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SF-6487

B. E. - II (Sem. IV) (ECC) Examination

May / June - 2011

Electronics Circuits

(Old Course)

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 2 (SEM. 4) (ECC)**

Name of the Subject :

☛ **ELECTRONICS CIRCUITS (OLD)**

☛ Subject Code No. : **6 4 8 7** ☛ Section No. (1, 2,.....) : **NIL**

Seat No. :

Student's Signature

(2) Attempt all the questions.

(3) Figure on right indicates full marks.

(4) Assume suitable data wherever it is necessary.

1 (a) Attempt the following : **10**

(i) Draw the frequency response of RC coupled amplifier. Also mention the effect of different capacitances.

(ii) Draw the symbol for the following :

(a) P channel Depletion type MOSFET

(b) N channel enhancement type MOSFET.

(iii) What do you mean by amplification factor U ? Give its equation which relates transconductance factor gm.

(iv) Define Unity gain frequency. Also, relate it with f_B cut off frequency.

(v) Mention the effect of bypass and coupling capacitors on frequency response of CE amplifier shortly.

(b) For the common source amplifier obtain the expression for voltage gain input and output impedance. **5**

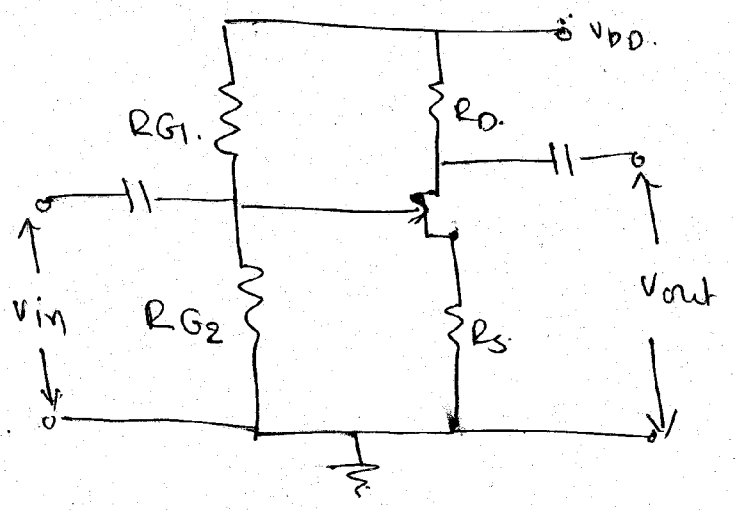
(c) In an n-channel JFET biased by voltage divider method, determine the value of R_s to given operating point **5**

I_D = u mA and V_{DS} = 8V

For the figure 1 shown below

RG = 1.2 Mn; RG_2 = 0.6 mn JFET

Parameters are I_D SS = 12 mA and Vp = -2V.

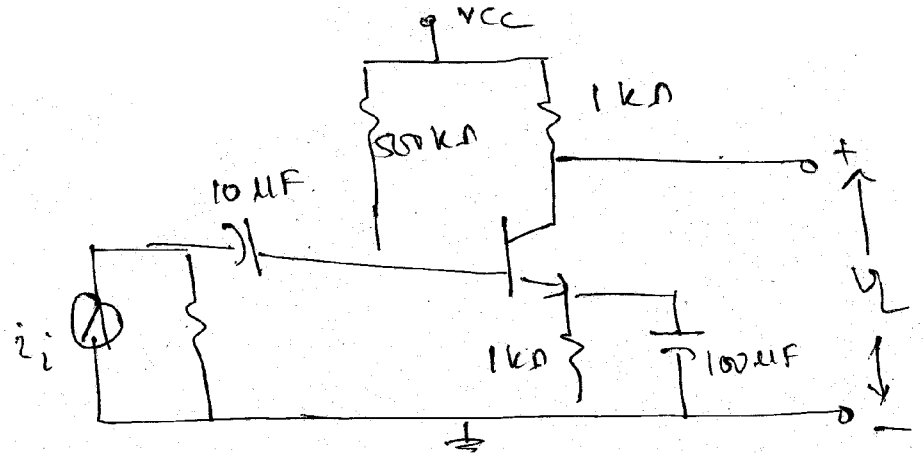


2 Attempt any two of the following : **16**

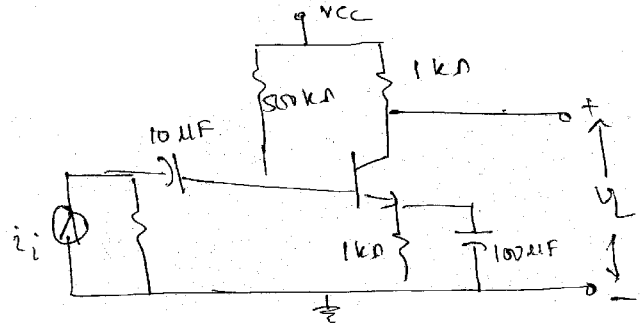
(a) Derive the expression for low frequency response for CE amplifier to find out the impact of coupling capacitor on lower BdB frequency. Find out the relationship between amplifier parameters and lower 3-dB frequency.

