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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B.E. - Electronics and Communication Engineering

Semester End Examination; May/June - 2018

Analog Communication

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. Define the joint probability density function and explain its properties. 8

b. Derive an expression for probabilities of statistically independent events. 4

c. There are two identical boxes '*X*' and '*Y*'. Box '*X*' contains 4 white and 3 red balls and box '*Y*' contains 3 white and 7 red balls. One ball is drawn at random from the box. If the ball is white, what is the probability that it is drawn from box '*X*'? 8

2 a. Define modulation. Explain in detail the AM and derive the expression for the same in time and frequency domain. 10

b. Explain in detail the generation of AM wave using square law modulator. 10

UNIT - II

3 a. Explain the generation of DSBSC using ring modulator. 10

b. Explain in detail the Quadrature null effect and how is avoided in DSBSC receiver? 10

4 a. Explain in detail the generation of SSB using phase discrimination method. 10

b. With the help of block diagram, explain the FDM used in communication systems. 7

c. A 2 stage SSB modulator where the message signal occupies a band 0.3 to 4.0 kHz and the 2 carrier frequencies are f_1 = 10 kHz and f_2 = 100 kHz. Find; 3

i) The sidebands of DSBSC waves at the output of the product modulators

ii) The sidebands of SSB waves at the output of the BPF

UNIT - III

5 a. Explain the generation and detection of VSB. 10

b. Distinguish between different amplitude modulations. 10

6 a. Explain the types of angle modulations. 6

b. Show that the FM wave has infinite sidebands. 10

c. A 92.7 MHz carrier is frequency modulated by a 6 kHz sine wave. The resultant FM signal has a frequency deviation of 50 kHz. 4

i) Find the carrier swing of the FM signal

ii) Find the highest and lowest frequencies of FM signal

iii) Find the modulation index.

Contd…2

UNIT - IV

7	a.	Explain the FM generation using indirect method.	10
	b.	Distinguish between AM and FM.	5
	c.	Describe FM demodulation using frequency discrimination method.	5
8	a.	Explain the linear model of phase locked loop.	7
	b.	Explain in detail the super heterodyne receiver.	6
	c.	Explain in detail the FM stereo Multiplexing.	7

UNIT - V

9	a.	Explain different types of noises.	6
	b.	Derive an expression for Noise equivalent bandwidth.	8
	c.	Two 2 port networks are connected in cascade, for the first stage, the noise figure and available power gain are 6 dB and 10 dB respectively. For the second stage the noise figure and available power gain are 16 dB and 12 dB respectively. Determine the overall noise figure in dB.	6
10	a.	Explain in detail the pre-emphasis and de-emphasis in FM systems.	8
	b.	Derive an expression for FOM of AM receiver.	8
	c.	An FM wave receiver receives an FM signal $S(t) = 10\cos[2\pi 10^8 t + 6\sin(2\pi 10^3 t)]$ find the FOM of FM receiver.	4

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