

N 1153

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2004.

Fourth Semester

Electronics and Communication Engineering

EC 244 — LINEAR INTEGRATED CIRCUITS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw a neat sketch showing the frequency response of $\mu A 741$ OP AMP.
2. In response to a square wave input, the output of an OP AMP voltage follower changed from $-3V$ to $+3V$ in $0.25 \mu \text{ sec}$. What is the slew rate of the OP AMP?
3. State the important features of an instrumentation amplifier.
4. What is the most important application of a Schmitt trigger circuit?
5. What is a two quadrant multiplier?
6. With reference to a VCO, define voltage to frequency conversion factor K_v .
7. What output voltage will be produced by a 4 bit D/A converter whose output range is $0 V$ to $10 V$ and whose input binary number is 0110 ?
8. How many comparators are required to build an n bit flash type A/D converter?
9. Why is it that a switching regulator has a higher efficiency than a series regulator?
10. What is the roll off rate for a third order low pass filter?

PART B — (5 × 16 = 80 marks)

11. (i) Draw the circuit diagram of a symmetrical emitter coupled difference amplifier and show that a very high CMRR will result if the diff. amp is supplied by a constant current bias. (12)
- (ii) What is the main difference between the OP AMPs 741, 741 C, 741 S and 741 SC? (4)

12. (a) (i) Explain how a comparator can be used as a zero crossing detector. (4)
- (ii) Design an OP AMP phase shift oscillator for $f_0 = 500$ Hz. (12)

Or

- (b) (i) Draw the circuit diagram of an OP AMP differentiator and derive an expression for the output in terms of the input. (4)
- (ii) Design a Schmitt trigger for UTP = + 0.5 V and LTP = -0.5 V. (12)
13. (a) (i) Explain how the log-antilog method can be used to build a multiplier. (6)
- (ii) Explain how the operation of division can be carried out using a multiplier IC. (10)

Or

- (b) (i) With reference to a PLL, define 'capture range', 'lock range' and 'pull in time'. (6)
- (ii) Using a neat circuit diagram, explain how 565 PLL can be used as a FSK demodulator. (10)
14. (a) (i) Explain the working of a weighted resistor D/A converter and state its important features. (10)
- (ii) Explain how dual slope A/D converter provides noise rejection. (6)

Or

- (b) (i) Explain the working of a counter type A/D converter and state its important features. (10)
- (ii) Determine the resolution of an 8 bit A/D converter for a 10 V input range. (6)

- (i) List out the various sources of noise.
- (ii) Design an astable multivibrator using 555 timer to produce square waveform for duty cycle $D = 0.50$.

Or

- (i) Draw and explain the functional block diagram of a 723 regulator. (10)
- (ii) Write an explanatory note on 'opto couplers'. (6)