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BIEL-038

DIPLOMA – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI)

00085

Term-End Examination

June, 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 should be assumed.*

1. (a) Aliasing is a problem in *7×2=14*

(i) Active RC filters

(ii) Passive filters

(iii) Switched-capacitor filters

(iv) IC active filters

(b) The PLL is a closed-loop system in which the feedback signal is the

(i) Voltage difference

(ii) Current difference

(iii) Frequency difference

(iv) Phase difference

(c) The circuit shown in Figure 1 is called

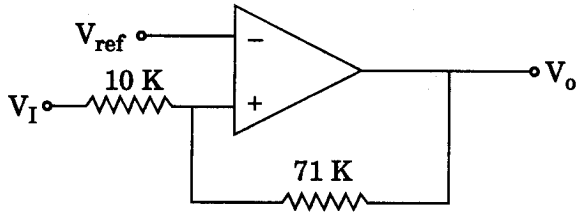

Figure 1

(i) Comparator

(ii) Zero crossing detector

(iii) Voltage-level detector

(iv) Schmitt trigger

(d) The frequency compensation technique of op-amp is

(i) Internal frequency compensation

(ii) Feedback frequency compensation

(iii) External frequency compensation

(iv) All of the above

(e) The number of PLL IC is

(i) IC-741

(ii) IC-766

(iii) IC-566

(iv) IC-714

(f) The basic operation of IC-555 is

(i) Voltage regulation

(ii) Amplification

(iii) Clipping and clamping

(iv) Switching

(g) The summing amplifier contains an inverting amplifier. This statement is

(i) True

(ii) False

2. (a) Briefly explain the function of different stages of op-amp in the block diagram, with necessary circuit diagrams. *8*

(b) Draw and explain the ideal voltage transfer curve of an op-amp. *6*

3. (a) Compare inverting and non-inverting amplifiers. Show that the output of the subtractor is proportional to the difference between the two input voltages. *3+5=8*

(b) Explain the basics of virtual ground concept. Prove that the gain of voltage follower using op-amp is exactly equal to unity. *2+4=6*

4. (a) Draw and explain the commonly used three op-amp instrumentation amplifier circuit. Derive expression for its gain. *8*

(b) Draw the circuit diagram of basic log amplifier using diode and explain its working. *6*

5. (a) Explain the concept of (i) Window detector (ii) Active peak detector. *8*

(b) Write down the applications of analog multiplier and analog divider. *6*

6. (a) Explain the various types of filters along with their frequency response. *7*

(b) Explain with neat diagram, the operation of Band reject filter (narrow band reject). Write down the disadvantages of passive filters with respect to active filters. *7*

7. (a) Define Duty cycle. Derive the expression for the duty cycle of an astable multivibrator using IC-555. *8*

(b) A 555 timer IC is configured to run in astable mode with $R_A = 4\ k\Omega$, $R_B = 4\ k\Omega$ and $C = 0{\cdot}01\ \mu F$. Determine the frequency of the output and Duty cycle. *6*

8. (a) Define capture range, lock-range and pull-in time with reference to a PLL. *3+2+3=8*

(b) What is the concept of water-level controller timer circuit used in industries ? *6*