

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010

Fourth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U07EC404: Linear Integrated Circuits

Time: Three Hours

Maximum Marks: 100

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. The Slew Rate of 741C is
 - a. $0.5 \text{ V}/\mu\text{S}$
 - b. $0.5 \text{ V}/\text{mS}$
 - c. $0.6 \text{ V}/\mu\text{S}$
 - d. $0.6 \text{ V}/\text{S}$
2. Mark the wrong statement

A large value of collector resistance in differential amplifier

 - a. Requires a large chip area
 - b. Increases the quiescent drop
 - c. Requires large power supply
 - d. Produces constant power dissipation
3. The operational transconductance amplifier output is a
 - a. Voltage proportional to its input current
 - b. Current proportional to its input voltage
 - c. Frequency proportional to its input voltage
 - d. Current proportional to its input frequency
4. The phase Shift Oscillator is
 - a. Low frequency oscillator
 - b. High frequency Oscillator
 - c. Square wave oscillator
 - d. Triangular wave oscillator
5. A VCO converts
 - a. Low frequency signals to high frequency signals
 - b. Frequency to voltage
 - c. Voltage to frequency
 - d. High frequency signals to low frequency signals
6. The output from a PLL system is
 - a. Either a voltage or a power signal
 - b. Constant frequency signal
 - c. Either a voltage or a frequency signal
 - d. Only power signal
7. Resolution of a 12-bit DAC is
 - a. $1/2^{12}$
 - b. $1/2^{12}$
 - c. 2^{12}
 - d. $2^{12}-1$
8. The low speed ADC is
 - a. Flash type ADC
 - b. Counting type ADC
 - c. Successive approximation ADC
 - d. Dual slope ADC

9. 78XX is a

- a. Three terminal voltage regulator
- b. Two terminal voltage regulator
- c. Negative voltage regulator
- d. Dual voltage regulator

10. A switched Capacitor filter consists of

- a. Capacitor, resistors and periodic switches
- b. Capacitor, periodic switches and op-amp
- c. Capacitor, op-amp and resistor
- d. Inductor, resistor and capacitor

PART B (10 x 2 = 20 Marks)

11. What is current mirror?

12. Draw the circuit of voltage follower.

13. What is slew rate?

14. What is precision diode?

15. What are the different types of phase detectors and list the major difference between them.

16. Define capture range.

17. What is the advantage of R-2R ladder DAC?

18. Which is the fastest ADC and why?

19. Write the application of 555 timer.

20. Write the difference between series voltage regulator and switching regulator.

PART C (5 x 14 = 70 Marks)

21. (a) (i) Explain the operation of difference amplifier and derive the expression for CMRR.

(12)

(ii) Write the function of active load.

(2)

(OR)

(b) (i) Explain in detail one external frequency compensation technique.

(10)

(ii) The output of an op-amp voltage follower is a triangular wave with 8V peak-to-peak amplitude with of frequency 2 MHz. Find the slew rate of the op-amp.

(4)

22. (a) (i) Explain in detail the working of full wave rectifier using precision diode.

(9)

(ii) With neat diagram derive the output expression of antilog amplifier.

(5)

(OR)

(b) (i) Derive the output expression of an integrator and discuss the frequency response.

(7)

(ii) With neat diagram and waveform explain the operation of triangular wave generator and derive the expression for output voltage.

(7)

23. (a) (i) Explain in detail about the working of a variable transconductance multiplier. (10)
(ii) Write a short note on compander ICs. (4)

(OR)

- (b) (i) Explain in detail about the operation of PLL. (7)
(ii) Explain the application of PLL as FSK modulator and demodulator. (7)

24. (a) (i) With a neat sketch explain the working of sample and hold circuit. (7)
(ii) Explain the operation of Inverted R-2R ladder DAC. (7)

(OR)

- (b) (i) Explain the operation of dual slope ADC. (10)
(ii) Discuss the different DAC switches. (4)

25. (a) (i) Explain the operation of one shot multivibrator using 555 timer and derive the expression for the time period. (10)

- (ii) In Astable multivibrator, for $R_A = 6.8K\Omega$, $R_B = 3.3K\Omega$ and $C = 0.1\mu F$, Calculate (a) free running frequency (b) duty cycle. (4)

(OR)

- (b) (i) With neat sketch and necessary waveforms, explain the working of switching regulator. (10)

- (ii) Discuss about opto-couplers. (4)
