NEW SCHEME

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# Third Semester B.E. Degree Examination, July/August 2005

## 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.*

**1.** (a) Draw the piece-wise linear volt-ampere characteristics of a p-n diode. Give the circuit model for the ON state and OFF state. **(4 Marks)**

(b) Sketch and explain the circuit of a double ended clipper using ideal p-n diodes which limit the output between $\pm 10V$ **(6 Marks)**

(c) Draw the circuit diagram of a bridge rectifier with capacitor filter. Plot its input and output waveforms. Derive an expression for its ripple factor. **(10 Marks)**

**2.** (a) Explain the working of a full wave voltage doubler circuit. **(5 Marks)**

(b) Explain how a diode can be used in a transistor circuit to compensate for changes in $I_{CO}$. **(6 Marks)**

(c) In the circuit of Fig.2(c) given below, $V_{CC} = 10V$, $R_C = 1.5\ \Omega$, $I_{C_\theta} = 2mA$, $V_{CE} = 5V$, $V_{BE} = 0.7V$, $\beta = 50$ and stability factor $s \leq 5$. Find $R_1$ and $R_2$. **(9 Marks)**

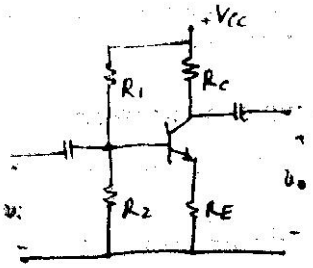


Fig: Q 2(c)

**3.** (a) Obtain h-parameter model of a transistor. **(5 Marks)**

(b) The transistor amplifier shown in Fig.3(b) uses a transistor whose $h$-parameters are $h_{ie} = 1.1\ k\Omega$, $h_{fe} = 50$, $h_{re} = 2.5 \times 10^{-4}$ and $1/h_{oe} = 40k\Omega$. Calculate $A_I = \frac{I_o}{I_i}$, $A_V$, $A_{V_s}$, $R_O$ and $R_i$. **(10 Marks)**

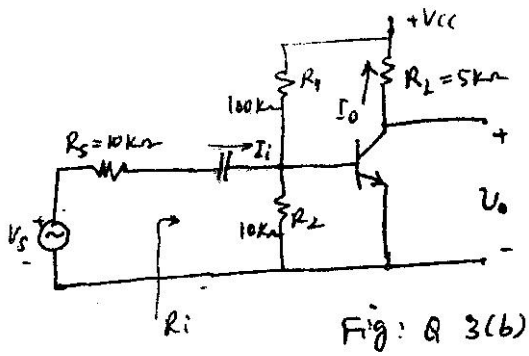


Fig: Q 3(b)

(c) State and prove Millers theorem. (5 Marks)

4. (a) Derive expressions for transistor input conductance $g_{b'e}$ and feedback conductance $g_{b'c}$ (10 Marks)

(b) Explain different types of distortions in amplifiers. (5 Marks)

(c) How are amplifiers classified? Explain them briefly. (5 Marks)

5. (a) Discuss the general characteristics of negative feedback amplifiers. (9 Marks)

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

(c) An amplifier without feedback gives a fundamental output of 36V with 7 percent second harmonic distortion when the input voltage is 0.028V.

i) If 1.2 percent of the output is fed back into the input in a negative voltage series feedback circuit, what is the output voltage ?

ii) If the fundamental output is maintained at 36V but the second harmonic distortion is reduced to 1 percent, what is the input voltage? (6 Marks)

6. (a) Discuss how rectification may take place in a power amplifier. (5 Marks)

(b) Show that the maximum conversion efficiency of the idealized class B push pull amplifier is 78.5 %. (9 Marks)

(c) Calculate the peak power dissipated in each transistor of a class B pushpull power amplifier if $V_{CC} = 15V$ and $R'_L = 5\Omega$. (6 Marks)

7. (a) Explain how to measure the differential input resistance $R_i$ of an op.amp. (7 Marks)

(b) What are the advantages of active filters over passive ones? Design a first order high pass filter at a cutoff frequency of 400Hz and a pass band gain of 2. (7 Marks)

(c) Draw an op-amp Schmitt trigger circuit and explain its operation. (6 Marks)

8. (a) Draw a 4-bit D/A converter using R/2R resistors and explain its working. (7 Marks)

(b) Draw and explain the working of a sample and hold circuit. (5 Marks)

(c) Draw the circuit diagram of an A.M.V. using 555 timer and explain its operation. (8 Marks)

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