NEW SCHEME

EC32

Reg. No. | | | | | | | | | | |

Third Semester B.E. Degree Examination, January/February 2006

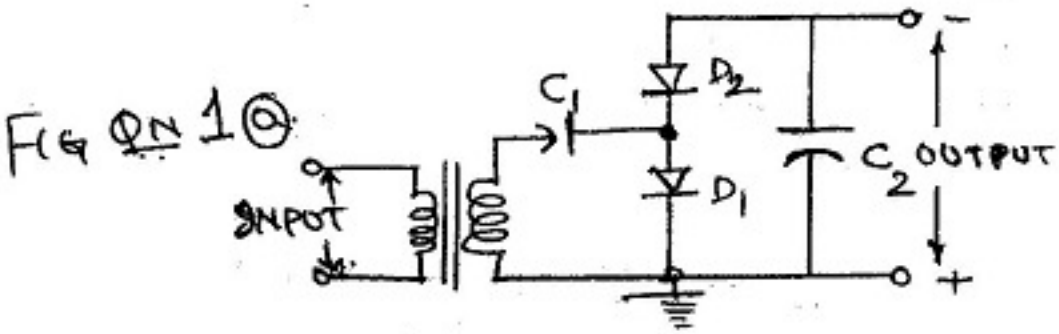
EC/TE/EE/ML/BM/IT/CS/IS

Electronic Circuits

Time: 3 hrs.) (Max.Marks : 100

Note: *1. Answer any FIVE full questions.*
2. All questions carry equal marks.
3. Missing data, if any may suitably be assumed giving valid reasons.

1. **(a)** Analyse the operation of the half wave voltage doubler circuit shown in the following figure. Calculate the maximum possible voltage across each capacitor. What should be done to change the polarity of output? **(8 Marks)**



(b) i) In the clipping circuit shown, assume that the diodes have infinite back resistance, forward resistance of 50Ω and $V_\gamma = \theta$. Calculate and plot the transfer characteristic Vo Vs VI. Show that the circuit has an extended break point. **(6 Marks)**

ii) Find the transfer characteristic If D_2 were removed and the resistor R were moved to replace D_2. **(6 Marks)**

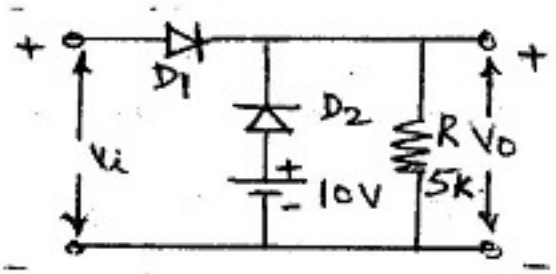


FIG QN 1 (b)

Contd.... 2

2. (a) What are the causes of instability in a transistor? Explain them in brief. **(5 Marks)**

(b) For the biasing arrangement shown in the following figure, determine $S(I_{CO})$, $S'(V_{BE})$ & $S''(\beta)$. Assume the reverse saturation current of diode and transistor are equal. **(9 Marks)**

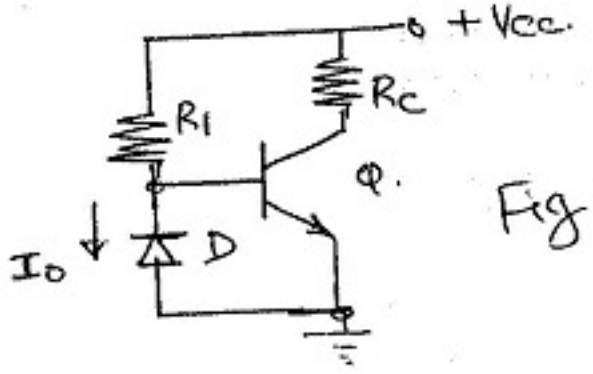


Fig Qn 2 (b)

