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Question Paper Code: 54035

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Fourth Semester

Electrical and Electronics Engineering

15UEE405 - ANALOG INTEGRATED CIRCUITS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- Which of the following is most difficult to fabricate in an Integrated Circuits (IC)?
(a) Diode (b) Transistor (c) FET (d) Capacitor
- Photolithography involves
(a) Making Photographic mask and photo etching
(b) Only Photo etching
(c) Only Masking
(d) None of these
- Which concept states that if one input terminal of an op-amp is at zero potential, then the other one also will be at zero potential?
(a) Virtual short (b) Virtual ground
(c) Zero input current (d) None of these
- In absence of any applied AC input signal, what would be the gain of an ideal integrator?
(a) Zero (b) Unity (c) Infinity (d) Unpredictable
- In a peak detector circuit, which component holds the peak value till a higher peak value is detected?
(a) Diode (b) Inductor (c) Capacitor (d) MOSFET switch

6. In dual slope type of Analog to Digital Converters, an input hold time is
 - (a) Almost zero
 - (b) Higher than that of flash type ADCs
 - (c) Longest
 - (d) All the above
7. In VCO IC 566, the value of charging & discharging is dependent on the voltage applied at
 - (a) Triangular wave output
 - (b) Square wave output
 - (c) Modulating input
 - (d) All the above
8. The frequency deviation of VCO is directly proportional to
 - (a) DC control voltage
 - (b) Applied power supply
 - (c) Ground
 - (d) Frequency of the signal
9. Which type of IC voltage regulator exhibits continuous variation in the impedance of transistor in order to supply the desired load current
 - (a) Linear Regulators
 - (b) Switching regulators
 - (c) Both a and b
 - (d) None of these
10. A power amplifier is a
 - (a) Current amplifier
 - (b) Voltage amplifier
 - (c) Transresistance
 - (d) Transconductance amplifier

PART - B (5 x 2 = 10 Marks)

11. List down the various processes used to fabricate IC's using Silicon Planar Technology.
12. Mention the characteristics of an ideal op-amp.
13. Design a clipper circuit for a clipping level of +0.35 V, given an input sine wave signal of 0.5 V peak. Assume the gain of the amplifier is 10 and it has an input resistance of 1 k Ω connected.
14. What is the purpose of having a low pass filter in PLL?
15. Determine the range in which output voltage can be varied with the help of LM 317 voltage regulator using $R_1 = 820$ ohm and R_2 as 10 k Ω potentiometer.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the basic planar processes involved to fabricate IC using silicon planar technology with neat sketch. (16)

Or

- (b) Draw the popular structure of Monolithic diode and discuss in detail. Enumerate the different types of resistors fabricated in IC. Comment on the choice of the type with respect to the resistance values with neat diagrams. Also state why inductors are difficult to be fabricated in IC's. (16)

17. (a) Explain the AC and DC characteristics of op-amp in detail. (16)

Or

- (b) List down the steps involved in designing a practical differentiator. Design an op-amp differentiator to differentiate an input signal that varies in frequency from 10 Hz to 1 kHz. Draw the output waveform for a sine wave of 3 V peak to peak amplitude at 200 Hz applied to the differentiator. Also mention two most important applications of practical differentiator circuits. (16)

18. (a) Draw the circuit of a high speed sample and hold circuit and describe its operation, sketching the input signal, control and output voltage waveforms. (16)

Or

- (b) Construct the dual slope and successive approximation type A/D converter. (16)

19. (a) Enumerate the desirable properties for a Voltage Controlled Oscillator (VCO). Draw the basic block diagram and connection diagram of a Voltage Controlled Oscillator (VCO) using NE/SE 566 and discuss its operation in a detailed manner. Also write the formula for calculation of the free-running frequency of VCO. State assumptions and approximations, if any. (16)

Or

- (b) With a neat diagram explain the applications of PLL. (16)

20. (a) With a neat schematic diagram, describe a monolithic IC Audio power amplifier (LM 380). State its advantages over conventional power amplifiers. (16)

Or

- (b) Illustrate the working principles of function generator IC8038 with neat block diagram. (16)

