SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY::PUTTUR
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QUESTIONBANK (DESCRIPTIVE)

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UNIT-I

AMPLITUDE MODULATION

PART-A (2 MARKS)

1.	**(a)**	Define Modulation	[L1] [CO1]	[2M]
	(b)	Determine Bandwidth of AM.	[L3] [CO5]	[2M]
	(c)	Define coherent Demodulation.	[L1] [CO5]	[2M]
	(d)	What are the advantages of DSB-SC.	[L1] [CO5]	[2M]
	(e)	Write the applications of SSB-SC.	[L6] [CO5]	[2M]

PART-B(10 MARKS)

2.		Define Communication .Draw and explain the basic block diagram of communication system.	[L1] [CO2]	[10M]
3.	**(a)**	Classify different types of modulation.	[L1][CO2]	[5M]
	(b)	Explain need for Modulation.	[L2] [CO2]	[5M]
4.	**(a)**	Define Amplitude Modulation. Derive expression for AM wave in time	[L2] [CO2]	[5M]
	(b)	A modulating signal 10 cos ($2\pi \times 10^3$t) is used to modulate a carrier signal 20 cos ($2\pi \times 10^4$ t). Compute the modulation index, % of modulation index, frequency of sideband components and their amplitudes. What will be the bandwidth of modulated signal?	[L3] [CO2]	[5M]
5.	**(a)**	Illustrate the Amplitude modulation for single tone information	[L2] [CO2]	[5M]
	(b)	With a neat diagram and relevant equations, explain the generation of AM wave using Switching modulator.	[L2] [CO2]	[5M]
6.	**(a)**	Derive the expression for total transmitted power of AM wave and comment on the power wastage in AM.	[L1] [CO5]	[5M]
	(b)	An AM transmitter radiates 9kW of power when the carrier is un-modulated and 10.125kW of power when the carrier is sinusoidal modulated. Find the modulation index & Percentage modulation. Now if another sine wave corresponding to 40% modulation is transmitted simultaneously. Calculate total radiated power.	[L1] [CO5]	[5M]
7.	**(a)**	Determine the modulation index of AM, Percentage Modulation and Bandwidth of AM.	[L3] [CO2]	[5M]
	(b)	What is DSB-SC Modulation? Explain the time domain expressions of DSB-SC wave.	[L1] [CO2]	[5M]
8.	**(a)**	A message signal m(t)=5cos(200πt) is multiplied with a carrier c(t)=10cos(2000πt).Find the DSB-SC modulated signal.	[L2] [CO2]	[5M]
	(b)	Explain about Balanced Modulator technique.	[L1] [CO2]	[5M]

9.	**(a)**	Explain single tone modulation for transmitting only upper side band (USB) frequency of SSB modulation	[L1] [CO2]	[5M]
	(b)	Explain single tone modulation for transmitting only lower side band (LSB) frequency of SSB modulation.	[L1] [CO5]	[5M]
10.	**(a)**	Sketch and explain the block diagram of SSB-SC signal generation using frequency discrimination method.	[L3] [CO1]	[5M]
	(b)	A message signal $m(t)=\cos(2\pi\times 1\times 10^{3}t)$ is used to generate an upper-sideband (USB) SSB-SC signal with a carrier frequency fc=100kHz.Find the SSB-SC transmitted sign	[L3] [CO5]	[5M]
11.	**(a)**	Explain the scheme for generation of VSB modulated wave.	[L2] [CO2]	[5M]
	(b)	Compare different types of Amplitude modulation techniques.	[L2] [CO2]	[5M]

UNIT- II

ANGLE MODULATION

PART-A(2 MARKS)

1.	**(a)**	Define angle modulation.	[L1] [CO2]	[2M]
	(b)	What are the advantages, disadvantages of PM.	[L1] [CO5]	[2M]
	(c)	Define frequency deviation.	[L2] [CO1]	[2M]
	(d)	Define NBFM.	[L2] [CO2]	[2M]
	(e)	Define Pre-Emphasis and De-Emphasis.	[L2] [CO2]	[2M]

PART-B(10 MARKS)