(c) Explain any one method of biasing linear integrated circuits. **(6 Marks)**

3. (a) State and explain dual of Miller's theorem. **(5 Marks)**

(b) What are the advantages of h-parameters? **(5 Marks)**

(c) For the transistor amplifier shown, calculate A_I, A_V, A_{VS}, R_o *and* R_i Assume $h_{ie} = 1100\Omega$, $h_{re} = 2.5 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = \frac{1}{40K}$. **(10 Marks)**

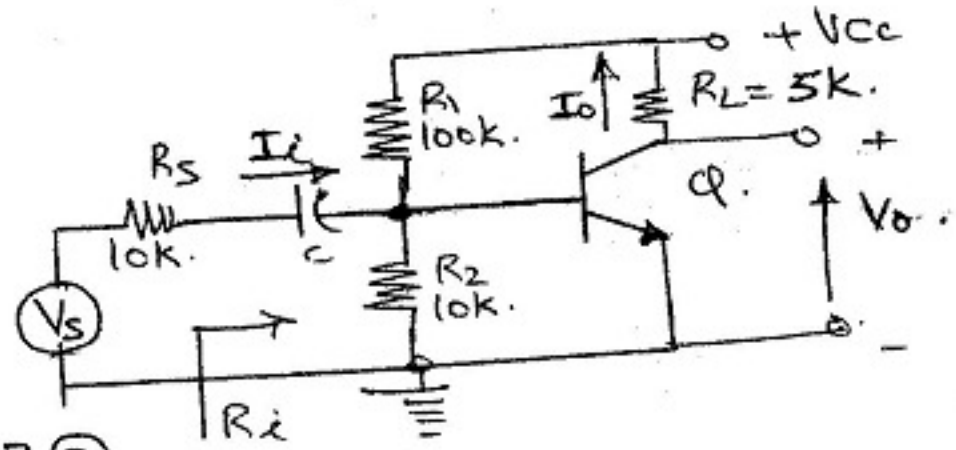


Fig Qn 3 (c)

4. (a) i) Draw the hybrid $-\pi$, circuit at low frequencies, if the load resistance is $R_L = \frac{1}{g_L}$. Prove that

$$k = \frac{V_{ce}}{V_{be}} = \frac{-g_m + g_{b'c}}{g_{b'c} + g_{ce} + g_L}$$, neglecting C_e and C_o. **(12 Marks)**

ii) Using Miller's theorem, draw the equivalent circuit between C and E. Applying K_{CL} to the network, show that the above value of k is obtained.

(b) Explain the various types of distortions encountered in amplifiers. **(8 Marks)**

Contd.... 3

5. (a) Derive an expression for R_{if} for a feedback amplifier employing current series feed back. **(5 Marks)**

   (b) Show by a mathematical derivation that bandwidth of an amplifier increases with negative feedback. **(8 Marks)**

   (c) The h-parameter model of a transistor can be considered to represent a feedback amplifier, due to the presence of h_{rc} source. Using feedback formulae, find the input resistance with feedback R_{if}. **(7 Marks)**

6. (a) Show that a transformer coupled class A amplifier has a maximum power efficiency of 50%. **(8 Marks)**

   (b) What are the advantages of push pull operation? **(4 Marks)**

   (c) A class B power amplifier is delivering an output voltage of 10 volts peak to a 8Ω load. If the DC power supply is 30 volts, calculate

   i) DC power input

   ii) AC power delivered to the load

   iii) Conversion efficiency

   iv) Power dissipated in the collector of each transistor. **(8 Marks)**

7. (a) Describe a method of measuring CMRR of an op-Amp. **(6 Marks)**

   (b) Design an op-Amp inverting type Schmitt trigger circuit to have $UTP = +2V$ and $LTP = -4V$. Assume $V_{sat} = \pm 10V$. If the input is 5 $sin\omega t$, plot the wave forms at input and output. **(7 Marks)**

   (c) Draw the diagram of an absolute value circuit and explain its operation. **(7 Marks)**

8. (a) With the help of a neat diagram describe the operation of a successive approximation type analog to digital converter. **(10 Marks)**

   (b) Explain how a 555 timer chip can be used as a free running ramp generator. Derive an expression for its frequency. **(10 Marks)**

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