NEW SCHEME

EC32

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Third Semester B.E. Degree Examination, July/August 2004

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

Electronic Circuits

Time: 3 hrs.] [Max.Marks : 100

Note: *1) Answer any FIVE questions.*
2) All questions carry equal marks.

1. (a) What is the origin of diffusion capacitance. Obtain an expression for the diffusion capacitance in terms of current in a P-n diode. (6 Marks)

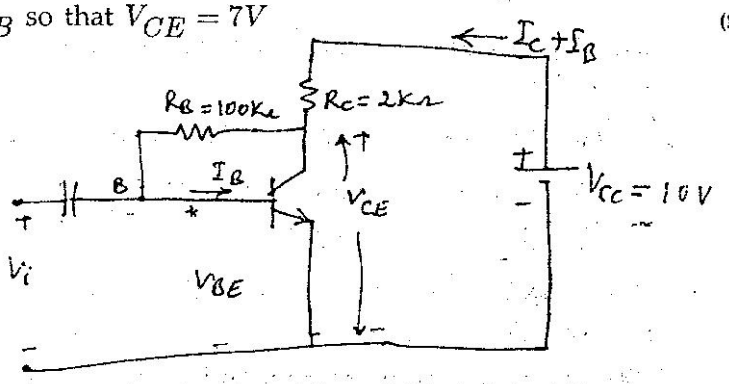
   (b) Draw a double diode clipper which limits at two independent levels and explain its working. (8 Marks)

   (c) Draw a simple clamping circuit and explain its working. (6 Marks)

2. (a) Define the terms P.I.V and regulation as applied to rectifiers. (4 Marks)

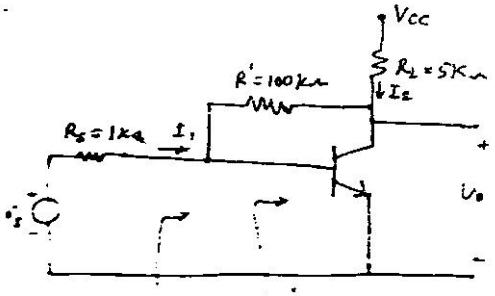
   (b) For a self bias circuit, derive an expression for the stability factor S. (8 Marks)

   (c) For the circuit shown in Fig. 2(c) calculate
   i) I_B, I_C and V_{CE} if a silicon transistor is used with $\beta = 50$
   ii) A value for R_B so that $V_{CE} = 7V$ (8 Marks)



3. (a) What are the advantages of using hybrid model to represent the transistor? Explain how the h-parameters can be obtained from the static characteristics of the transistor. (10 Marks)

   (b) For the amplifier shown in Fig. 3(b), calculate R_i, R_i', A_V, A_{V_S} and $A_I' = -\frac{I_2}{I_1}$. The transistor parameters are $hie = 1.1k\Omega$, $hre = 2.5 \times 10^{-4}$, $h_{fe} = 50$ and $h_{oe} = 25\mu A/V$. (10 Marks)



4. (a) Draw hybrid-π model for C.E transistor and explain the significance of each component in the model. (6 Marks)

   (b) Derive expressions for transistor input conductance $g_{b'e}$ and feed back conductance $g_{b'c}$. (8 Marks)

   (c) How are amplifiers classified? Discuss them briefly. (6 Marks)

5. (a) Draw a feedback amplifier in block diagram form. Identify each block and explain its function. (8 Marks)

   (b) Derive an expression for the input resistance of a voltage series feedback topology. (5 Marks)

   (c) If an amplifier has a bandwidth of 200kHz and a voltage gain of 100, what will be the new band width and gain if 5% negative feedback is introduced? What would be the amount of feedback if the bandwidth is restricted to 1 MHz? (7 Marks)

6. (a) Non linear distortion results in the generation of frequencies in the output that are not present in the input. If the dynamic curve can be represented by the equation $i_c = G_1 ib + G_2 i_b^2$ and if the input signal is given by $i_b = (I_1 cos\omega_1 t + I_2 cos\omega_2 t)$. Show that the output will contain a D.C. term and sinusoidal terms of frequency $\omega_1, \omega_2, 2\omega_1, 2\omega_2, (\omega_1 + \omega_2)$ and $(\omega_1 - \omega_2)$. (10 Marks)

   (b) Show that even harmonics are absent in the output of a push pull amplifier. (6 Marks)

   c) A transistor supplies 0.85 w to a $4k\Omega$ load. The zero signal D.C. collector current is 31mA and the D.C. collector current with signal is 34 mA. Determine the second harmonic distortion. (4 Marks)

7. (a) Draw the circuit and explain how to measure the differential input resistance of an op. Amp. (7 Marks)

   (b) Explain the working of a first order low-pass butter worth filter. (5 Marks)

   (c) Design an op Amp Schmitt trigger circuit to meet the following specifications.
   $$V_{UTP} = 7V, \quad V_{LTP} = 3V, \quad V_a = \pm 15V.$$ (8 Marks)

8. (a) With a neat block diagram, explain the working of a successive approximation type of ADC circuit. (3+5=8 Marks)

   (b) With the help of neat diagram and relevant wave forms explain the working of manostable multivibrator circuit using 555 timer. (8 Marks)

   (c) Design a monostable multivibrator using 555 timer to obtain a pulse of width 1msec. (4 Marks)

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