INSTITUTE OF AERONAUTICAL ENGINEERING
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ELECTRONICS AND COMMUNICATION ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**DIGITAL COMMUNICATIONS**
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OBJECTIVES:

I	Understand the different digital modulation techniques
II	Discuss the importance of error detection and correction codes and use them in presence of channel noise.
III	Describe and analyze the methods of transmission of digital data using baseband and carrier modulation techniques.
IV	Decompose codes separately into source codes, channel codes, and develop competency in modeling and analyzing communication system elements.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		UNIT-I				
1	Define Modulation.	Modulation is the process of changing the parameters of the carrier signal, in accordance with the instantaneous values of the modulating signal.	Remember	CO 1	CLO 1	AEC009.01
2	Define Noise.	Noise is an unwanted signal which interferes with the original message signal and corrupts the parameters of the message signal.	Understand	CO 1	CLO 3	AEC009.03
3	Define angle Modulation.	If the angle of the carrier wave is varied, in accordance with the instantaneous value of the modulating signal, then such a technique is called as Angle Modulation.	Understand	CO 1	CLO 1	AEC009.01
4	Define Carrier Signal.	The high frequency signal which has a certain phase, frequency, and amplitude but contains no information, is called a carrier signal.	Understand	CO 1	CLO 1	AEC009.01
5	Define Message Signal.	The signal which contains a message to be transmitted, is called as a message signal.	Understand	CO 1	CLO 1	AEC009.01
6	Define DeModulation.	It is used to recover the information content from the modulated carrier wave.	Understand	CO 1	CLO 1	AEC009.01

7	Define Pulse Modulation.	Pulse- Modulation is a form of signal modulation where the message information is encoded in the amplitude of a series of signal pulses.	Understand	CO 1	CLO 1	AEC009.01
8	What is PAM?	By varying the Amplitude of the pulses (the carrier signal) in proportion to the instantaneous values of the analog signal (the message signal).	Understand	CO 1	CLO 2	AEC009.02
9	What is PPM?	By varying the position of the pulses (the carrier signal) in proportion to the instantaneous values of the analog signal (the message signal).	Understand	CO 1	CLO 2	AEC009.02
10	What is PWM?	By varying the width of the pulses (the carrier signal) in proportion to the instantaneous values of the analog signal (the message signal).	Understand	CO 1	CLO 1	AEC009.01
11	What is Analog Modulation?	Analog modulation refers to the process of transferring an analog baseband (low frequency) signal, like an audio or TV signal over a higher frequency signal such as a radio frequency band.	Remember	CO 1	CLO 1	AEC009.01
12	What is Transmission B.W?	Transmission bandwidth is the actual width of the transmitted signal	Understand	CO 1	CLO 2	AEC009.02
13	Define Bitrate?	bit rate is the rate at which a signal is modulated, it is a function of symbol rate.	Understand	CO 1	CLO 2	AEC009.02
14	Define Quantization Error?	The difference between an input value and its quantized value is called a Quantization Error.	Understand	CO 1	CLO 2	AEC009.02
15	What is Quantization in PCM?	PCM is a method of converting an analog into digital signals. ... The value that a signal has in certain time is called a sample. The process of taking samples is calledquantization by time.	Understand	CO 1	CLO 3	AEC009.03
16	Define Band Width.	Bandwidth is defined as a range within a band of frequencies or wavelengths	Understand	CO 1	CLO 3	AEC009.03
17	What is Communication?	Communication is simply the act of transferring information from one place, person or group to another.	Understand	CO 1	CLO 1	AEC009.01
