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Question Paper Code: 41033

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2015.

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. Why SiO_2 is used in oxidation Process?
2. List out the different methods that are available for fabricating integrated resistors?
3. Define slew rate.
4. Define thermal drift.
5. Give two applications of operational amplifier, when operated in open loop configuration?
6. Find the output frequency of a Astable multivibrator implemented using *IC 741*. Assume $R_1=R_2=10\Omega$ and $C_1=C_2=10\mu F$.
7. For a 555 timer in monostable multivibrator configuration, R=100$k\Omega$ and the time delay $T=100ms$.Calculate the value of C.
8. If the full scale voltage of a 8 bit D/A converter is $5V$. find the resolution of D/A converter.
9. Why do we use voltage regulator?
10. What are the limitations of three terminal regulators?

PART - B (5 x 16 = 80 Marks)

11. (a) With necessary illustrations, explain the various steps involved in fabrication of a typical circuit. (16)

Or

(b) Write short notes on:

(i) Cathode sputtering (8)

(ii) Integrated resistors (8)

12. (a) Explain the DC characteristics of operational amplifier in detail. (16)

Or

(b) Design an operational differentiator that will differentiate an input signal with F_{max}=100*kHz*. Draw the output waveform for a sine wave of 1*v* Peak at 100*Hz* applied to the differentiator. If a square wave input is applied to the differentiator of 1*v* peak and 1*kHz*, sketch the output. (16)

13. (a) (i) With brief illustrations, explain the Successive Approximation technique of analog to digital converter in detail. (8)

(ii) Explain the working of R-2R Ladder digital to analog converter in detail. (8)

Or

(b) (i) Explain the working of free running oscillator using operational amplifier 741.

(ii) Design a wide band reject filter having F_h=*400Hz* and F_l=*2 kHz* having Pass band gain as *2*. Assume R_f= R_i= *10kΩ* and C=0.01µF. (8)

14. (a) (i) Explain the monostable multivibrator operation of *IC 555* timer with necessary waveforms. (8)

(ii) For *IC 555* timer in astable multivibrator mode, R_a=6.8*kΩ*, R_b=3.3*kΩ* and C=0.1µF. Calculate T_{high}, T_{low}, free running frequency, duty cycle *D*. (8)

Or

(b) (i) Explain the working of phase locked loop in detail. (8)

(ii) Explain the frequency multiplication using PLL IC in detail. (8)

15. (a) Explain the block diagram of a Switched Mode Power Supply in detail. (8)

Or

(b) For a IC 7805 acting as a boosting three terminal regulator. let $V_{eb(on)}$=1*v*, β=15. Calculate the output current coming from 7805 and I_c (collector current) coming from transistor *Q1* for loads 100*Ω*, 50*Ω* and 1*Ω*. (16)

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