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SF-6503

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

May / June - 2011

Electronics Circuits - II

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

Instruction :

(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) (ELE.)
Name of the Subject :
☛ ELECTRONICS CIRCUITS - 2
☛ Subject Code No. : 6 5 0 3 ☛ Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Assume suitable data whenever necessary.

(4) Figures to the right indicate full marks.

1 (a) Answer the following questions :

(i) What is the difference between oscillator and amplifier. **1**

(ii) Draw the current shunt and voltage shunt topology. **2**

(iii) Explain the term CMRR. **1**

(iv) What do you mean by cascading of an amplifier ? **2**

(v) The phase shift of wein bridge oscillator is _____ (180^o, 70^o, 0^o, 90^o). **1**

(vi) Draw two stage R-C coupled amplifier. **2**

(vii) For Hartley oscillator Fo = _____ **1**

(b) Find the frequency of oscillation for Hartley oscillator if L = 10 μH c = 20 pF. **2**

(c) What do you understand by Darlington amplifier ? Explain its working and derive the expression for its current gain and input resistance. **8**

2 (a) For the current series feedback, derive expression for Af. 7

(b) For the circuit shown in fig (1) with h_{ie} = 1.1 k h_{re} = 50 for both transistors find 8

(i) $A_{if} = \frac{i_0}{i_s}$ (ii) R_{if} (iii) $A_{vf} = \frac{v_0}{v_s}$ (iv) $A_{vf}' = \frac{v_0}{v_i}$ (v) R_{og}'

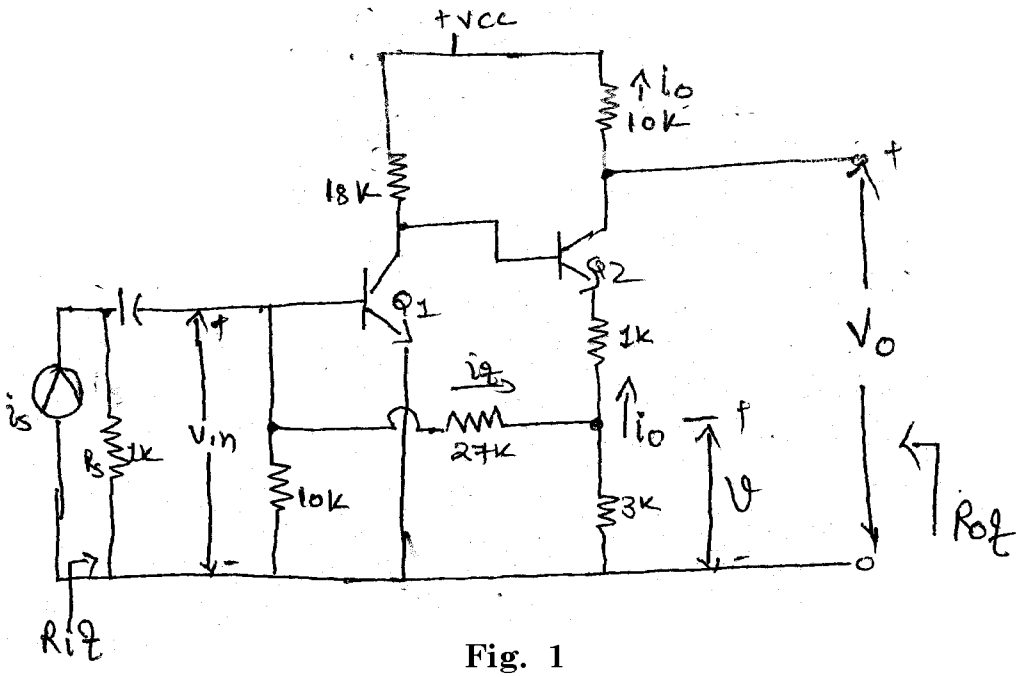


Fig. 1

OR

2 (a) List the advantages and disadvantages of negative feedback. 7

(b) For the circuit shown in fig (2) prove that 8

$$A_{vf} = \frac{v_0}{v_s} = \frac{-R^1}{R} \frac{1}{1 + \frac{R^1}{R_m}\left(\frac{R_i + R^1}{R^1} + \frac{R_i}{R}\right)}$$