18	What Is Sampling Theorem?	A continuous time signal can be represented in its samples and can be recovered back whensampling frequency fs is greater than or equal to the twice the highest frequency component of message signal.	Understand	CO 1	CLO 2	AEC009.02
19	Define Single Polarity In PAM.	Single polarity PAM is a situation where a suitable fixed DC bias is added to the signal to ensure that all the pulses are positive.	Understand	CO 1	CLO 1	AEC009.01
20	Define Double Polarity In PAM .	Double polarity PAM is a situation where the pulses are both positive and negative.	Understand	CO 1	CLO 1	AEC009.01
21	What is Uniform Quantization?	The type of quantization in which the quantization levels are uniformly spaced is termed as a Uniform Quantization.	Understand	CO 1	CLO 2	AEC009.02
22	What is Non Uniform Quantization?	The type of quantization in which the quantization levels.	Understand	CO 1	CLO 2	AEC009.02
23	Define Filter.	It removes the unwanted components in original data	Remember	CO 1	CLO 3	AEC009.03

24	What is Channel?	Definition of communication channel: A medium through which a message is transmitted to its intended audience, such as print media or broadcast	Understand	CO 1	CLO 1	AEC009.01
25	Define Signal.	A signal is an electrical or electromagnetic current that is used for carrying data from one device or network to another.	Understand	CO 1	CLO 1	AEC009.01
26	What is De-Multiplexing?	Extracting the number of channels from one, which is done at the receiver is called as demultiplexing.	Understand	CO 1	CLO 1	AEC009.01
27	Define Sample.	Sample is a piece of data taken from the signal.	Understand	CO 1	CLO 1	AEC009.01
28	What is Multiplexing?	The process of multiplexing divides a communication channel into several number of logical channels, allotting each one for a different message signal or a data stream to be transferred.	Understand	CO 1	CLO 1	AEC009.01
29	Define Companding.	Companding refers to a technique for compressing and then expanding (or decompressing) an analog or digital signal.	Understand	CO 1	CLO 2	AEC009.02
30	Define Nyquist Rate.	The rate of sampling is called as Nyquist rate.	Remember	CO 1	CLO 3	AEC009.03
31	What is QUAD BIT?	A 16 bit pskmodulator acts on the incomming data in group of 4 bits is called quad bits.	Understand	CO 1	CLO 1	AEC009.01
32	What is need for ber?	Ber is the empirical record of systems actual bit error performance.	Understand	CO 1	CLO 2	AEC009.02
33	What Is Encoding?	Encoding is the process of using various patterns of voltage or current levels to represent 1s and 0s of the digital signals on the transmission link.	Understand	CO 1	CLO 3	AEC009.03
34	What Is decoding?	Decoding is the reverse process of encoding which is to extract the information from the converted format.	Remember	CO 1	CLO 3	AEC009.03
35	How does Granular noise occurs?	It occurs due to large step size and very small amplitude variation in the input signal.	Remember	CO 1	CLO 3	AEC009.03
36	Define Phase modulation.	Phase Modulation is the process of varying the phase of the carrier signal linearly with the message signal.	Understand	CO 1	CLO 3	AEC009.03
37	Define Delta modulation.	The type of modulation, where the sampling rate is much higher and in which the stepsize after quantization is of a smaller value Δ, such a modulation is termed as delta modulation.	Understand	CO 1	CLO 3	AEC009.03
38	What is PCM?	Pulse code modulation (PCM) is a technique of digitally representing analog signals.	Understand	CO 1	CLO 2	AEC009.02
39	Define DPCM?	This technique samples the analog signal and then quantizes the difference between the sampled value and its predicted value	Understand	CO 1	CLO 2	AEC009.02
40	Define ADM?	Adaptive delta modulation or Continuously variable slope delta modulation is a modification of DM in which the step size is not fixed.	Remember	CO 1	CLO 2	AEC009.02

		UNIT-II				
1	What is Digital Modulation	Digital Modulation (DM) is a modulation technique that uses discrete signals to modulate a carrier wave i.e variation in the parameter of the carrier wave is discrete	Remember	CO 2	CLO 4	AEC009.04