2.	**(a)**	Classify different types of angle modulation and write their mathematical expressions.	[L2] [CO2]	[5M]
	(b)	Explain the generation of PM.	[L2] [CO2]	[5M]
3.	**(a)**	Define FM and derive the expression with necessary wave forms.	[L1] [CO2]	[5M]
	(b)	A single-tone FM is represented by the voltage equation as: $v(t) = 12\cos(6 \times 10\text{^}6t + 5\sin 1250t)$. Determine the following: (i) Carrier frequency (ii) Modulating frequency (iii) Modulation index (iv) What power will this FM wave dissipate in 10Ω resistors?	[L3] [CO5]	[5M]
4.	**(a)**	Analyze the expression of single tone FM.	[L4] [CO5]	[5M]
	(b)	A 20 MHz carrier is frequency modulated by a sinusoidal signal such that the peak frequency deviation is 100 kHz. Determine the modulation index and the approximate bandwidth of the FM signal if the frequency of the modulating signal is: (i) 1 kHz (ii) 15 kHz	[L3] [CO2]	[5M]
5.	**(a)**	Explain Spectrum Analysis of Sinusoidal FM Wave using Bessel functions	[L2] [CO1]	[5M]
	(b)	What are the advantages, disadvantages, and applications of FM.	[L1] [CO5]	[5M]
6.	**(a)**	Explain the generation of Narrow band FM.	[L2] [CO2]	[5M]
	(b)	Derive the equation for average power.	[L2] [CO5]	[5M]
7.	**(a)**	What are the differences between NBFM &WBFM?	[L2] [CO1]	[5M]
	(b)	Discuss about transmission bandwidth &Carson's rule of FM signal.	[L2] [CO2]	[5M]
8.	**(a)**	Explain the block diagram of indirect method in FM generation.	[L2] [CO2]	[10M]
9.	**(a)**	Explain the detection of FM wave using balanced slope detector.	[L2] [CO2]	[5M]
	(b)	Compare between the FM & PM.	[L4] [CO2]	[5M]
10.		Demonstrate the working principle of PLL.	[L2] [CO2]	[10M]
11.	**(a)**	Compare between the FM &AM.	[L4] [CO2]	[5M]
	(b)	Explain about Pre-Emphasis and De-Emphasis circuits in FM.	[L2] [CO2]	[5M]

UNIT-III

TRANSMITTERS

PART-A(2 MARKS)

1.	**(a)**	What are the types of Transmitters?	[L1] [CO2]	[2M]
	(b)	What are the basic functions of a Transmitter and Receiver?	[L1] [CO2]	[2M]
	(c)	Define Intermediate frequency and Image frequency.	[L1] [CO2]	[2M]
	(d)	What is the basic function of AGC?	[L1] [CO2]	[2M]
	(e)	Write any two characteristics of RF section.	[L1] [CO2]	[2M]

PART-B(10MARKS)

2.	**(a)**	Draw a neat block diagram of an AM transmitter and explain each block.	[L1] [CO2]	[5M]
	(b)	Draw a neat block diagram of a High Level AM transmitter and explain each block.	[L1] [CO2]	[5M]
3.	**(a)**	Draw a neat block diagram of a Low Level AM transmitter and explain each block.	[L1] [CO2]	[5M]
	(b)	Why feedback is used in the AM transmitter? Explain its uses.	[L4] [CO5]	[5M]
4.	**(a)**	Draw a neat block diagram of an FM transmitter and explain each block.	[L1] [CO5]	[5M]
	(b)	Explain the concept of frequency stability in the FM transmitter.	[L2] [CO2]	[5M]
5.	**(a)**	Draw a neat block diagram of Tuned Radio Frequency (TRF) and explain each block.	[L1] [CO2]	[5M]
	(b)	List out the advantages and disadvantages of TRF receivers.	[L1] [CO2]	[5M]
6.	**(a)**	Draw the block diagrams of a super hetrodyne receiver and explain the function of each block.	[L1] [CO5]	[5M]
	(b)	What are the advantages of a super hetrodyne receiver as compared to a TRF receiver?	[L1] [CO2]	[5M]
7.		Explain the following terms i) Sensitivity, ii) Selectivity iii) Image frequency and its rejection iv) Fidelity of asuperheterodyne receiver.	[L2] [CO2]	[10M]
8.	**(a)**	In a broadcast super heterodyne receiver having an RF amplifier with Quality factor of theantenna coupling circuit (at the input to the mixer) is 100. If the intermediate frequency is455 kHz, calculate i) The image frequency and its rejection ratio at 1000 kHz. ii) The image frequency and its rejection ratio at 25 MHz	[L2] [CO2]	[5M]
	(b)	Explain the general process of frequency changing in a super-heterodyne receiver.	[L2] [CO2]	[5M]
9.	**(a)**	What is tracking? What is the necessity of tracking in radio receivers?	[L1] [CO2]	[5M]
	(b)	Explain about image frequency and intermediate frequency of radio receiver.	[L2] [CO5]	[5M]
10.	**(a)**	Explain the principle of working of AGC in detail.	[L1] [CO5]	[5M]
	(b)	Explain the necessity for an amplitude limiter in an FM receiver.	[L2] [CO2]	[5M]
11.	**(a)**	Draw the block diagram of FM receiver and explain its working	[L1] [CO1]	[5M]
	(b)	Compare AM and FM Receivers.	[L2] [CO1]	[5M]

UNIT- IV

INTRODUCTION TO NOISE AND PULSE MODULATION

PART-A(2 MARKS)

