

Reg. No. :

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B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Electronics and Communication Engineering

EC 6404 — LINEAR INTEGRATED CIRCUITS

(Common to Medical Electronics and Robotics and Automation Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention two advantages of active load over passive load in an operational amplifier.
2. Define input bias current and input offset current of an operational amplifier.
3. Determine the output voltage for the circuit shown in Figure 1 when
 - (a) $V_{in} = -2V$ and
 - (b) $V_{in} = 3V$.

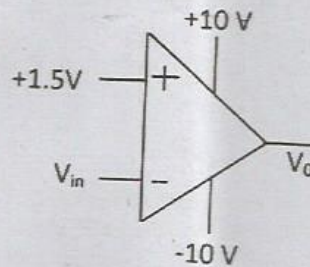


Figure 1

4. Plot the transfer characteristics of the circuit shown in Figure 2, The OPAMP saturates at $\pm 12V$.

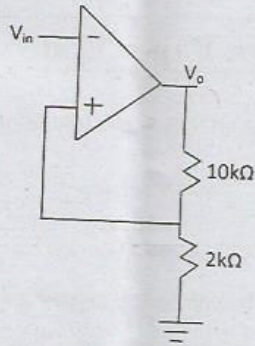


Figure 2

5. Define :
- (a) Capture range and
 - (b) Lock range of Phase Locked Loop (PLL).
6. Mention two applications of analog multiplier.
7. Determine the number of comparators and resistors required for 8 bit flash type ADC.
8. Mention two advantages of R-2R ladder type Digital to Analog Converter when compared to weighted resistor type Digital to Analog Converter.
9. What is the purpose of connecting a capacitor at the input and the output side of an IC voltage regulator?
10. Mention two applications of frequency to voltage converter.

PART B — (5 × 16 = 80 marks)

11. (a) With a neat diagram, explain the input side of the internal circuit diagram of IC741.

Or

- (b) What is the need for frequency compensation in an OPAMP? With a suitable illustration, explain the pole-zero frequency compensation technique.

12. (a) (i) With a neat circuit diagram, explain the working of precision rectifier. (8)
- (ii) Explain the application of operational amplifier as differentiator. (8)

Or

- (b) (i) Mention two advantages of active filter over passive filter. Also design a second order low pass filter using operational amplifier for the upper cut off frequency of 2 kHz. Assume the value of capacitor to be $0.1\mu F$. (8)
- (ii) With a neat circuit diagram explain the working of voltage to current converter. (8)
13. (a) Derive the expression for the capture range and lock range of Phase Locked Loop.

Or

- (b) Explain the application of Phase Locked Loop as
- (i) Frequency synthesizer
- (ii) AM demodulator and
- (iii) FM demodulator.
14. (a) With a neat block diagram, explain the working of Successive Approximation type Analog to Digital Converter. Also determine the conversion time of 8 bit and 16 bit Successive Approximation type Analog to Digital Converter if its clock frequency is 50 Hz.

Or

- (b) With a neat block diagram, explain the working of two bit flash type analog to digital Converter.
15. (a) With a neat functional diagram, explain the working of 555 timer as monostable multivibrator and derive an expression for the frequency of oscillation with relevant wave forms.

Or

- (b) With a neat circuit diagram, explain the working of linear voltage regulator using operational amplifier.