# VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
## B.E. (ECE) III Year I–Semester Main & Backlog Examinations, December-2017
## Linear Integrated Circuits and Applications

Time: **3 hours**                                                                 Max. Marks: **70**

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

### Part-A (10 × 2 = 20 Marks)

1. Define Input offset voltage and Explain why it exists in all opamps?

2. A 741C op-amp is used as an inverting amplifier with a gain of 50. The voltage gain (vs) frequency curve of 741C is flat upto 20kHz. What maximum peak to peak input signal can be applied without distorting the output.

3. Draw the circuit of a precision rectifier and mention its importance

4. For the circuit shown below, if $R_1 = 2k\Omega$, $R_0 = 4k\Omega$, $R_L = 3k\Omega$. If $I_1 = $ mA, Find the value of $I_0$?
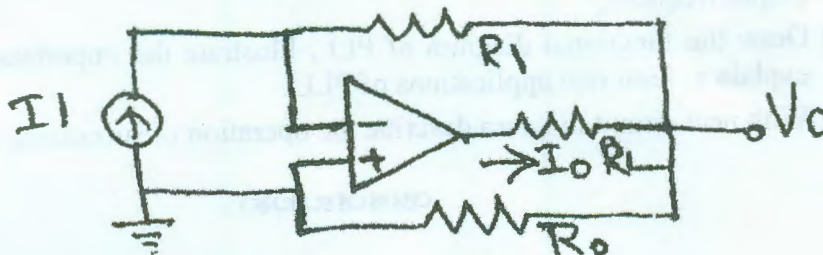


5. Distinguish between basic comparator and the Schmitt trigger?

6. Design a first order LPF so that it has a cut off frequency of 2 kHz and a pass band gain of 2.

7. Define Lock range and Capture range of PLL

8. How do we vary the duty cycle of an astable multi vibrator using 555 Timer?

9. Define Resolution, Accuracy and Monotonicity of digital to analog converters.

10. The basic step of a 9 –bit DAC is 10.3mV. If 000000000 represents 0V, what output is produced if the input is 101101111?

### Part-B (5 × 10 = 50 Marks)

11. a) Describe the operation of circuits which improves CMRR.                                        [5]

    b) Illustrate the operation of external pole-zero frequency compensation method in operational amplifiers.                                                                            [5]

12. a) Discuss about the practical differentiation and derive the necessary expression.              [5]

    b) Mention the important features of Instrumentation amplifier and derive the expression of the output voltage.                                                                          [5]

13. a) Construct the triangular wave form generator using op-amp and derive the expression for the frequency.                                                                               [6]

    b) Design a wide band pass filter having $f_l = 400$ Hz, $f_h = 2$ kHz and passband gain of 4. Find the value of Q of the filter.                                                         [4]

14. a) Draw functional diagram of a 555 timer and using the above design monostable multivibrator to produce a pulse width of 100ms.                                                    [5]

    b) Give the block diagram of IC 566 VCO and explain the functionality of each block.          [5]

15. a) i) List the various ADC Conversion techniques.                                          [6]

        ii) Explain the operation of dual slope ADC and mention the importance of dual slope ADC.

    b) How current boosting is achieved in a 723 IC?                                       [4]

16. a) Draw the block diagram of the operational amplifier. List ac and dc parameters of op-amp.    [4]

    b) Draw the circuit of an ideal integrator and explain its operation .What are the limitations of an ideal integrator .How these limitations can be overcome?                              [6]

17. Answer any *two* of the following:

    a) Construct the Square wave generator using op-amp and derive the expression of output frequency.                                                                       [5]

    b) Draw the functional diagram of PLL. Illustrate the importance of each block and explain at least two applications of PLL.                                               [5]

    c) With neat circuit diagram describe the operation of successive approximation ADC.       [5]

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