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BIEL-038

DIPLOMA – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI)

Term-End Examination

June, 2015

00326

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) A zero-level detector is a *7×2=14*

(i) Comparator with a sine wave output

(ii) Comparator with a trip point referred to zero

(iii) Peak detector

(iv) Limiter

(b) A digital-to-analog converter is an application of the

(i) Scaling adder

(ii) Voltage to current converter

(iii) Non-inverting amplifier

(iv) Adjustable bandwidth circuit

(c) A Comparator is an example of a(n)

(i) Active filter

(ii) Current source

(iii) Linear circuit

(iv) Non-Linear circuit

(d) A two-pole high pass active filter would have a roll-off rate of

(i) 40 dB/decade

(ii) −40 dB/decade

(iii) 20 dB/decade

(iv) −20 dB/ decade

(e) Duty cycle of an astable multivibrator for $R_A = 5\ k\Omega$ and $R_B = 10\ k\Omega$ with $C = 0{\cdot}05\ \mu F$ is

(i) 0·5

(ii) 0·4

(iii) 0·6

(iv) 0·75

(f) An instrumentation amplifier should ***not*** have a CMRR which should be

(i) Low

(ii) High

(iii) Zero

(iv) Infinite

(g) A notch filter is a

(i) Wide BPF

(ii) Narrow BPF

(iii) Wide band reject filter

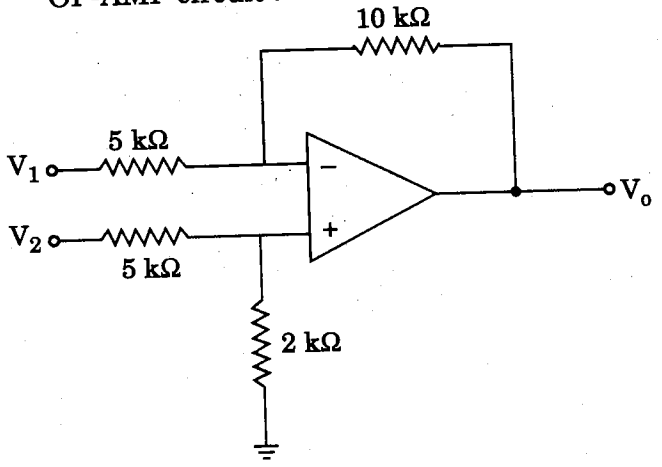
(iv) Narrow band reject filler

2. (a) Write down the characteristics of an ideal and practical OP-AMP. Draw and explain the ideal voltage transfer curve of an OP-AMP. 7

(b) Explain how the bandwidth of an OP-AMP is changed with feedback. Explain the function of complementary push-pull amplifier in the output stage of an OP-AMP. 7

3. (a) Draw and explain the operation of a practical integrator with necessary derivation. 7

(b) Find the output voltage of the following OP-AMP circuit : 7



4. (a) What is the difference between open-loop gain and closed-loop gain of an OP-AMP ? What is the function of unity gain amplifier (voltage follower) ? 7

(b) Discuss briefly the operation of the sample and hold circuit with required waveforms. 7

5. (a) What is an instrumentation amplifier ? Draw and explain the operation of three OP-AMP based instrumentation amplifiers. 7

(b) What are the limitations of an active filter ? Plot the response of a typical low pass Butterworth filter and explain the response by identifying the different parameters. 7

6. (a) Design a high pass filter with cut-off frequency 1 kHz and a pass band gain of 2. 7

(b) Draw and explain the internal block diagram of monostable multivibrator using IC-555 and draw its output waveforms. 7

7. Explain any ***two*** of the following : *2×7=14*

(a) IC-565 (PLL) with its applications

(b) Peak to peak detector

(c) FM detector

8. (a) Explain how a basic inverting amplifier configuration of an OP-AMP can be used as the following circuits : 7

(i) Sign changer

(ii) Scale changer

(b) Draw and explain the operation of antilogarithmic amplifier (using diodes) with required derivation. 7