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Question Paper Code: 31434

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Electrical and Electronics Engineering

01UEE404 - ANALOG INTEGRATED CIRCUITS

(Common to Instrumentation and Control Engineering)

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. State the advantages of integrated circuits over discrete components.
2. What are the two important properties of SiO_2 ?
3. List the ideal Op-amp characteristics.
4. What is the maximum undistorted amplitude that a sine wave input of 10 kHz, can produce at the output of an op-amp whose slew rate is $0.5 \text{ V}/\mu\text{S}$?
5. Give one application for each of the following circuits: Peak detector, comparator, Schmitt trigger and clamper
6. What output voltage would be produced by a D/A converter whose output range is 0 to 10 V and whose input binary number is 0110 for a 4 bit DAC.
7. In an astable multivibrator using IC 555 timer $R_A = 6.8 \text{ k}\Omega$, $R_B = 3.3 \text{ k}\Omega$, $C = 0.1 \mu\text{F}$. Calculate the free running frequency
8. Define the term lock in range of PLL.
9. What is a power amplifier?
10. What are the features of MA78s40?

PART - B (5 x 16 = 80 Marks)

11. (a) Discuss briefly about the fabrication methods for FET and diodes. (16)

Or

(b) Illustrate the various basic processes used in the fabrication of monolithic IC with neat diagram. (16)

12. (a) (i) Draw the designed circuit for getting output voltage $V_o = -(V_a + V_b + V_c) / 3$ and suggest modification for converting into scaling amplifier. (8)

(ii) Design an op-amp differentiator that will differentiate an input signal with $f_{max} = 100 \text{ Hz}$. (8)

Or

(b) (i) Describe the AC performance characteristics of operational amplifier. (8)

(ii) Define output offset voltage. Explain methods to nullify offset voltage. (8)

13. (a) (i) Design a second order high pass Butterworth filter with a cut off frequency of 1.5 kHz and also draw the designed circuit. (8)

(ii) Draw the circuit using op-amp to generate triangular wave. Explain its operation. (8)

Or

(b) (i) Draw the circuit of Instrumentation amplifier using 3-opamp and derive the equation for its output voltage. (10)

(ii) For a dual slope ADC, t_1 is 83.3 ms , reference voltage is 100 mV , $R = 205 \text{ k}\Omega$ and $C = 0.1 \mu\text{F}$. Calculate t_2 if V_I is 100 mV and 200 mV . (6)

14. (a) (i) Describe the operation of IC555 timer when it is working in monostable mode. (10)

(ii) Draw the circuit of a PLL used as AM detector and explain its operation. (6)

Or

(b) (i) Draw the block diagram of VCO and explain its operation. Also derive the frequency of oscillator. (10)

(ii) State the advantages of variable transconductance technique for analog multiplication. (6)

15. (a) Draw and explain the functional block diagram of a IC 723 regulator and make the necessary changes to make it as a low voltage regulator. (16)

Or

(b) Write short notes on optocoupler and ICL 8038 function generator. (16)
