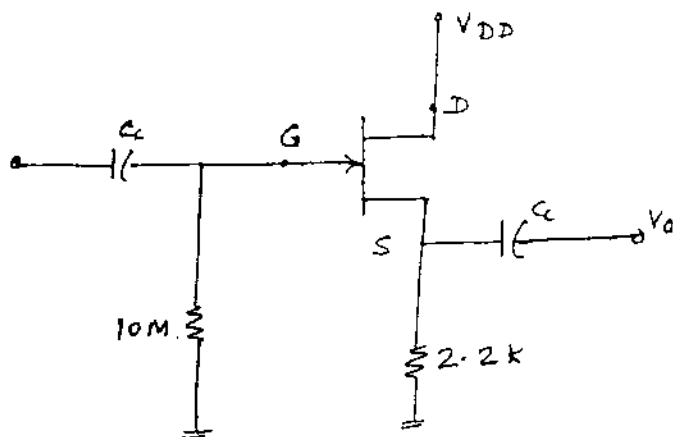


- (d) For the following network, determine  $V_{DD}$  and  $R_D$ . Levels of  $V_{DS}$  and  $I_D$  5

are specified as  $V_{DS} = \frac{1}{2} V_{DD}$  and  $I_D = I_{D(ON)}$



2. (a) Derive relations for input impedance, output impedance, overall voltage gain and current gain of a cascade amplifier. 10  
 (b) Determine  $A_v$ ,  $Z_i$ ,  $Z_o$  for the following circuit. Draw A.C. equivalent. 10



