Reg. No.																

Question Paper Code	14473

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Second Semester

M.E. - Communication Systems

24PCOPC202 - MIC AND RF SYSTEM DESIGN

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	SFDR stands for_____.	*1*	*K1*	*CO1*
	a) Signal Frequency Dynamic Range b) Spurious Free Dynamic Range			
	c) Signal Free Dynamic Ratio d) Spectral Frequency Dynamic Range			
2.	In direct up-conversion transmitters, the baseband signal is directly converted to_____.	*1*	*K2*	*CO1*
	a) Intermediate frequency b) Audio frequency			
	c) Radio frequency d) Image frequency			
3.	The center of the smith chart represents_____.	*1*	*K3*	*CO1*
	a) Open circuit b) Short circuit			
	c) Matched impedance d) Infinite impedance			
4.	_____.network is commonly used for impedance matching.	*1*	*K2*	*CO2*
	a) LC network b) RC network			
	c) RL network d) Diode network			
5.	The parameter S_{11} represents_____.	*1*	*K1*	*CO2*
	a) Output reflection coefficient b) Forward transmission coefficient			
	c) Input reflection coefficient d) Reverse transmission coefficient			
6.	The purpose of two-step up-conversion in transmitters is to_____.	*1*	*K3*	*CO2*
	a) Reduce antenna size b) Eliminate mixers			
	c) Improve frequency conversion and filtering d) Reduce modulation			
7.	A feedback system is considered stable when_____.	*1*	*K1*	*CO3*
	a) Output oscillates continuously b) Output remains bounded for bounded input			
	c) Output becomes zero d) Output becomes infinite			
8.	Linearization techniques are used to_____.	*1*	*K2*	*CO3*
	a) Increase distortion b) Reduce amplifier nonlinearity			
	c) Reduce gain d) Increase noise			
9.	Root locus technique is used to study_____.	*1*	*K3*	*CO3*
	a) Power gain b) System stability			
	c) Noise figure d) Bandwidth			
10.	The Barkhausen criterion is associated with_____.	*1*	*K2*	*CO4*
	a) Filters b) Oscillators			
	c) Mixers d) Couplers			

11.	What is the primary function of a resonator in RF circuits?		*1*	*K1*	*CO4*
	a) Amplification	b) Frequency selection			
	c) Rectification	d) Modulation			
12.	A high-frequency oscillator commonly used in RF applications is_____.		*1*	*K3*	*CO4*
	a) Wien bridge oscillator	b) Hartley oscillator			
	c) Gunn oscillator	d) RC phase shift oscillator			
13.	_____ amplifier is commonly used for high-efficiency RF applications.		*1*	*K2*	*CO5*
	a) Class A	b) Class AB			
	c) Class C	d) Class B			
14.	_____ parameter is most important in evaluating amplifier linearity.		*1*	*K3*	*CO5*
	a) Gain	b) Efficiency			
	c) ACPR	d) Frequency			
15.	Coplanar circuits mainly consist of conductors placed on_____.		*1*	*K3*	*CO6*
	a) Opposite sides of substrate	b) Same side of substrate			
	c) Metallic enclosure	d) Vacuum tube			
16.	Which transistor is commonly used in microwave amplifiers?		*1*	*K1*	*CO6*
	a) BJT	b) MOSFET			
	c) HEMT	d) HEMT			

PART – A (ii) (Short Answer Questions)
(6 × 3 = 18 Marks)
Answer ALL Questions

17.	Make use of the concept to explain available power gain and insertion power gain.	*3*	*K3*	*CO1*
18.	Choose the correct equation relating bandwidth, rise time, and delay.	*3*	*K3*	*CO2*
19.	Analyze the efficiency boosting techniques and state their features.	*3*	*K4*	*CO3*
20.	Examine a basic dielectric resonator using its equivalent circuit.	*3*	*K4*	*CO4*
21.	Apply conversion efficiency concepts to power amplifiers.	*3*	*K3*	*CO5*
22.	Distinguish between different passive components used in MIC.	*3*	*K4*	*CO6*

PART - B (Descriptive Answer Questions)
(6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Apply mathematically two types of noise and explain theconcept of heterodyne mixing with a neat diagram.	*11*	*K3*	*CO1*
		OR			
	b)	Make use of MOSFET equations to explain the I–V characteristics with necessary diagram.	*11*	*K3*	*CO1*
24.	a)	Build a brief explanation describing the impact of OC time constants in bandwidth estimation.	*11*	*K3*	*CO2*
		OR			
	b)	Choose the appropriate parameters and explain the working of differential LNAs with suitable analysis.	*11*	*K3*	*CO2*
25.	a)	Analyze the importance of a negative feedback system with a suitable example.	*11*	*K4*	*CO3*
		OR			

	b)	Analyze the appropriate root locus method to analyze a positive feedback system and state the inference.	*11*	*K4*	*CO3*
26.	a)	Develop the PLL architecture by incorporating the loop filter and explain its importance.	*11*	*K3*	*CO4*
		OR			
	b)	Apply the working principle of a directional coupler in microwave systems.	*11*	*K3*	*CO4*
27.	a)	Construct examples illustrating the importance of ACPR metrics in communication systems.	*11*	*K3*	*CO5*
		OR			
	b)	Utilize LNA and medium power amplifiers in microwave communication systems.	*11*	*K3*	*CO5*
28.	a)	Model the operation of lumped elements in MIC components.	*11*	*K4*	*CO6*
		OR			
	b)	Examine appropriate substrate materials for MIC component fabrication based on their properties.	*11*	*K4*	*CO6*