A 263

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005

Fifth Semester

Electrical and Electronics Engineering

EE 334 — INTEGRATED CIRCUITS

Time : Three hours

Maximum : 100 marks

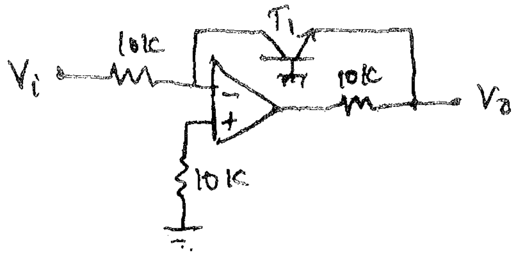
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name the parameters which govern the thickness of the film in the oxidation process.

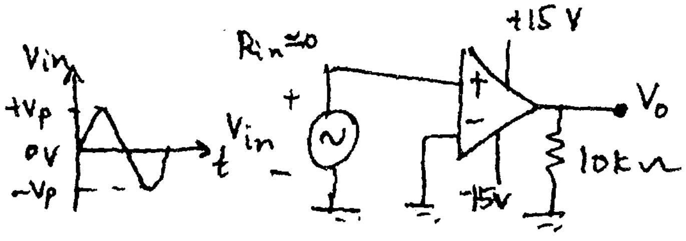
2. What is the advantage of using dry etching process?

3. Write down the output expression for the circuit given below.



$V_T = 26$ mV at room temperature

4. Plot the output waveform of the circuit shown below :



5. Why NMOS devices are used as pull down device?

6. Draw the CMOS circuit for two input NOR gate.

7. Name two commonly used materials for the packaging of VLSI devices

8. What is the step taken to avoid material defect in Ion implantation?

9. What are the failure mechanisms present in a digital VLSI circuit?

10. What is clock skew?

PART B — (5 × 16 = 80 marks)

11. (i) Design an op-amp circuit to generate a pulse waveform of frequency 2 KHz. (6)

(ii) Describe the process involved in the fabrication of a diode and transistor with suitable figures. (10)

12. (a) (i) Draw an op-amp circuit to implement the following expression : (6)

$$V_0 = V_1 + V_2 - V_3 \; (V_4 + 2)$$

(ii) Explain any two applications of 565. (10)

Or

(b) (i) Design a 2 KHz clock with a 50% duty cycle using 555 timer.

(ii) Design a low voltage regulator using 723 for 5 V and explain its characteristics. Draw and explain the internal block diagram of 555.

13. (a) (i) Design a CMOS logic circuit for the expression given below :

$$y = \overline{(A\ B) + (C + D)}.$$

(ii) Design an ALU and a dynamic memory structure.

Or

(b) (i) Write down the steps to design a J.K. flip flop circuit. (5)

(ii) Describe in detail about designing array structures, carry look ahead adders and multiplier circuits. (11)

14. (a) (i) Discuss in detail the fabrication steps involved in the CMOS IC technology. (11)

(ii) Write briefly about failure mechanisms and rates. Present in VLSI circuits. (5)

Or

(b) (i) Explain the steps involved in the fabrication of NMOS IC technology. (10)

(ii) Describe about the packaging and reliability of VLSI devices. (6)

15\. (a) (i) Explain any two techniques of converting analog to digital signal. (11)

(ii) Write briefly about filter IC's. (5)

Or

(b) (i) Compare the methods of conversion of digital to analog signal and explain the characteristics of DAC IC. (10)

(ii) Describe the features of function generator IC. (6)