

B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

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 figure of merit for differential amplifier is
 - a) $\rho = A_{DM}/A_{CM}$
 - b) $\rho = A_{CM}/A_{DM}$
 - c) $\rho = A_{CL}/A_{DM}$
 - d) $\rho = A_{DM}/A_{CL}$
2. Voltage to current converter is known as
 - a) Emitter coupled amplifier
 - b) Transresistance amplifier
 - c) Transconductance amplifier
 - d) Differential amplifier
3. The voltage gain of OP-AMP application is
 - a) $A_{CL} = -Z_f/Z_i$
 - b) $A_{CL} = -Z_i/Z_f$
 - c) $A_{CL} = Z_f/Z_i$
 - d) $A_{CL} = Z_i/Z_f$
4. Which is greater regarding PLL?
 - a) Capture range
 - b) lock range
 - c) pull-in-time
 - d) both capture & lock range
5. Voltage controlled oscillator is
 - a) IC 741
 - b) IC 555
 - c) IC NE566
 - d) IC 7404
6. The basic step of a 9-bit DAC is 10.3mV. If 000000000 represents 0V, what output is produced if the input is 101101111?
 - a) 7.34V
 - b) 3.78V
 - c) 5V
 - d) 3.75V
7. The performance of converter changes with temperature, age and power supply variations is
 - a) Stability
 - b) linearity
 - c) Resolution
 - d) Settling time
8. Which of the following is the application of monostable operation?
 - a) FSK generator
 - b) Pulse position modulator
 - c) AM modulator
 - d) Linear ramp generator
9. In series OP-AMP regulator
 - a) $\beta = R_2/(R_1 + R_2)$
 - b) $\beta = R_1/(R_1 + R_2)$
 - c) $\beta = (R_2 + R_1)/(R_1 + R_2)$
 - d) $\beta = R_2/R_1$
10. The output voltage $V_o = -([V_1 + V_2 + V_3] / 3)$ is for
 - a) Inverting summing amplifier
 - b) Non-Inverting summing amplifier
 - c) Subtractor
 - d) Integrator

PART B (10 x 2 = 20 Marks)

11. A circuit is designed in which difference between 2 signals V_1 and V_2 is to be amplified by a factor of 10. Design a circuit to perform this.
12. Define slew rate and thermal drift.
13. Design a square wave generator for $f_0 = 1$ KHz. Use IC 741 and dc supply voltage of 12V.
14. What is the need of precision rectifier?
15. An 8 bit DAC has a resolution of 20 mv/LSB. Find V_{FS} and V_0 if the input is $(10000000)_2$.
16. With reference to a PLL, define 'pull in time'.
17. What is meant by sample and hold circuit?
18. What is the switched capacitor filter?
19. State the important features of instrumentation amplifier.
20. In an astable multivibrator $R_A = 2.2k\Omega$, $R_B = 6.8k\Omega$, $C = 0.01\mu f$.
Calculate a) t_{high} b) t_{low} c) free running frequency

PART C (5 x 14 = 70 Marks)

21. (a) Compare the external frequency compensation techniques with analysis and neat sketches.

(OR)

(b) Draw the circuit diagram of a symmetrical emitter coupled difference amplifier and derive an expression for the difference mode gain A_d and the common mode gain A_c .
22. (a) Design a fourth order Butterworth low pass filter having a upper cutoff frequency of 1Khz.

(OR)

(b) (i) Explain the operation of instrumentation amplifier. (7)
(ii) Detail the working of log and Antilog amplifiers. (7)
23. (a) Using neat sketches, explain how a PLL can be used as
(i) Frequency translator.
(ii) An AM demodulator.

(OR)

(b) (i) Explain the working principle of Gilbert cell multiplier circuit. (10)
(ii) With block diagram, discuss the principle of operation of NE565 PLL circuit (4)

a) Explain in detail about the working of successive approximation ADC.

(OR)

b) Construct a circuit to overcome the drawbacks of weighted resistor DAC and derive its output voltage for the word 100.

a) (i) Discuss the operation of IC 555 as a monostable multivibrator. Draw the waveforms and explain. (7)

(ii) Draw the functional block diagram of switching regulator and explain it briefly. (7)

(OR)

(b) (i) Explain the current limit protection in voltage regulator circuit. (7)

(ii) Explain the working of video amplifier circuit. (7)