2	What is Amplitude Shift keying (ASK)	A binary information signal directly modulates the amplitude of an analog carrier	Remember	CO 2	CLO 4	AEC009.04
3	What is ON-OFF Keying (OOK)	In Amplitude Shift keying (ASK), as information signal is binary, only two input voltages (+1V or -1V) occurs, as a result we get only two output voltages (Ac cos(ωct) or 0V) because of these the carrier is either ON or OFF state, that is why ASK is also known as ON or OFF Keying (OOK).	Understand	CO 2	CLO 5	AEC009.05
4	What is Frequency Shift keying (FSK)	A binary information signal directly modulates the frequency of an analog carrier.	Understand	CO 2	CLO 5	AEC009.05
5	What is Phase Shift keying (PSK)	A binary information signal directly modulates the phase of an analog carrier	Understand	CO 2	CLO 6	AEC009.06
6	What is Binary modulation	In binary signaling, the modulator produces one of two distinct signals in response to one bit of source data at a time.	Remember	CO 2	CLO 4	AEC009.04
7	What is Binary Phase shift keying (BPSK)	Binary Phase Shift Keying (BPSK) is a two phase modulation scheme, where the 0's and 1's in a binary message are represented by two different phase states in the carrier signal, θ= 0° for binary 1 and θ=180° for binary 0.	Understand	CO 2	CLO 6	AEC009.04
8	What is Quadrature phase shift keying (QPSK)	QPSK transmits two bits per symbol (i.e) ,it represents 00, 01, 10, or 11 and a phase shift of 90 degrees.	Understand	CO 2	CLO 6	AEC009.06
9	What is 8 PSK modulator?	8-PSK modulation or multilevel PSK modulation is a type of digital modulation based on carrier phase change, in which eight different phase angles are used to represent bits.	Remember	CO 2	CLO 6	AEC009.06
10	What is Differential Phase Shift Keying (DPSK)?	In Differential Phase Shift Keying (DPSK) the phase of the modulated signal is shifted relative to high or low state of the previous signal element. This DPSK technique doesn't need a reference oscillator at the receiver.	Understand	CO 2	CLO 6	AEC009.06
11	What is Mark Frequency (fm) ?	In Frequency Shift keying (FSK), the carrier wave modulates itself to a frequency known as Mark Frequency (fm), when the input logic is 1.	Understand	CO 2	CLO 4	AEC009.04
12	What is Space Frequency(fs)?	In Frequency Shift keying (FSK), the carrier wave modulates itself to a frequency known as Space Frequency (fs), when the input logic is 0.	Understand	CO 2	CLO 4	AEC009.04
13	What is Coherent detection?	Coherent detection requires a replica carrier wave of the same frequency	Understand	CO 2	CLO 5	AEC009.05

		and the phase at the receiver. The received signal and replica carrier are cross correlated using information contained in their amplitudes and phases. It is also known as synchronous detection.				
14	What is Non coherent detection?	Non Coherent detection doesnot requires a reference wave and it doesnot exploit phase reference information (envelope detection). It is less complex than coherent detection but has poor performance.	Remember	CO 2	CLO 5	AEC009.05
15	What is synchronous Demodulation?	The clock frequency at the transmitter when matches with the clock frequency at the receiver, it is known as a Synchronous method, as the frequency gets synchronized.	Remember	CO 2	CLO 5	AEC009.05
17	What is Asynchronous Demodulation?	When the clock frequency at the transmitter doesnot matches with the clock frequency at the receiver, it is known as a ASynchronous method	Remember	CO 2	CLO 5	AEC009.05
18	What is M –ary ASK?	M-ary Amplitude Shift Keying (M-ASK) or M-ary Pulse Amplitude Modulation (PAM), The amplitude of the carrier signal, takes on M different levels.	Remember	CO 2	CLO 6	AEC009.06
19	What is M–ary FSK?	M-ary Frequency Shift Keying (M-FSK), The frequency of the carrier signal, takes on M different levels.	Understand	CO 2	CLO 4	AEC009.04
