Reg. No. :

Question Paper Code: 50541

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

Fourth Semester

Electronics and Instrumentation Engineering

15UEI401 - LINEAR INTEGRATED CIRCUITS AND APPLICATIONS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. In IC fabrication, oxidation is used for

    (a) Isolation   (b) Surface passivation   (c) Packaging   (d) Doping

2. For an ideal op-amp, the CMRR will be

    (a) 1   (b) 0   (c) Infinity   (d) Negative

3. Output impedance recommended for an op-amp is

    (a) Unity   (b) Zero   (c) Infinity   (d) any value

4. Which factor makes the differentiator circuit unstable

    (a) Output impedance   (b) Input voltage
    (c) Noise   (d) Gain

5. In an instrumentation amplifier, the output voltage is based on the _____ time a scale factor.

    (a) summation of the two inputs   (b) product of the two inputs
    (c) difference between the two inputs   (d) none of these

6. In a flash analog-to-digital converter, the output of each comparator is connected to an input of

    (a) priority encoder   (b) decoder

    (c) multiplexer   (d) de multiplexer

7. What is the expression for time period of a mono-stable 555 multi-vibrator

    (a) $T = 0.33RC$ (b) $T = 1.1RC$ (c) $T = 3RC$ (d) $T = RC$

8. Which characteristic of PLL is defined as the range of frequencies over which PLL can acquire lock with the input signal?

    (a) Free-running state   (b) Pull-in time

    (c) Lock-in range   (d) Capture range

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. Which one can be used for the purpose of isolation?

    (a) Voltage regulator   (b) Multivibrator

    (c) Optocoupler   (d) Power amplifier

<center>PART - B (5 x 2 = 10 Marks)</center>

11. Calculate the voltage gain and output voltage of an inverting op-amp with $R_1 = 3.3$ kΩ and $R_2 = 33$kΩ when the input voltage is 0.5V.

12. Define slew rate and what is the cause for it?

13. The basic step of a 9 bit DAC is 10.3 mV. If 000000000 represents 0 Volts, what is the output for an input of 101101111?

14. What is meant by lock range of PLL?

15. Write the significance of isolation amplifiers.

<center>PART - C (5 x 16 = 80 Marks)</center>

16. (a) Explain the process of epitaxial growth and photo etching in IC Fabrication with neat sketches.   (16)

<center>Or</center>

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(b) Describe the design procedure to develop the integrated circuit of the following circuit shown in below figure. (16)
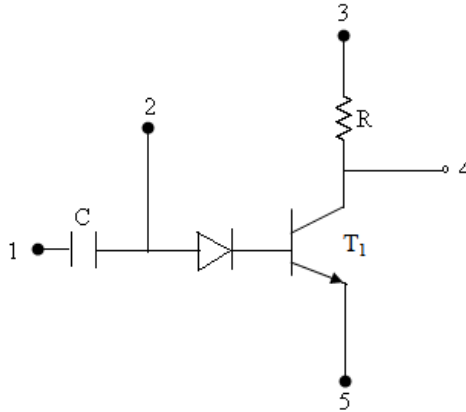
17. (a) (i) Brief about input bias current and input offset currents of operational amplifier. (8)

(ii) Describe about the condition for stability of an op-amp. (8)

Or

(b) With neat diagrams, explain the following applications of op-amp:
(i) Integrator (8)

(ii) Differentiator (8)

18. (a) (i) Draw an Instrumentation amplifier circuit using op-amp and derive the output voltage equation. (8)

(ii) With the help of a circuit diagram, explain the functioning of current to voltage converter using op-amp. (8)

Or

(b) (i) Draw the circuit of a weighted resistor DAC and explain its working principle. (6)

(ii) Brief about the principle of operation of successive approximation type ADC with neat block diagram. (10)

19. (a) With a neat block diagram, explain the functioning of monostable multivibrator using IC555. (16)

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(b) Explain the operation of IC565 phase locked loop with neat circuit diagram and derive its necessary equations. (16)

20. (a) (i) Draw the block diagram of IC Voltage regulator and explain its working. (8)

(ii) How does 723 Voltage regulator work? (8)

Or

(b) (i) Explain the functioning of LM380 power amplifier with its neat diagram. (8)

(ii) With neat diagram, describe the functioning of function generator using op-amp. (8)

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