EC32

USN

NEW SCHEME

Third Semester B.E. Degree Examination, Dec. 06 / Jan. 07
EE / EC / IT / TC / BM / ML / CS / IS
Electronics Circuits

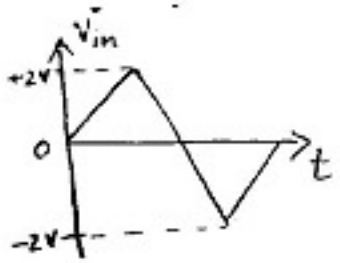
Time: 3 hrs.] [Max. Marks:100

Note : *1. Answer any FIVE full questions.*
2. Missing data may be suitably assumed.

1 a. Explain diffusion capacitance. Obtain an expression for the diffusion capacitance in a P-N diode. **(07 Marks)**

b. What is a voltage multiplier circuit? Explain the operation of a full wave voltage doubler circuit. **(07 Marks)**

c. Assuming ideal diode in the circuit shown below, draw the output voltage for the given input signal.



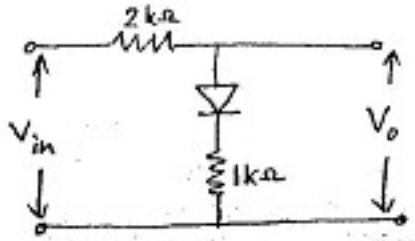


Fig.1(c) **(06 Marks)**

2 a. Draw and explain a double diode clipper circuit, which limits the output at two independent levels. **(06 Marks)**

b. Explain how a diode can be used in a transistor to compensate for changes in I_{CO}. **(06 Marks)**

c. For the circuit shown in the Fig.2(c) determine I_C, V_{CE}, R_1, V_B.

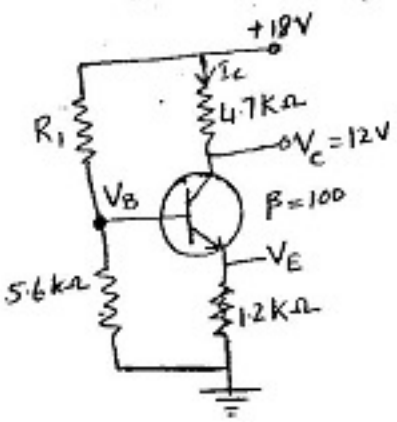


Fig.2(c) **(08 Marks)**

3 a. Explain how h-parameters can be obtained from the static characteristics of a transistor. **(06 Marks)**

b. State and explain Millers theorem. **(04 Marks)**

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c. For the common emitter amplifier with collector to base bias shown in the Fig.3(c) Calculate : A_i, R_i, R'_i, A_v and A_{vs}
Given : $h_{ie} = 1.1$ k ; $h_{fl} = 50$ $h_{oe} = 25$ μA/V ; $h_{re} = 2.5\times10^{-4}$

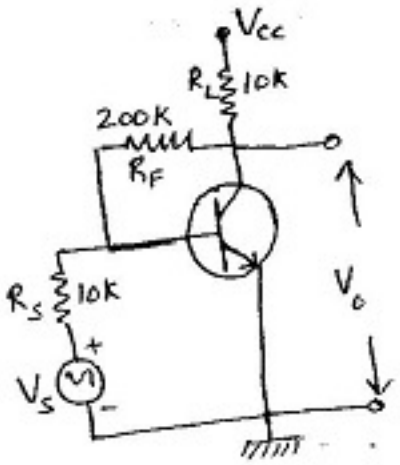

Fig.3(c) **(10 Marks)**

4 a. Draw the hybrid - π model of a transistor and explain the significance of each component in the model. **(06 Marks)**

b. Derive expressions for transistor transconductance g_m and input conductance $g_{b'e}$. **(10 Marks)**

c. Explain the various types of distortions encountered in amplifiers. **(04 Marks)**

5 a. What is negative feedback in amplifiers? Show that negative feedback increases the bandwidth of an amplifier. **(08 Marks)**

b. Derive an expression for the input resistance with feedback amplifier employing voltage series feedback. **(06 Marks)**

c. An amplifier with negative feedback has voltage gain 120. It is found that without feedback an input signal of 60mV is required to produce a particular output, whereas with feedback the input signal must be 0.5V to get the same input. Find A_V and β of the amplifier. **(06 Marks)**

6 a. Show that a transformer coupled class-A amplifier has a maximum power efficiency of 50%. **(07 Marks)**

b. With circuit diagram explain the working of class-B push-pull amplifier. Also obtain an expression for the maximum conversion efficiency of this amplifier. **(09 Marks)**

c. How much maximum power can be dissipated in the individual transistors of a class-B push-pull power amplifier if $V_{CC} = 20$V and $R_L = 4\Omega$. **(04 Marks)**

7 a. With usual notations derive an expression for the voltage gain of a practical inverting op-amp. **(06 Marks)**

b. Describe a method of measuring and calculating CMRR of an op-amp. **(06 Marks)**

c. What are the advantages of active filters over passive ones? Design a first order high pass filter at a cutoff frequency of 10 kHz with a pass band gain of 1.5. **(08 Marks)**

8 a. Draw an inverting op-amp Schmitt trigger circuit and explain its working. **(06 Marks)**

b. Explain the principle of operation of a R-2R ladder type D to A converter. **(06 Marks)**

c. With the help of a neat diagram and relevant waveforms explain the working of a monostable multivibrator circuit using 555 timer. **(08 Marks)**