

Reg.No.:



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7028

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE / JULY 2024

Second Semester

VLSI Design

P23VD207 - VLSI FOR WIRELESS COMMUNICATION

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

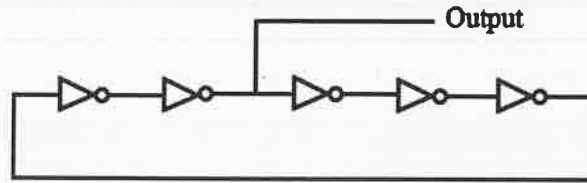
Q.No.	Questions	Marks	KL	CO
1.	Draw the block diagram and name the components of a digital communication system.	2	K1	CO1
2.	Recall the Shannon limit in a communication system.	2	K1	CO1
3.	List the various types of transceiver architecture.	2	K1	CO2
4.	Infer the purpose of a transceiver.	2	K2	CO2
5.	Recall importance of the Source of power dissipation in VLSI.	2	K1	CO3
6.	Relate the need of using a filter before the LNA in a RF receiver architecture.	2	K2	CO3
7.	List the key functional elements of an AGC.	2	K2	CO4
8.	Interpret the methods used for achieving impedance matching in narrowband LNA.	2	K2	CO4
9.	Infer the use of synthesizer in VLSI.	2	K2	CO5
10.	How is the PLL-based frequency synthesizer is different from a voltage controlled oscillator?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11.	a) What is Spread Spectrum Techniques? Explain in detail about Direct Sequence Spread Spectrum Techniques with necessary diagrams. (OR)	13	K2	CO1
	b) Explain the different types of frequency hopping with necessary diagrams.	13	K2	CO1
12.	a) i. Illustrate the effect of harmonic distortion and inter modulation due to nonlinearity in the RF receiver front end. ii. Explain operation of Super heterodyne receiver and direct conversion receiver (OR)	6+7	K2	CO2
	b) i. Define noise figure. Derive the expression for noise figure for a cascade of noisy stages. ii. Explain in details about the RF subsystem design.	7+6	K2	CO2
13.	a) Explain and analyze the techniques of power dissipation reduction at architecture and algorithm levels. (OR)	13	K2	CO3
	b) Explain in details the reduction of power dissipation at device and circuit levels.	13	K2	CO3
14.	a) i. Explain the comprehensive explanation of Automatic Gain Control (AGC) amplifier for Radio frequency. ii. Relate the nonidealities of switching mixers. (OR)	9+4	K2	CO4
	b) i. Explain the function of Automatic Gain Control (AGC) amplifier in radio receiver. ii. Solve the expression for the conversion gain in unbalanced switching mixer when V_{i0} is not switching.	7+6	K2	CO4
15.	a) i. Explain the working of power amplifier and list the basic types of power amplifiers and their applications. ii. Explain the operation of PLL-based phase detector/charge pump. (OR)	6+7	K2	CO5

- b) i. Explain the operation of PLL-based frequency synthesizer. 7+6 K2 CO5
- ii. What are the characteristics of ring oscillator? The inverters in the ring oscillator circuit shown below are identical. If the output waveform has a frequency of 10 MHz, the propagation delay of each inverter is



PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	i. Explain the gain and frequency response of a wideband LNA topology. ii. Explain in details about the baseband subsystem design (OR)	8+7	K2	CO5
b)	i. Explain the effect of distortion in the low-frequency analysis of Gilbert mixer. ii. With neat sketch, explain the working of transformer-based LC oscillator and derive the expression for transfer function from the small-signal circuit of it.	10+5	K2	CO5