(b) Plot the magntuide and phase of $A_i = i_c/i_i$ as a function of the amplifier shown in figure 2.

hfe = 200, hie = 1 KΩ



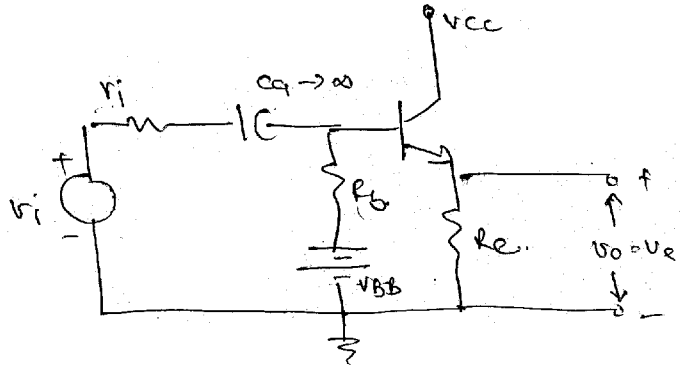
(c) In figure 3 find transfer function $v_i/_{ii}$ plot the asymptotic magnitude and the phase, hfe=50, hie=500 Ω.



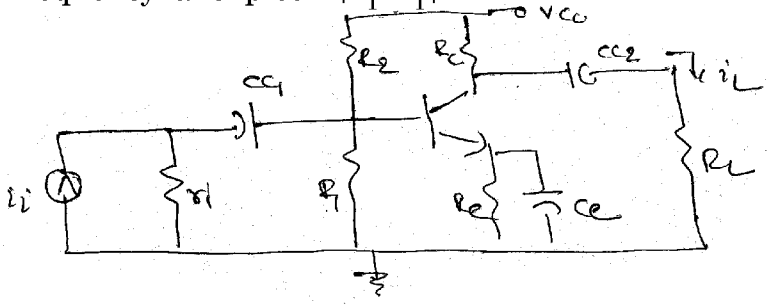
3 Attempt any two of the following : 14

(a) Explain common base C(B) amplifier at high frequency and obtain the expression for current gain and α. Cut off frequency state the relation between f_α and f_B cut-off frequencies.

(b) The emitter follower as shown in figure 4 has the component values
Cb'e = 1000 PF, hFe = 100 Cb'C = 10 PF
Re = 1 KΩ, rb'e = 100 Ω, Ri = 1 KΩ
Find the voltage gain Av.



(c) For figure 5; let ri = Rz = 10 KΩ, $R_1=R_C=R_L$=1KΩ, R_e = 100 Ω and $C_G = C_e=CC_2$ = 200 μF. The transistor is characterized by ω_T = 109 rad/S. hfe = 100, Cb'C = 5 PF and Vbb' = 0, 7EQ = 10m μΩ. Find upper 3dB frequency and plot $|z_i / z_i|$



4 (a) (i) Derive equation for input resistance with feedback for voltage-series feedback. **5**

(ii) An amplifier with negative feedback has a voltage gain of 100. It is found that without feedback an input signal of 50 mV is required to produce a given output whereas with feedback, the input signal, must be 0.6V for the same output. Calculate the value of voltage gain without feedback and feedback ratio. **5**

(b) (i) The resonant circuit of a tuned collector transistor oscillator has a resonant frequency of 5MHz. If value of capacitance is increased by 50%, calculate the new resonant frequency. **5**

(ii) Explain the Barkhausen criterion. **5**

5 (a) Write short note on the synchronously tuned amplifier. **7**

(b) Design a single tuned amplifier to operate at a center frequency of 455 kHz with a bandwidth of 10 kHz. The transistor has the parameters gm = 0.04 S, hfe=100, Cb'e = 1000 PF and Cb'c = 10 PF. The bias network and the input resistance are adjusted so that ri = 5KΩ and RL = 500Ω. **8**

OR

5 (a) Give advantages of negative feedback. **7**

(b) Draw and explain transistor phase-shift oscillator. **8**

6 Write short note on any three : **15**

(i) Voltage-series fedback amplifier.

(ii) Single tuned amplifier

(iii) Wien bridge oscillator

(iv) Crystal oscillator
