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NEW SCHEME

Third Semester B.E. Degree Examination, July 2007
EC/TE/EE/BM/ML/IT/CS/IS
Electronic Circuits

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

Note : ***Answer any FIVE full questions.***

1 a. Define diffusion capacitance. Derive an expression for the same. **(05 Marks)**

b. Draw the piece wise linear V-I characteristics of a P-N junction diode. Give the circuit model for the ON state and OFF state. **(05 Marks)**

c. The input voltage V_i to the two-level clipper circuit as shown in fig.1(c) varies linearly from 0 to 150 V. Sketch the output voltage V_0 to the time scale. Assume diodes as ideal. **(10 Marks)**

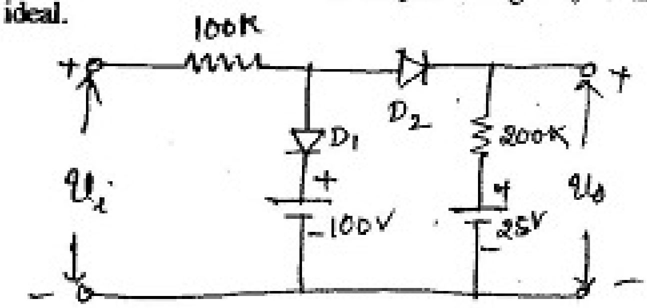

Fig.1(c)

2 a. With necessary circuit and waveforms, explain a bridge rectifier circuit with capacitor filter. Derive an expression for the ripple factor. **(10 Marks)**

b. Design a full wave rectifier filter to meet the following requirements. DC output voltage = 15 V, load resistance = 1 K, rms ripple voltage on capacitor <1 % of dc output voltage. The AC supply voltage is 230 V at 50 Hz. **(10 Marks)**

3 a. What is the need for bias compensation? Explain the compensation techniques used for V_{BE} and I_{CBO}. **(10 Marks)**

b. The circuit shown in fig.3(b) uses silicon transistor with $\beta = 45$, $V_{CC} = 24$ V, $R_C = 10$ K, R = 10 K, $R_E = 0.27$ K. If $V_{CE} = 5$ V under quiescent conditions, find the value of 'R' and the stability factor $S(I_{CO})$. **(06 Marks)**

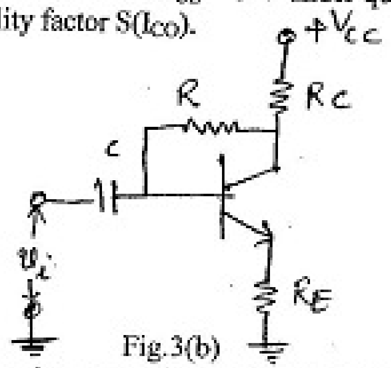

Fig.3(b)

c. What do you mean by thermal runway of a transistor? Explain. **(04 Marks)**

a. Obtain an expression in terms of 'h' parameters for a transistor as a two-port network. Using the above developed equations obtain the hybrid model of CE, CC and CB configurations. **(08 Marks)**
b. State and explain Millers theorem. **(04 Marks)**
c. A transistor is connected as a common emitter amplifier driving a load of 10 kΩ. It is supplied by a source of 1 kΩ internal resistance. The 'h' parameters are $h_{ie} = 1.1$ kΩ, $h_{fe} = 50$, $h_{re} = 2.5 \times 10^{-4}$, $h_{oe} = \frac{1}{40\,k\Omega}$. Find: i) Current gain ii) Voltage gain iii) Input impedance iv) Output impedance. **(08 Marks)**

a. Derive an expression for: i) Input conductance ($g_{b'e}$) ii) Output conductance (g_{ce}) for a transistor at high frequency. **(06 Marks)**
b. Give the classification of multistage amplifier. Explain the various distortions in amplifiers. **(08 Marks)**
c. Discuss the general characteristics of a negative feedback amplifier. **(06 Marks)**

a. Derive an expression for input and output resistance of a voltage shunt feedback amplifier. **(06 Marks)**
b. Explain the different types of power amplifiers. **(08 Marks)**
c. An ideal class B- pushpull amplifier with input and output transformers, has $V_{CC} = 20$ V, $N_2 = 2N_1$ and $R_L = 10\ \Omega$. The transistors have $h_{FE} = 20$. Let the input be sinusoidal. For the maximum output signal $V_m = V_{cc}$. Determine: i) The output signal power ii) Collector power dissipation iii) Conversion efficiency. **(06 Marks)**

a. Obtain an expression for the closed loop gain of a non-inverting amplifier. **(07 Marks)**
b. With necessary sketch and characteristic curves explain the operation of a Schmitt trigger. **(08 Marks)**
c. What do you mean by precision rectifiers? Explain full wave precision rectifier. **(05 Marks)**

a. Explain the working of SAR ADC. **(06 Marks)**
b. Explain the working R - 2R ladder DAC. **(07 Marks)**
c. Explain the applications of astable multivibrator as:
i) Square wave generator ii) To achieve variable duty cycle control. **(07 Marks)**