Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 33388

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fifth Semester

Electrical and Electronics Engineering

EC 1313 — LINEAR INTEGRATED CIRCUITS

(Common to Fourth Semester — Electronics and Instrumentation Engineering and Instrumentation and Control Engineering)

(Regulation 2004/2007)

(Common to B.E. (Part – Time) Fourth Semester – Electrical and Electronics Engineering — Regulation 2005)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What are the basic processes involved in fabricating IC's using planar technology?

2. What is the purpose of oxidation?

3. Define slew rate and what are the causes for slew rate?

4. Design an amplifier that will amplify an input signal of 0.25 volts p-to-p into an output signal of 12 volts p-to-p.

5. For a Schmitt trigger circuit, calculate the value of R_1 and R_2. if the saturation voltages are +12V and –12V. Assume hysteresis width = 6V and draw the circuit and wave form.

6. Design an RC phase shift oscillator for $f_0 = 300\text{Hz}$. Assume $C = 0.1\mu f$ and draw the circuit and waveform.

7. The frequency of a certain VCO changes from 100 KHz to 200 KHz when the control voltage changes from 1.5 volts to 4.0 volts. What is the VCO gain?

8. What is the need for current limiting in regulated power supplies?

9. Differentiate between linear and switching regulators.

10. List the applications of opto coupler.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the process of epitaxial growth IC fabrication with neat diagram? (8)

(ii) Describe in detail about the diffusion process of IC fabrication. (8)

Or

(b) (i) Discuss the different ways to fabricate diodes. (10)

(ii) Explain the process of masking and photo etching in IC fabrication. (6)

12. (a) (i) What are the methods used to improve the slew rate? Briefly explain. (8)

(ii) Explain the working operation of voltage shunt Feedback amplifier with circuit and waveforms. (8)

Or

(b) (i) Design an adder circuit using Op-Amp to get the output expression as $V_0 = +(0.1V_1 + V_2 + 10V_3)$,where V_1, V_2 and V_3 are the inputs. Assume $R_f = 10k\Omega$. (6)

(ii) Design a practical differentiator circuit that will differentiate an input signal with maximum frequency of 150 Hz. (10)

13. (a) (i) Explain the operation of an instrumentation amplifier using 3 - Op-Amps and derive the Output. State its advantages and application. (10)

(ii) Design a square wave oscillator with $f_0 = 1\,KHz$. The opamp is a 741 with DC supply Voltages +15 volts. (6)

Or

(b) (i) Explain any two applications of comparator in detail. (8)

(ii) Explain 3 bit flash type ADC with neat diagram. (8)

14. (a) (i) Explain with the help of neat sketch, the working of monolithic PLL. (8)

(ii) Derive free running frequency (*fo*) and conversion factor for a VCO (8)

Or

(b) Design a 555 based square wave generator to produce a symmetrical square wave of 2 kHz. If Vcc = 12 V, draw the voltage curve across the timing capacitor and the output waveform. (16)

15. (a) (i) Discuss the internal structure of 723 voltage regulator. (8)

(ii) What are the features of LM 380 power amplifier? With a schematic explain its application as high gain audio power amplifier. (8)

Or

(b) (i) Write a short notes on isolation amplifier. (8)

(ii) Explain the ICL 8038 function generator IC in detail. (8)
