Register Number: ……

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Fourth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U07EC404: Linear Integrated Circuits

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Ideally an Op-Amp should have

   (a) An infinite current from input terminal (b) An infinite output impedance

   (c) An infinite bandwidth (d) An infinite off-set voltage

2. A current mirror can be used as an active load for an amplifier to obtain

   (a) Very large current gain (b) Very large frequency gain

   (c) Very large power gain (d) Very large voltage gain

3. A simple Op-Amp integrator with feedback capacitance C_f and resistance R_l has output

   (a) $V_0 = - (1/ R_1C_f) \int V_i \, dt$ (b) $V_0= (1/R_1 C_f) \int V_i dt$

   (c) $V_0 = - R_1 C_f \int V_i \, dt$ (d) $V_0 = R_1 C_f \int V_i dt$

4. Triangular waveform can be generated by

   (a) Differentiating square wave (b) Integrating square wave

   (c) Differentiating sine wave (d) Integrating sine wave

5. PLL can track the frequency in the incoming signal when it is

   (a) Locked and out of capture range (b) Unlocked and within capture range

   (c) Locked and within the capture range (d) Unlocked and out of capture range

6. An Operational Transconductance Amplifier (OTA) is

   (a) Voltage input current input amplifier (b) Voltage output current output amplifier

   (c) Voltage input current output amplifier (d) Voltage output current input amplifier

7. Resolution is
   (a) Smallest change in voltage produced at output
   (b) Smallest change in voltage produced at input
   (c) Largest change in voltage produced at output
   (d) Largest change in voltage produced at input

8. Which is the fastest ADC?

   (a) Successive approximation (b) The parallel comparator

   (c) Dual slope (d) Single slope

9.555 IC can produce

(a)Inaccurate and unstable time delays (b) Inaccurate and stable time delays

(c) Approximate and unstable time delays (d) Accurate and stable time delays

10. Opto-couplers are mainly used to transfer

(a)Electronic signals (b) Energy (c) Power (d) Frequency

PART B (10 x 2 = 20 Marks)

11. Why a band gap voltage reference is used for amplifier circuits?
12. Define Slew Rate of Op-Amp. Give its formula.
13. Draw non inverting Op-Amp amplifier circuit. Write its gain formula.
14. What are the types of band pass filters? How are they related to the quality factor Q?
15. List basic building blocks of PLL.
16. What are the main applications of analog multipliers?
17. What are LSB, MSB and Full Scale Output for an 8-bit DAC for the 0 to 10 V range.
18. Define linearity and Accuracy.
19. What do you mean by line regulation and load regulation?
20. Differentiate class A and class B power amplifier.

PART C (5 x 14 = 70 Marks)

21. (a) (i) What are frequency compensation techniques? (2)

(ii) Explain any two techniques with the help of circuit diagram and Gain *vs* Frequency curves. (6+6)

(OR)

(b) (i) Draw circuit diagram of IC 741 Op-Amp. (6)

(ii) Briefly explain the role of various transistors in IC 741 Op-Amp. (8)

22. (a) (i) What are the main features of instrument amplifiers? (4)

(ii) Draw circuit diagram of instrument amplifier and derive its gain. (4+6)

(OR)

(b)(i) Explain the functioning of practical non inverting comparator with circuit diagram and input output waveform diagrams. (4+2+2)

(ii) How can it be used as a zero crossing detector? (6)

23. (a) Describe PLL as (i) Frequency Translator (ii) AM Detector.

(OR)

(b) Draw circuit diagram for FSK demodulator. Explain functioning of it.

24. (a) Explain Dual-Slope ADC with functional diagram and integrated output waveform.

(OR)

(b) Explain R-2R ladder DAC with suitable diagrams and with an example. Obtain expression for output voltage. (10+4)

25. (a) (i) Explain switched capacitor filter with its schematic diagram. (7)

(ii) Draw the switched capacitor network and its MOSFET realization. (7)

(OR)

(b) Explain how would you design a monostable multivibrator using 555 timer. Give circuit diagram and derive expression for time delay *T*.

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