## FACULTY OF ENGINEERING

## B.E. 3/4 (ECE) I Sem. (Suppl.) Examination, July 2014 LINEAR INTEGRATED CIRCUITS AND APPLICATIONS

## Note: Answerall questions from Part A, and any five questions from Part B.

PART-A

1. Draw dual-input balanced-output differential amplifier with emitter resistance $R_{E}$
and find its voltage gain.
2. Obtain the voltage gain of non-inverting amplifier using op-amp. 3
3. Define CMRR and Slew Rate.
4. Draw the practical integrator circuit and obtain its output. 3
5. What are the basic requirements of an instrumentation amplifiers? 2
6. Define filter. List out most commonly used filters using op-amp. 2
7. Design a monostable for a pulse width of 8 ms by using 555 timer, assume
capacitance is $0.1 \mu \mathrm{f}$.
8. What are the applications of PLL ? 2
9. What is meant by current fold back ? Explain. 2
10. The basic step of a 9 bit DAC is 10.3 mV . if 000000000 represents 0 V , what
output is produced if the input is 101101111 .

PART-B
11. a) Explain the DC and AC analysis of Dual input, Unbalanced output differential amplifier.
b) What is meant by level translator. Explain emitter follower with constant current bias circuit.
12. a) Explain the functional block diagram of operational amplifier. ..... 5
b) What are the ideal characteristics of an op-amp. Explain the ideal voltage transfer curve. ..... 5
13. a) Design an adder circuit using an op-amp to get the output expression as $V_{0}=-\left(0.1 \mathrm{~V}_{1}+\mathrm{V}_{2}+10 \mathrm{~V}_{3}\right)$, where $\mathrm{V}_{1}, \mathrm{~V}_{2}$ and $\mathrm{V}_{3}$ are the inputs. ..... 5
b) Explain the voltage-to-current converter with grounded load. ..... 5
14. a) Explain the operation of sample and hold circuit. ..... 5
b) Draw and explain full wave precision rectifier using op-amp. ..... 5
15. a) Show that the monostable multivibrator pulse width $T=0.69 \mathrm{RC}$ using op-amp. ..... 5
b) A Schmitt trigger with upper threshold level $\mathrm{V}_{\mathrm{UT}}=0 \mathrm{~V}$ and hysteresis width $\mathrm{V}_{\mathrm{H}}=0.2 \mathrm{~V}$ converts a 1 KHz sine wave of amplitude $4 \mathrm{~V}_{\mathrm{PP}}$ in to a square wave. Calculate the time duration of the negative and positive portion of the output waveform. ..... 5
16. a) Draw and explain bond reject filter. ..... 5
b) What is meant by voltage controlled oscillator? Explain its functional block diagram. ..... 5
17. a) Design an adjustable voltage regulator ( 3 V to 28 V ) with a short circuit limit of 60 mA using a 723 regulator. ..... 5
b) Draw and explain R-2R ladder digital to analog converter. ..... 5

