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EC32

Third Semester B.E. Degree Examination, Dec. 07 / Jan. 08
Electronic Circuits

Time: 3 hrs. Max. Marks:100

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

1 a. Discuss voltage doubler circuit. **(05 Marks)**

b. Define regulation and derive equation for a fullwave circuit. **(07 Marks)**

c. In the Fig.1(c) the diodes are ideal. Write the transfer characteristic equations (V_0 V_s V_i). Plot V_0 V_s V_i. Indicate all intercepts, slopes and voltage levels.

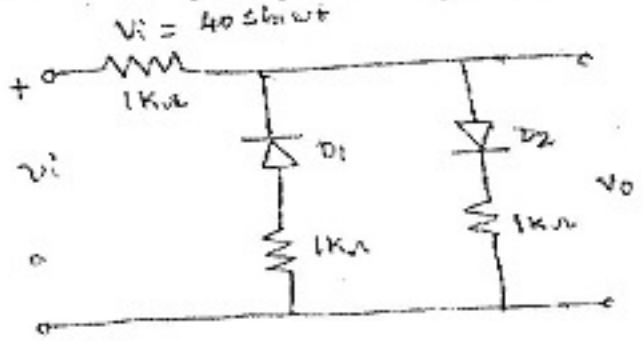

Fig.1(c)

Repeat for the case when $V_r = 1$ V $V_i = 40 \sin \omega t$ **(08 Marks)**

2 a. Define three stability factors. For a self bias circuit derive the expression for S_v and S_i. **(10 Marks)**

b. For the circuit shown in Fig.2(b) $V_{cc} = 24$ V, $R_c = 10$ kΩ, $R_e = 270$ Ω, $\beta = 45$. Silicon transistor is used under operationing condition $V_{ce} = 5$V find

i) R ii) Stability factor S

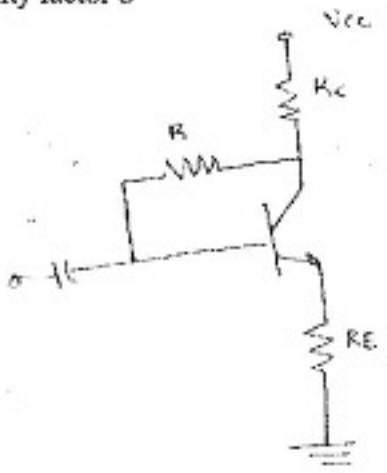

Fig.2(b) **(06 Marks)**

c. Briefly discuss how do you provide operating point stability using compensation technique. **(04 Marks)**

3 a. Using small signal low frequency hybrid model for the CE amplifier with a load of Z_L and source resistance R_S derive expression for A_i, A_V, Z_i and Z_o. **(10 Marks)**

b. For a transistor amplifier in CB configuration find A_i, A_V, Z_{in}, Z_{out}, A_{VS} and A_{IS} given that $h_{ib} = 22\ \Omega$, $h_{rb} = 2.9 \times 10^{-4}$, $h_{fb} = -0.98$, $1/h_{ob} = 2.04$ mΩ. **(06 Marks)**

c. State and Prove Miller's theorem. **(04 Marks)**

4 a. Draw small signal high frequency CE model for transistor and explain the significance of even component in the model and prove that $h_{fe} = g_m r_{b'e}$. (08 Marks)

b. Discuss the various types of distortion in amplifier. (06 Marks)

c. With suitable RC circuit calculate low frequency response of an amplifier. (06 Marks)

5 a. Explain the advantages of negative feed back circuit. (06 Marks)

b. Draw and explain different feed back amplifier topologies. (08 Marks)

c. An amplifier with open loop voltage gain $A_V = 1000 \pm 100$ is available. It is necessary to have an amplifier whose voltage gain varies by no more than $\pm 0.1\%$.

i) Find the reverse transmission factor β of the feed back network

ii) Find gain with feedback. (06 Marks)

6 a. Show that the maximum conversion efficiency of class-B push pull amplifier is 78.5%. (06 Marks)

b. Discuss why even harmonics are not present in push-pull amplifier. (06 Marks)

c. Explain :

i) Input bias current compensation in OPAMP.

ii) Input offset voltage compensation for inverting and non inverting configuration. (08 Marks)

a. Design a single pole LPF with a cut off frequency of 10 kHz and mid band gain of 1.5. Draw the circuit diagram. (05 Marks)

b. With a neat diagram and relevant waveforms explain the following OPAMP circuits :

i) Peak detector and clamper

ii) Schmitt trigger

iii) Instrumentation amplifier

c. Explain sample and hold act. (10 Marks)

a. With a neat diagram and relevant waveforms, explain the working of an astable modulator circuit using 555 timer. Obtain the expression for the time period. (05 Marks)

b. Discuss the specifications of a DAC circuit. (12 Marks)

(08 Marks)