No. of Printed Pages : 6

BIEL-038

DIPLOMA – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI)

Term-End Examination

00455

December, 2014

BIEL-038 : LINEAR INTEGRATED CIRCUITS

Time : 2 hours *Maximum Marks : 70*

Note : *First question is* ***compulsory*** *and attempt any* ***four*** *from the rest. All questions carry equal marks. Use of scientific calculator is permitted. Missing data, if any, should be assumed.*

1. (a) What is used to eliminate the effect of offset voltage ?

(i) Voltage offset null circuit

(ii) Resistor feedback

(iii) Feedback circuit with passive device

(iv) None of the above

(b) The op-amp integrator and differentiator are useful for

(i) clipping circuit

(ii) wave-shaping circuit

(iii) clamping circuit

(iv) None of the above

(c) The application of PLL is

(i) Charging device

(ii) Wave generator

(iii) AM and FM demodulator

(iv) All of the above

(d) The voltage gain of a basic instrumentation amplifier is set by

(i) Diode

(ii) Capacitor

(iii) Resistor

(iv) Inductor

(e) The Duty cycle of astable operation using IC-555 is

(i) $\frac{R_A + R_B}{2(R_A + R_B)}$

(ii) $\frac{2R_A + R_B}{R_A + R_B}$

(iii) $\frac{R_A + R_B}{2R_A + R_B}$

(iv) $\frac{R_A + R_B}{R_A + 2R_B}$

(f) The critical frequency is defined as the point at which the response drops _____ from the pass band.

(i) – 20 dB

(ii) – 3 dB

(iii) – 6 dB

(iv) – 40 dB

(g) An op-amp as a voltage follower has a voltage gain of

(i) Infinity

(ii) Zero

(iii) Unity

(iv) Less than unity *7×2=14*

2. (a) Why is differential amplifier used as an input stage of op-amp ? Draw and explain the circuit diagram of push-pull amplifier used in output stage of an op-amp. *8*

(b) Define the following parameters as applied to an op-amp : *2+2+2=6*

(i) SVRR

(ii) CMRR

(iii) Output voltage swing

3. (a) Draw the circuit diagram of an op-amp based practical differentiator and derive an expression for the output in terms of the input. What are the disadvantages of an ideal differentiator ? *2+4+2=8*

(b) For a non-inverting amplifier shown in figure 1, calculate (i) A_{CL} (ii) V_o (iii) I_L. *6*

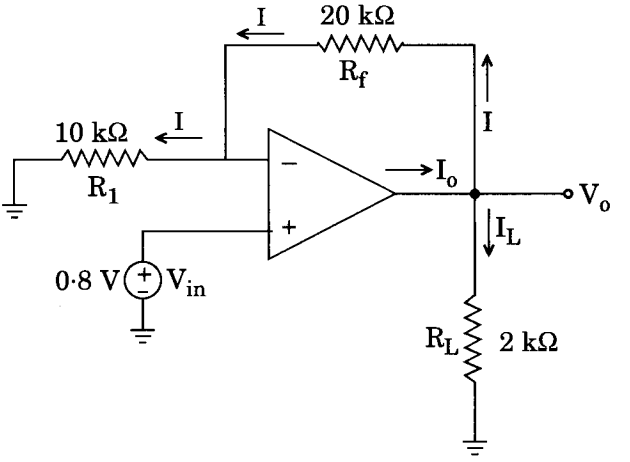

Figure 1

4. (a) With the help of neat diagram and waveform explain the Schmitt trigger. Write down the comparison between Schmitt trigger and Comparator. *4+4=8*

(b) Draw and explain the circuit diagram of sample and hold circuit with necessary waveform and expressions. *6*

5. (a) Explain the operation of second order low pass Butterworth filter with their frequency response. *8*

(b) Explain with neat diagram, the operation of wide-band pass filter. What is roll-off rate for a third order low pass filter ? *6*

6. (a) Draw the circuit diagram of an astable multivibrator to generate the output signal with frequency of 1 KHz and the duty cycle of 75%. Consider the value of capacitor in the circuit diagram is 0·1 μF. *8*

(b) Explain the use of IC-555 as a monostable multivibrator with necessary diagrams and waveforms. *6*

7. (a) A 555 timer is configured to run in astable mode with R_A = 4 kΩ, R_B = 4 kΩ and C = 0·01 μF. Determine the frequency of the output and duty cycle. Define duty cycle. *8*

(b) Draw and explain the transfer characteristics of PLL. *6*

8. (a) Explain the working of PLL using appropriate block diagram. Derive the expression for capture range of PLL IC-565.

4+4=8

(b) Explain how 565 PLL IC can be used as a FSK demodulator with necessary diagram. *6*