Q. Code: 184079

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

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

Second Semester

CU22203 – WIRELESS TRANSCEIVER DESIGN

(Communication Systems)

(Regulation 2022)

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

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Identify the various concepts involved in transceiver system design.	**2**
CO 2	Obtain insights on radio architectures and design considerations for transceiver.	**6**
CO 3	Design and analyze receiver system.	**6**
CO 4	Design and analyze transmitter system.	**6**
CO 5	Estimate the system performance under various real time applications.	**4**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Draw the block diagram of generic RF Transceiver.	**1**	**2**
2.	What is the significance of harmonic distortion.	**1**	**2**
3.	The transmitter of GSM cellphone delivers 1W power to the antenna. Explain the effect of harmonics of this signal.	**1**	**2**
4.	Give the effect of desensitization in nonlinear system design.	**1**	**2**
5.	State image rejection realization in low IF receiver.	**2**	**2**
6.	List the steps used to avid self-corruption of asymmetric signals.	**2**	**3**
7.	The designer of an IEEE 802.11g receiver attempts to place image frequency in GPS band which contains only low level satellite transmissions and hence no strong interferers. Is this Possible.	**2**	**3**
8.	An engineer is to design a receiver for space applications with no concern for interferers. Construct heterodyne front end with effect of noise spectra.	**2**	**3**
9.	Discuss about VSWR magnitude for Base station antenna.	**3**	**2**
10.	Considering two symbol power integrated in the DSP with conversion gain of 30.64, nSymb= 2 and assuming nc = 64, ns = 2, Cr=256 and Vref = 180 mVrms, Calculate signal reference level in AGC algorithm.	**3**	**3**
11.	Determine the factors for dynamic range requirement of an ADC used in a mobile station.	**3**	**2**
12.	List ADC for CDMA mobile station using AMPS, GSM, EDGE.	**3**	**2**

13.	Estimate the overall modulation accuracy EVM total, of a CDMA mobile station transmitting IS-95.	**4**	**3**
14.	Define Adjacent Channel Power Ratio.	**4**	**2**
15.	Highlight important characteristics for noise emission calculation.	**4**	**2**
16.	Draw the cascaded block diagram of transmitter chain in noise emission.	**4**	**2**
17.	List the critical parameters of Application system design.	**5**	**2**
18.	Compare multimode and multiband super heterodyne transceiver design.	**5**	**2**
19.	Mention the techniques to measure linearity in super heterodyne receivers.	**5**	**2**
20.	Discuss about toughest requirement-Spurious Emission in a Receiver Band.	**5**	**2**

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Devise a system where an output can be expressed as a linear combination of responses to Individual inputs.	**(10)**	**1**	**4**
	(OR)			
(b)	Categorize the transmitter leakage in CDMA and procedures to overcome in transceiver.	**(10)**	**1**	**4**
22. (a)	Recommend and detail the CMOS technology which started to employ this architecture to cope with the flicker noise and the DC offset problems.	**(10)**	**2**	**4**
	(OR)			
(b)	Collaborate radio architecture with good sampling rate and resolution of the modem ADC/DAC with an acceptable power consumption enough to sustain present wireless communication system.	**(10)**	**2**	**4**
23. (a)	Devise the relationship in detail between receiver characteristics sensitivity and noise figure.	**(10)**	**3**	**3**
	(OR)			
(b)	Briefly explain the Single-tone desensitization is a unique specification for CDMA mobile system.	**(10)**	**3**	**3**
24. (a)	Evaluate the transmitter noise emission analysis of single port model device.	**(10)**	**4**	**3**
	(OR)			
(b)	Relate and brief the fundamental representation of noise voltages for a device identifying thermal noise presence.	**(10)**	**4**	**3**
25. (a)	Categorize the methods to achieve high resolution in building up a CDMA direct conversion transceiver.	**(10)**	**5**	**4**

(OR)

		Marks	CO	RBT LEVEL
(b)	Analyze the Minimum performance specifications of GSM 800/1900 Mobile transmitter used in cellular band and PCS band.	**(10)**	**5**	**4**

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	A Bluetooth receiver employs a Low Noise Amplifier (LNA) having a Gain of 10 and input impedance of 50 ohms. The LNA senses a desired signal level of -80 dBm at 2.410GHz and two interferers of equal levels 2.420GHz and 2.430 GHz. Assume load is matched. (i) Determine the value of with P1of -30dBm, (ii) If each interferer is 10 dB below P1.Determine the corruption experienced by desired output of LNA.	**(10)**	**1**	**5**

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