CBCS SCHEME

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BEC402

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Principles of Communication Systems

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define probability. Illustrate the relationship between sample space, events and probability.	06	L1	CO1
	b.	Outline random processes and illustrate an ensemble of sample function with a neat diagram.	06	L2	CO1
	c.	Show that if a Gaussian process x(t) is applied to a stable linear filter, then the random process y(t) developed at the output of the filter is also Gaussian.	08	L3	CO2
		OR			
Q.2	a.	What is conditional probability? Prove that $P(B/A) = P(A/B) \cdot P(B) / P(A)$	06	L1	CO1
	b.	Define mean, correlation and covariance function.	06	L2	CO2
	c.	Develop a program to generate the probability density function of Gaussian distribution function.	08	L3	CO2
		Module – 2			
Q.3	a.	An antenna has an impedance of 40 Ω an unmodulated AM signal produces a current of 4.8 A. The modulation is 90 percent calculate i) The carrier power ii) The total power iii) The sideband power	06	L1	CO1
	b.	Explain with neat diagrams amplitude demodulation using the diode detector.	07	L1	CO1
	c.	Explain a general block diagram of an FDM system	07	L2	CO2
		OR			
Q.4	a.	Interpret the concept of modulation index and percentage of modulation write the necessary equations.	06	L1	CO1
	b.	Explain high level collector modulation with neat block diagram.	07	L2	CO1
	c.	Explain with diagrams the working principle of lattice type balanced modulator.	07	L2	CO2
		Module – 3			
Q.5	a.	Compare and contrast FM and AM.	06	L1	CO1
	b.	Explain with diagrams the working principle of frequency modulation using voltage controlled oscillator.	07	L2	CO2
	c.	Explain general block diagram of a super heterodyne receiver.	07	L2	CO2
		OR			
Q.6	a.	The input to an FM receiver having an S/N of 2.8. The modulating frequency is 1.5 KHz. The maximum permitted deviation is 4 KHz. What are (i) The frequency deviation caused by the noise (ii) The improved output S/N.	06	L2	CO2
	b.	Define PLL. Explain the basic block diagram of a PLL.	07	L1	CO2
	c.	Explain JFET mixer.	07	L2	CO2

		Module – 4			
Q.7	**a.**	What are the advantages of digital signal over analog signals?	**04**	**L1**	**CO1**
	b.	Explain with basic elements of a PCM system with neat diagrams.	**08**	**L2**	**CO1**
	c.	For the data stream 0 1 1 0 1 0 0 1 draw the following line code waveforms i) Unipolar NRZ ii) Polar NRZ iii) Unipolar RZ iv) Manchestor code	**08**	**L3**	**CO2**
		OR			
Q.8	**a.**	State and prove Sampling theorem.	**04**	**L1**	**CO1**
	b.	What is multiplexing and why is it required in communication? Explain the working of TDM with a neat block diagram.	**08**	**L2**	**CO1**
	c.	Explain the generation of PPM with a relevant block diagrams and waveforms.	**08**	**L2**	**CO2**
		Module – 5			
Q.9	**a.**	Define Intersymbol interference (ISI) outline baseband binary data transmission system with neat block diagram and equations.	**08**	**L2**	**CO1**
	b.	Develop a code to generate RZ pulse.	**04**	**L3**	**CO2**
	c.	Define signal to noise ratio. Explain different types of external and internal noise.	**08**	**L2**	**CO1**
		OR			
Q.10	**a.**	Explain the following concept briefly: i) Nyquist criterion for distributors transmission ii) Baseband M-ary PAM transmission	**08**	**L1**	**CO2**
	b.	Develop a code to generate Raised cosine pulse.	**04**	**L2**	**CO2**
	c.	Illustrate the concept of noise in cascaded stages with a diagram. Write Friis formula and mention its terms.	**08**	**L2**	**CO3**

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