20	What is M –ary PSK ?	M-ary Phase Shift Keying (M-PSK), The phase of the carrier signal, takes on M different levels.	Understand	CO 2	CLO 6	AEC009.06
21	What is Antipodal signals?	Antipodal signal are signal with 180 degree opposite to each other. One signal have value of -1 and other has +1.	Remember	CO 2	CLO 6	AEC009.06
22	What is Phase locked loop (PLL).	If a low level pilot carrier signal is transmitted along with the Binary Phase Shift Keying (BPSK) signal, then the carrier phase and frequency may be recovered at the receiver using a phase locked loop (PLL).	Remember	CO 2	CLO 4	AEC009.04
23	What is Costas loop or squaring loop?	If no pilot carrier is transmitted, a Costas loop or squaring loop may be used to synthesize the carrier phase and frequency from the received Binary Phase Shift Keying (BPSK) signal.	Understand	CO 2	CLO 4	AEC009.04
24	What is Probability of error or bit error rate (BER).	Probability of error or bit error rate (BER) is an empirical record of a systems actual bit error performance	Understand	CO 2	CLO 5	AEC009.05
25	What is Carrier power?	Carrier power is defined as the combined power of the carrier and its associated sidebands.	Understand	CO 2	CLO 5	AEC009.05
26	What is Carrier-to-noise power ratio	Carrier-to-noise power ratio is the ratio of the average carrier power to the thermal noise .	Remember	CO 2	CLO 5	AEC009.05
27	What is Energy per bit?	Energy per bit is the energy of a single bit of information.	Understand	CO 2	CLO 5	AEC009.05

28	What is Noise power density?	Noise power density is the thermal noise power normalized to a 1- Hz bandwidth (i.e., the noise power present in a 1-Hz bandwidth).	Remember	CO 2	CLO 5	AEC009.05
29	What is Energy per bit-to-noise power density ratio?	Energy per bit-to-noise power density ratio is used to compare two or more digital modulation systems that use different transmission rates (bit rates), modulation schemes (FSK, PSK, QAM), or encoding techniques (M-ary).	Understand	CO 2	CLO 5	AEC009.05
30	What is Baud?	Baud refers to the rate of change of a signal on the transmission medium after encoding.	Understand	CO 2	CLO 5	AEC009.05
31	What is Matched filter?	The matched filter is the optimal linear filter for maximizing the signal-to-noise ratio (SNR) in the presence of additive stochastic noise.	Remember	CO 2	CLO 6	AEC009.06
32	What is Line encoding formats ?	Digital Line Coding is a special coding system used to represent binary digits on a transmission medium. Line encoding takes place at the physical layer of the OSI model.	Understand	CO 2	CLO 6	AEC009.06
33	What is Unipolar encoding ?	Unipolar encoding is a very basic method of encoding which makes use of one polarity, i.e. positive voltage, to represent a binary 1 and it uses an idle line to represent a binary 0, i.e. zero voltage.	Understand	CO 2	CLO 5	AEC009.05
34	What is Polar encoding ?	Polar encoding represents bits by using two levels of polarity or amplitude: positive and negative.	Remember	CO 2	CLO 5	AEC009.05
35	What is Non return to zero?	Non Return to Zero (NRZ) encodes a signal that is always positive or negative, but never zero. If the line is idle, i.e. neither positive nor negative, then there is no transmission.	Understand	CO 2	CLO 5	AEC009.05
36	What is Correlation receiver?	Correlation receivers are used to reduce the effect of interference in the gain and other parameters of the system.	Understand	CO 2	CLO 5	AEC009.05
37	What is Biphase encoding ?	Biphase encoding is a variation on polar encoding, it works by changing the signal in the middle of the bit interval, however, the signal does not return to zero it continues to the opposite pole.	Understand	CO 2	CLO 6	AEC009.06
38	What is Manchester encoding ?	Manchester encoding uses inversion at the middle of each bit interval for both synchronisation and bit representation. A negative to positive transition represents binary 1 whereas, a positive to negative transition represents binary 0.	Understand	CO 2	CLO 5	AEC009.05