1.	**(a)**	Define Noise and its classification.	[L1] [CO4]	[2M]
	(b)	What is Thermal Noise?	[L1] [CO4]	[2M]
	(c)	What are Noise considerations in PCM?	[L1] [CO5]	[2M]
	(d)	Define Companding.	[L1] [CO5]	[2M]
	(e)	List the Advantages of Delta Modulation.	[L1] [CO5]	[2M]

PART-B(10MARKS)

2.	**(a)**	Define (i) Input S/N ratio (ii) Output S/N ratio	[L1] [CO4]	[4M]
	(b)	Explain a receiver model in communication system.	[L2] [CO4]	[6M]
3.	**(a)**	Define (iii) Signal to Noise Ratio(iv) Figure of merit	[L1] [CO4]	[4M]
	(b)	Derive the expression for figure of merit of AM (DSB-FC) system.	[L3] [CO4]	[6M]
4.	**(a)**	Derive the expression for output SNR of DSB-SC system.	[L3] [CO4]	[5M]
	(b)	Prove that the figure of merit for SSB-SC is 1.	[L3] [CO4]	[5M]
5.	**(a)**	Derive the expression for figure of merit of FM system.	[L4] [CO4]	[5M]
	(b)	Explain the generation of PAM with mathematical analysis.	[L2] [CO4]	[5M]
6.		With a neat sketch, explain the modulation & demodulation of Pulse Duration Modulation.	[L2] [CO3]	[10M]
7.	**(a)**	Describe how a PPM signal can be generated and detected from PWM signal.	[L2] [CO4]	[7M]
	(b)	What are the advantages and disadvantages of PPM?	[L1] [CO4]	[3M]
8.	**(a)**	Differentiate between TDM & FDM.	[L2] [CO4]	[4M]
	(b)	With a neat block diagram explain PCM transmitter and receiver.	[L2] [CO5]	[6M]
9.	**(a)**	Define quantization .Explain quantization with one example.	[L2] [CO5]	[5M]
	(b)	Consider an audio signal consisting of the sinusoidal term given as $x(t) = 3\cos(500\pi t)$. i) Determine the SNR noise ratio. When this is quantized using 10 bits PCM. ii) How many bits of quantization are needed to achieve a SNR ratio of at least 40dB.	[L3] [CO5]	[5M]
10.		Explain the working of DM (delta modulation system) with suitable diagrams	[L2] [CO5]	[10M]
11.	**(a)**	Explain the DPCM system with neat diagram.	[L2] [CO5]	[5M]
	(b)	Derive the quantization noise in PCM?	[L3] [CO5]	[5M]

UNIT-V

DIGITAL MODULATION TECHNIQUES

PART-A(2 MARKS)

1.	**(a)**	Define coherent digital modulation.	[L1] [CO5]	[2M]
	(b)	Define inter symbol interference.	[L1] [CO6]	[2M]
	(c)	What are the coherent digital modulation techniques?	[L1] [CO5]	[2M]
	(d)	What is base band transmission in digital communication systems?	[L1] [CO6]	[2M]
	(e)	Define Eye Diagrams.	[L1] [CO5]	[2M]

PART-B(10MARKS)

2.		Draw the block diagram of ASK transmitter and receiver and explain the operation.	[L1] [CO5]	[10M]
3.	**(a)**	Describe the generation and detection of BPSK.	[L2] [CO5]	[5M]
	(b)	Describe the generation and detection of BFSK.	[L2] [CO5]	[5M]
4.		Draw the block diagram of QPSK transmitter & receiver and explain each block in detail.	[L1] [CO5]	[10M]
5.	**(a)**	Describe the generation and detection of DPSK.	[L3] [CO5]	[5M]
	(b)	A binary data stream 101101100 is to be transmitted using DPSK. Determine the encoded and decoded output.	[L3] [CO5]	[5M]
6.	**(a)**	Explain M-ary modulation schemes and their significance in digital communication.	[L1] [CO5]	[5M]
	(b)	Compare all the binary digital modulation techniques.	[L4] [CO5]	[5M]
7.	**(a)**	Describe the concept of Base band Transmission. How does it differ from passband transmission?	[L2] [CO6]	[5M]
	(b)	Explain the process of Optimal Reception of Digital Signals. What are the factors influencing it?	[L1] [CO6]	[5M]
8.	**(a)**	What is a Base band Signal Receiver? How does it work	[L2] [CO6]	[5M]
	(b)	Derive the Probability of Error for optimum filter.	[L1] [CO6]	[5M]
9.	**(a)**	What is an Optimum Receiver? Explain how it is designed for different modulation techniques.	[L1] [CO6]	[5M]
	(b)	Discuss the significance of Coherent Reception in digital communication systems.	[L2] [CO6]	[5M]
10.		Explain the concept of Inter Symbol Interference (ISI). What are its causes and effects?	[L1] [CO6]	[10M]
11.		Describe the structure and interpretation of an Eye Diagram. How does it help in evaluating system performance?	[L2] [CO6]	[10M]