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MODEL QUESTION PAPER

B.E. ELECTRICAL AND ELECTRONICS ENGINEERING

FIFTH SEMESTER

EE334 - INTEGRATED CIRCUITS

Time : 3 Hrs Max. Marks: 100

Answer all the Questions

Part A (10 x 2 = 20 Marks)

1. Categorise IC's on the basis of their packaging techniques.
2. Explain cathode sputtering and Aluminium spiking effects in IC's
3. What are advantages of active filters over passive filters.
4. Design analog circuits that can generate square and square root of given analog signal of 1V and 100Hz.
5. Derive the Wein Bridge oscillator function $f = 1/2\Pi rc$ and $R_f = 2R_1$
6. Design a dual power supply of ± 12V with using IC's 78XX and 79XX.
7. Prove that he power consumption of CMOS inverter is lower compared to NMOS inverters?
8. Justify that integrated circuit PLL is advantages when compared to the discrete PLL.
9. What are the types and causes of noise in IC's.
10. For a two Op-Amp differential amplifier, if the bias resistors $R_1 = R_2 = 680\Omega$ for Op-Amps, and $R_{f1}=R_{f2}=6.8\Omega$. $V_x = -1.5V_{pp}$; $V_y = -2V_{pp}$ sine waves of 1kHz. Calculate the voltage gain the output voltage.

PART – B (5 x 16 = 80 Marks)

11. Discuss briefly with neat figures and derivation the design of function generation circuits using opamps.

12.a) Design as Op-Amp differentiater to differentiate an input signal that varies in frequency from 20Hz to 800 Hz.

OR

12.b) Using a 555 Timer IC design an Astable multivibrator. Discuss how a pulse position modulator can be realised with an Astable multivibrator.

13.a) What is capture range, lock range and pull in time in PLL circuits?
Explain the function of PLL ICs for frequency multiplication.

OR

13.b) Give the sequence of steps involved in realising a monolithic IC from silicon wafer. Also brief the techniques required to realise diodes, capacitors, resistors and pin leads during IC fabrications.

14.a) Design an interactive network, which has an output of 1 from the last cell only if the input sequence contains exactly 1 group of 1 or more consecutive ones.

The input sequence and output should be as shown

00110111→ 1; 00011100→ 1; 00001111→1;
00110001→ 0; 00110110→ 0; 00110001→1;

OR

14.b) Explain with neat figures the realisation of a 4:1 multiplexer IC using NMOS & PMOS circuits. Explain the importance of realising the functional blocks, circuits and stick representation during a VLSI IC design.

15.a) Write short notes on any two of following:

(i) Semiconductor memory ICs

(ii) Application of IC173 regulator as a current limiter and as a current booster

(iii) Ramp type ADC

OR

15.b) With neat figures explain how CMOS IC is synthesised using N – welt and P – well MOS fabrication.