Register Number………………………

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010

Fourth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U07EI404: Linear Integrated Circuits

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

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. Epitaxial growth involves growth from

   A. mixed phase   B. solid phase   C. liquid phase   D. gas phase

2. Ultraviolet radiation is used in IC fabrication process for

   A. Diffusion   B. Masking   C. Isolation   D. Metalization

3. The gain of an op-amp is nearly

   A. 10^3 B. 10^4 C. 10^5 D. 10^6

4. The main advantage in using a three OPAMP instrumentation amplifier over a single op-amp

   differential amplifier lies in

   A. higher values of CMRR

   B. lower noise figures

   C. elimination of the need for accurate matching of resistors

   D. simplicity of gain adjustments

5. The number of comparisons carried out in a 4 – bit flash type A/D converter is

   A. 16   B. 15   C. 4   D. 3

6. A 555 timer can be used as

   A. an astable multivibrator only

   B. a monostable multivibrator only

   C. a frequency divider only

   D. all the above

7. The slew rate of an op-amp is 0.5 V/micro sec. The maximum frequency of a sinusoidal

   input of 2V rms that can be handled without excessive distortion is

   A. 3kHz   B. 30kHz   C. 200kHz   D. 2MHz

8. Power supply rejection ratio (PSRR) of an opamp should be

   A. ideally unity   B. as large as possible

   C. as small as possible   D. ideally zero

9. If the differential and common mode gains of an differential amplifier are 50 and 0.2 respectively, then the CMRR will be

    A. 10   B. 49.8   C. 50.2   D. 250

10. One of the application of astable multivibrator is

    A. counter   B. sweep generator

    C. Voltage to frequency converter   D. Comparator

PART B (10 x 2 = 20 Marks)

11. Name the different types of IC packages.

12. What is ion implantation?

13. Draw the equivalent circuit of a practical op-amp.

14. Define slew rate and CMRR.

15. What is a zero crossing detector?

16. Calculate the values of the LSB, MSB and full scale output for an 8 bit DAC for the 0 to 10V range.

17. Mention the applications of analog multiplier.

18. What are the different stages of operation in a PLL?

19. How the current boosting is achieved in a 723IC?

20. Mention the advantages of an isolation amplifier.

PART C (5 x 14 = 70 Marks)

21. (a) (i) Explain the importance of SiO_2 layer.   (7)

    (ii) Explain the need for making isolation islands.   (7)

(OR)

    (b) (i) Discuss the various methods used for fabricating IC resistors and compare their performance.   (7)

    (ii) Write short note on Photolithography.   (7)

22. (a) (i) Explain the DC characteristics of an OP-AMP.   (7)

    (ii) Design a practical differentiator circuit that will differentiate an input signal with the $f_{max} = 150Hz$.   (7)

(OR)

(b) (i) With circuit diagram explain the operation of integrator. (7)

    (ii) Design the opamp circuit which can give the output as (7)

$$V_0 = 2V_1 - 3V_2 + 4V_3 - 5V_4$$

23. (a) (i) Draw and explain the operation of a triangular waveform generator. (7)

    (ii) Draw the circuit of a full wave rectifier and explain how it gives the average value. (7)

(OR)

(b) Explain the following with neat sketch.

        (i) Succesive approximation A-D converter. (7)

        (ii) Weighted resistor DAC. (7)

24. (a) (i) Explain the operation of PLL. (10)

    (ii) Discuss the application of PLL as frequency synthesizer. (4)

(OR)

(b) (i) List the important features of 555 timer. (6)

    (ii) Write a note on analog multipliers. (8)

25. (a) (i) Discuss the functional diagram of IC 723 series regulator. (8)

    (ii) Write a note on isolation amplifier. (6)

(OR)

(b) Explain the working principle of ICL 8038 function generator. (14)

****