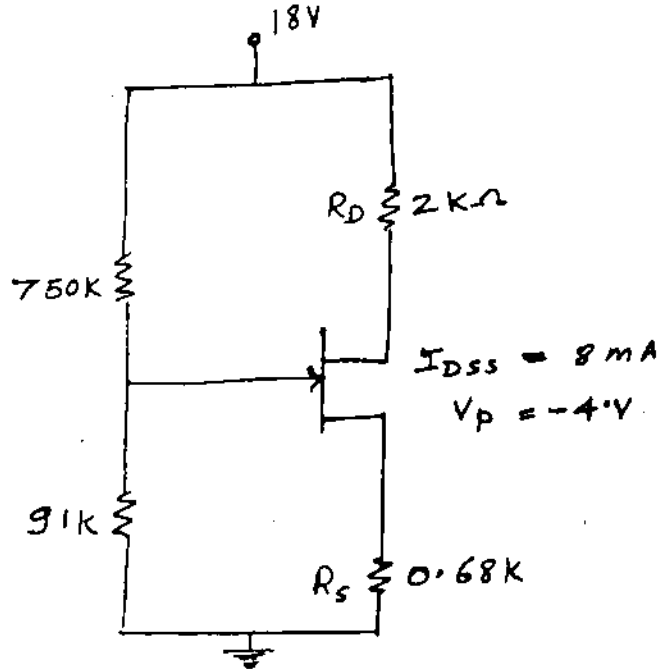
$I_{DSS} = 16 \text{ mA.}$

$V_P = -4 \text{ V}$

$Y_{OS} = 20 \text{ ms}$

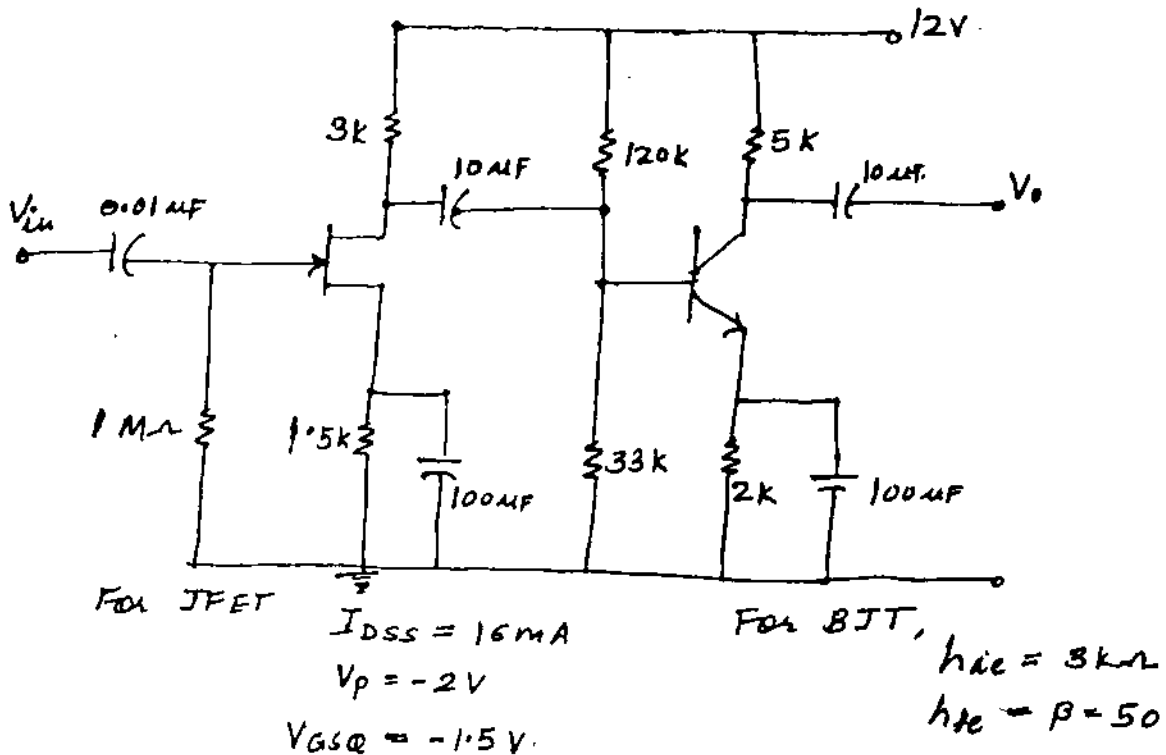
$V_{GSQ} = -2.86 \text{ V}$

3. (a) For the following network, determine  
 (1)  $I_{DQ}$  and  $V_{GSQ}$  (2)  $V_{DS}$  and  $V_S$ . What is the effect of resistance  $R_S$  ?



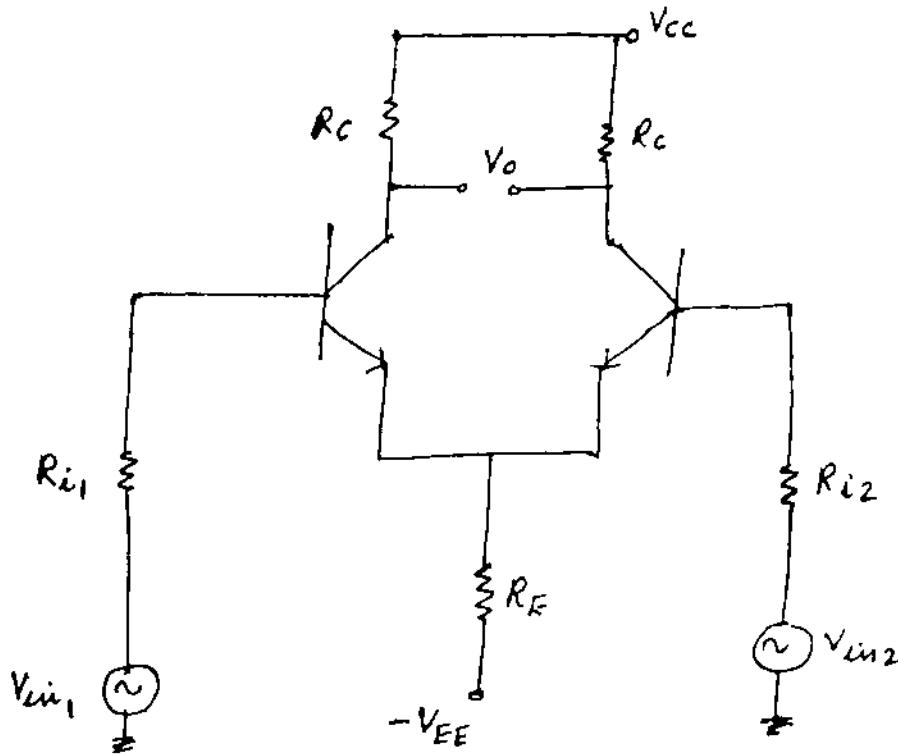
- (b) Discuss various types of biasing techniques used for BJT and compare them. 10

4. (a) For the circuit shown below, determine the following parameters.  
 (i) DC bias (Q points)  
 (ii) Mid frequency voltage gain. ( $A_V$ ).  
 (iii) Lower cut-off frequency (for BJT and FET)  $f_L$   
 (iv) Input impedance ( $Z_i$ )  
 (v) Output impedance. ( $Z_o$ ).



5. (a) Design a single stage RC coupled CE amplifier to meet the following specifications.  
 $V_o = 2V$ ,  $A_V \geq 70$ ,  $S \leq 10$   
 Audio frequency range  
 $R_L \approx 10 K\Omega$  Use BJT BC 147A.  
 (b) For the above designed circuit, determine maximum expected voltage gain  $Z_i$  and  $Z_o$ .

6. (a) Analyse the following circuit and derive the differential voltage gain ( $A_d$ ), i/p impedance ( $R_i$ ) and output impedance ( $R_o$ ). 10



- (b) For the above circuit if,  
 $R_C = 2.2 \text{ K}$ ,  $R_E = 4.7 \text{ K}$ ,  $R_{in1} = R_{in2} = 50 \Omega$   
 $\pm V_{CC} = 10 \text{ V}$ ,  $\beta_{dc} = \beta_{ac} = 100$ ,  $V_{BE} = 0.7 \text{ V}$   
 Determine  $A_d$ ,  $R_i$  and  $R_o$ . 10

7. Write short notes on the following (any three) :— 20
- Photo diode
  - MOSFET applications
  - Constant current source
  - Bode plots.

(Refer to Page No. 4 for DATA SHEET)