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BIEL-011

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

00566

Term-End Examination

June, 2015

BIEL-011 : LINEAR INTEGRATED CIRCUITS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Missing data may be suitably assumed. Use of scientific calculator is permitted.*

1. Give the circuit diagram of a CASCODE AMPLIFIER (CE-CB configuration). Explain its operation by carrying out its DC Analysis and AC Analysis. *10*

2. (a) Give the block diagram representation of a typical op-amp and also enlist the functions performed by each individual stage. *2+3=5*

(b) What are the different arrangements for obtaining positive and negative supply voltages for an op-amp ? *5*

3. Explain the frequency response of an internally compensated and non-compensated op-amp. *5+5=10*

4. Define the term slew rate of an op-amp and derive the slew rate equation. An inverting amplifier using 741C has a flat response upto 40 kHz. The gain of the amplifier is 10. What maximum peak-to-peak input signal can be applied without distorting the output ? *2+4+4=10*

5. (a) Prove that for an inverting amplifier, the compensation resistor (R_{comp}) placed at the non-inverting terminal to compensate for bias current is given by the expression $R_{comp.} = \frac{R_F R_1}{R_1 R_F}$. *5*

(b) For the circuit shown in Figure 1, determine the magnitude of the output voltage, V_o. *5*

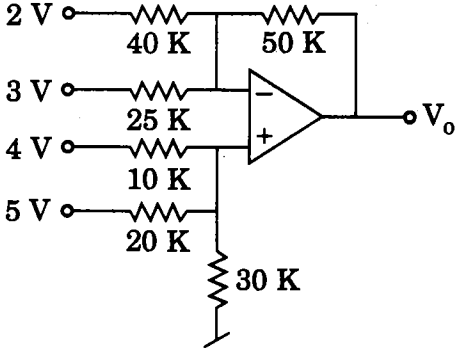

Figure 1

6. (a) Draw the circuit diagram of a voltage to current converter with (i) floating load (ii) grounded load and show that output current is proportional to the input voltage. i.e. $i_L \propto V_i$. $3\frac{1}{2}+3\frac{1}{2}=7$

(b) What is the function of a peak detector circuit ? Give its circuit diagram only. 3

7. What are active filters ? List the advantages of active filter over passive filter. Prove that the circuit shown in Figure 2 is a first order high-pass filter.

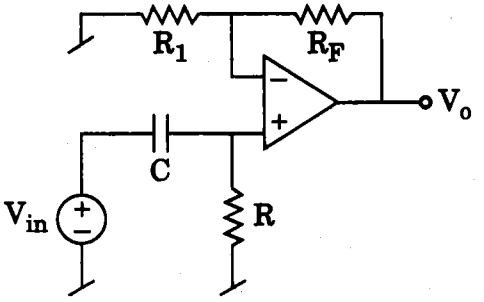

Figure 2

8. For the circuit shown in Figure 3, determine the nature of waveforms at V_{o_1} and V_{o_2}. Also determine the expression for the frequency of the waveform obtained at V_{o_2}. *4+6=10*

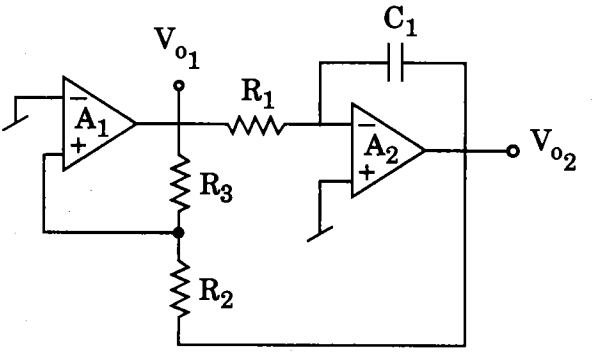

Figure 3

9. Explain the operation of a RC-phase shift oscillator with the help of a neatly labelled circuit diagram and also determine : *5+5=10*

(i) Condition for oscillations

(ii) Frequency of oscillations

10. Write the technical notes on any ***two*** of the following : *2×5=10*

(a) Absolute Value Detectors

(b) Clippers and Clampers

(c) Small-Signal Full-Wave Rectifiers

(d) Zero-Crossing Detectors