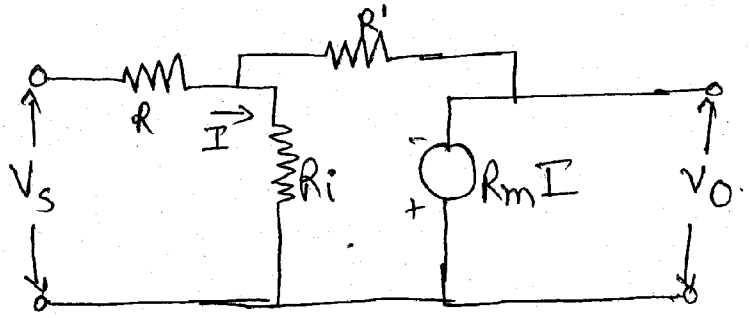


Fig. 2

3 (a) Explain RC phase shift oscillator and derive the frequency of oscillation. 8

(b) Explain the frequency stability in oscillator. 7

OR

3 (a) Draw and explain crystal oscillator with necessary derivations. 8

(b) A Hartley oscillator uses a FET with gm of 3 ms and rds = 10 kΩ. The total coil inductance is 10 μH. With a turns ratio of input side of 1:10. It is tuned with 20 PF capacitor. Find the frequency of oscillation and amplifier gain in decibles. 3

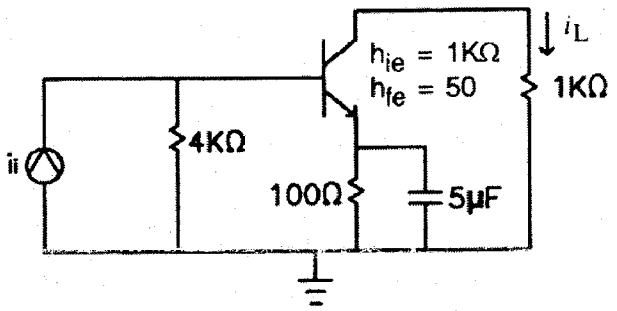
(c) Prove that in a crystal, the ratio of frequency in series and parallel resonance is given by $1+\frac{1}{2}\frac{C}{C'}$ 4

4 (a) Answer the following questions : (each of 1 mark) 10

(i) What do you mean by linear network ?
(ii) Give the definition of bandwidth.
(iii) What is meant by cut off frequency ?
(iv) Define clipper circuit.
(v) Write atleast two application of clamper circuit.
(vi) What is the difference between clipping circuit and clamping circuit ?
(vii) State the criterion for good integration.
(viii) State the definition of gain of an amplifier.
(ix) Name the type of acpacitance associated with RC coupled amplifier at high frequency.
(x) Give the definition of comparator.

(b) Derive the equation of current gain for RC coupled amplifier circuit by considering the effect of emitter bypass capacitor. 10

5 (a) In the figure shown below find the transfer function A. 8

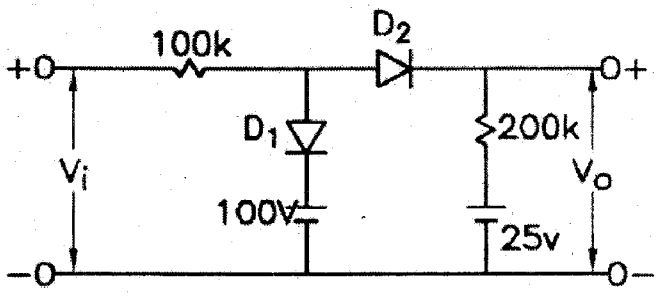


(b) Draw and explain the two-level diode clipper circuit in detail. **7**

OR

5 (a) Derive the equation of voltage gain for FET amplifier circuit by considering the effect of drain coupling capacitor. Assume that the value of gate coupling capacitor and source bypass capacitor is very high. **8**

(b) Obtain the transfer characteristic for the figure shown below. Assume ideal diode. Sketch output if Vi = 150 sin wt. **7**



6 Answer any three questions from following : **15**
(each of 5 marks)

(i) Draw and explain RC high pass circuit as differentiator.

(ii) Draw and explain basic negative clamper circuit.

(iii) Write short note on transistor as a switch.

(iv) Explain clamping circuit theorem.

(v) Explain the response of RC low pass circuit when excited by sinusoidal input.