Q. Code:390338

Reg. No. | | | | | | | | | | | | | |

M.E./ M. TECH DEGREE EXAMINATIONS, MAY 2024

Second Semester

CU22204 – MIC AND RF SYSTEM DESIGN

(Communication Systems)

(Regulation 2022)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Realize the concept of transceiver architectures.	**3**
CO 2	Design the impedance matching circuits and analyse the stability of amplifiers.	**3**
CO 3	Analyze the feedback systems and power amplifiers.	**4**
CO 4	Design RF filter, oscillator and mixer.	**3**
CO 5	Understand the performance of any practical Microwave integrated circuits.	**2**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What is popcorn noise? How do you control it?	**1**	**2**
2.	Define IP2 and IP3.	**1**	**2**
3.	Compare homodyne and heterodyne receiver.	**1**	**2**
4.	Relate direct up conversion and two step-up conversion.	**1**	**3**
5.	Illustrate Q point and load line concepts.	**2**	**3**
6.	Give the relationship between bandwidth, rise time and delay.	**2**	**2**
7.	Discuss the bandwidth estimation methods.	**2**	**3**
8.	Distinguish single ended and differential ended LNA.	**2**	**2**
9.	Discuss about gain margin and phase margin.	**3**	**2**
10.	Mention the different types of linearization techniques.	**3**	**2**
11.	Write the advantages and disadvantages of class C power amplifier.	**3**	**3**
12.	Discuss about ACPR Metric.	**3**	**3**
13.	Why ideal filter characteristics not realized in practice?	**4**	**2**
14.	Outline few CAD tools for RF circuit design.	**4**	**3**
15.	Differentiate oscillator and Mixer.	**4**	**3**
16.	Draw the basic PLL architecture.	**4**	**3**
17.	What are the advantages of microwave integrated Circuits?	**5**	**2**
18.	Give the dielectric material features used in MIC.	**5**	**2**

19.	Discuss about coplanar circuits.	**5**		**2**
20.	List out four substrates along with their dielectric values.	**5**		**2**

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Determine the expression for Drain Current in Linear and Saturated region of MOSFET.	**(10)**	**1**	**3**
	(OR)			
(b)	Elaborate the transceiver architecture with commonly used few performance metrics.	**(10)**	**1**	**3**
22. (a)	Discuss the properties of S parameters and prove the same.	**(10)**	**2**	**3**
	(OR)			
(b)	Consider a common gate broadband LNA. Determine the expression for NF of this amplifier in the absence of gate noise.	**(10)**	**2**	**3**
23. (a)	Explain various stability analyses performed to improve system efficiency.	**(10)**	**3**	**3**
	(OR)			
(b)	Describe the principles of E and F amplifiers with neat diagrams.	**(10)**	**3**	**3**
24. (a)	With neat diagram explain the various resonator configurations.	**(10)**	**4**	**3**
	(OR)			
(b)	With neat diagram discuss in detail about the working principle of two-hole directional coupler.	**(10)**	**4**	**3**
25. (a)	Discuss in detail about the lumped elements of MIC components.	**(10)**	**5**	**3**
	(OR)			
(b)	Discuss in detail about MIC micro strip components and coplanar circuits.	**(10)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	Design a linear amplifier for use in a 1 GHz communication system. The requirements are to supply 1W into 50 ohms. Assume that a 3.3 V. DC power supply is available. Specify important device parameters compute all component values and estimate drain efficiency.	**(10)**	**3**	4

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