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Register Number: …….

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2013)

Fourth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U13EIT401: Linear Integrated Circuits and Applications

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Silicon dioxide is used as a

   a) Diffusing element b) Mask against diffusion

   c) Contact element d) Base

2. In a current mirror with multiple outputs, all the transistors must be……..

3. Non-inverting amplifier has a R_i of 1kΩ and an R_f of 100kΩ. The closed-loop gain is_____.

   a) 100,000 b) 1000

   c) 101 d) 100

4. In a integrator circuit, R=1KΩ, C=0.1μF V_{in}=2mV. Find the output voltage with over an interval of 0.1ms to 0.5ms.

5. The disadvantages of differential amplifier is _____

   a) High CMRR b) High 1/p impedance

   c) Low 1/p impedance d) High o/p impedance.

6. Give the any one application of clamper.

7. In a binary R/2R ladder D/A converter, the input resistance for each input is

   a) R b) 2R

   c) 3R d) 4R

8. The maximum sink or source current of the 555 timer is……..

9. When the two inputs of a multiplier are connected together, the device operates as a

   a) Voltage doubler b) Square root circuit

   c) Squaring circuit d) Averaging circuit

10. LM380 is commonly used as_____.

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. What is the advantage of using dry etching process?
12. Why op-amp in open loop operation is not used for most of the applications?
13. List the important characteristics of ideal op-amp.
14. Draw the circuit of an ideal integrator.
15. What are the requirements of good instrumentation amplifier?
16. What is the need of sample and hold circuit?
17. An A/D converter has a conversion time of 1 micro seconds. Calculate the maximum frequency at which it can be used.
18. If the value resistance is 1kΩ and that of capacitor is 0.1 micro farad, calculate the pulse width of monostable circuit using IC555.
19. Define VCO.
20. Name any two types of optocouplers.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. Describe the various stages involved in the fabrication of a resistor, diode, capacitor and transistor in a single chip.

22. a) (i) Outline the DC characteristics of an op-amp 7

(ii) For a voltage series feedback, amplifiers in non-inverting ncode, the values of R_1 and R_f are 1kΩ and 10kΩ respectively. The various op-amp parameters are, 7

open gain = 2×10^5

input resistance = 2MΩ,

output resistance =75Ω ,

single break frequency = 5Hz,

supply voltages= ± 12 V.

Calculate the closed loop gain, input resistance, output resistance and bandwidth with feedback.

(OR)

b) (i) Draw an op-amp circuit to implement the following expression: $V_0=V_1+V_2-[V_3+V_4+2]$ (7)

(ii) Design a Differentiator circuit with the frequency of 1KHZ. (7)

23. a) Derive the expression for 1^{st} order Low pass filter and also analyze the frequency response.

(OR)

b) (i) Elaborate the operation of an inverting Schmitt trigger. (10)

(ii) For a non inverting regenerative comparator calculate tripping voltages. Assume $V_{sat} = \pm 13.5V$, $R_1=100k\Omega$, $R_2=1k\Omega$. (4)

24. a) Illustrate in detail about successive approximation ADC and dual slope ADC.

(OR)

b) (i) Draw the functional diagram of astable multivibrator using IC 555 timer and explain its operation. (7)

(ii) Design a circuit using IC555 timer in astable multivibrator mode. With a clock frequency of 2KHZ and duty cycle of 50%. (7)

25. a) (i) Write short notes on isolation amplifiers. (6)

(ii) List the various applications of PLL and elucidate any one application. (8)

(OR)

b) With simplified block diagram explain the basic principle of ICL 8038 function generator and depict its pin configuration.

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