39	What is Bipolar encoding ?	Bipolar encoding utilises three voltage levels: positive, negative and neutral (zero). Zero is used to represent binary 0 and binary 1 is represented by alternating positive and negative voltages.	Understand	CO 2	CLO 5	AEC009.05

40	What is Alternate Mark Inversion (AMI)?	Alternate Mark Inversion (AMI) is a bipolar encoding system, where neutral (zero) voltage represents binary 0 and alternating positive and negative voltages represents binary 1.	Remember	CO 2	CLO 6	AEC009.06
		UNIT-III				
1	What is Baseband?	Baseband refers to the original frequency range of a transmission signal before it is converted, or modulated, to a different frequency range.	Understand	CO 3	CLO 7	AEC009.07
2	Define Baseband Transmission.	Baseband Transmission is a signaling technology that sends digital signals over a single frequency as discrete electrical pulses.	Understand	CO 3	CLO 7	AEC009.07
3	What is the difference between broadband and baseband transmission?	baseband uses digital signaling, broadband uses analog signals in theform of optical electromagnetic waves over multiple transmission frequencies.	Understand	CO 3	CLO 8	AEC009.08
4	What is meant by Line Encoding?	which analog/digital data is converted into analog/digital electromagnetic signals for transmission via. wired/wireless transmission links.	Understand	CO 3	CLO 8	AEC009.08
5	What are the applications of Line Encoding?	In telecommunication, a line code is a code chosen for use within a communications system for baseband transmission purposes	Remember	CO 3	CLO 8	AEC009.08
6	List out the types of line encoding.	The common types of line encoding are unipolar, polar, bipolar and Manchester encoding	Understand	CO 3	CLO 9	AEC009.09
7	Define unipolar coding.	In unipolar coding A positive voltage represents a binary 1, and zero volts indicates a binary 0.	Understand	CO 3	CLO 8	AEC009.08
8	Define bipolar coding.	bipolar encoding is a type of return-to-zero (RZ) line code, where two nonzero values are used, so that the three values are +, −, and zero.	Understand	CO 3	CLO 8	AEC009.08
9	Define polar coding.	The code construction is based on a multiple recursive concatenation of a short kernel code which transforms the physical channel into virtual outer channels.	Understand	CO 3	CLO 8	AEC009.08
10	Define Manchester coding.	The code in which the encoding of each data bit is either low then high, or high then low, for equal time.	Understand	CO 3	CLO 8	AEC009.08
11	Define scrambling.	Provide aid in retrieving information from received data enhancing synchronization between the transmitter and the receiver	Understand	CO 3	CLO 7	AEC009.07
12	What is the need of scrambling?	To enable accurate timing recovery on receiver equipment.	Understand	CO 3	CLO 7	AEC009.07
13	Expand HDB3?	High Density Bipolar Order 3 Encoding.	Understand	CO 3	CLO 7	AEC009.07
14	Expand B8ZS?	Binary 8 Zero Suppress (B8ZS) is an improved line encoding scheme	Understand	CO 3	CLO 7	AEC009.07
15	Define HDB3.	The HDB3 code is a bipolar signaling technique (i.e. relies on the	Remember	CO 3	CLO 7	AEC009.07

		transmission of both positive and negative pulses). It is based on Alternate Mark Inversion (AMI)				
16	Define B8ZS.	B8ZS works in a similar way to AMI by changing poles for each binary 1	Understand	CO 3	CLO 7	AEC009.07
17	Define Power Spectral Density.	A Power Spectral Density (PSD) is the measure of signal's power content versus frequency	Understand	CO 3	CLO 8	AEC009.08
18	What are different types of unipolar codes?	There are two types 1.Non-Return-to-Zero (NRZ)2. Return-to-Zero (RZ) .	Understand	CO 3	CLO 8	AEC009.08
19	What is meant by NRZ coding?	NRZ line code is a binary code in which 1's are represented by positive voltage, while 0's are represented by a negative voltage.	Understand	CO 3	CLO 9	AEC009.09
20	What is meant by RZ coding?	Return-to-zero RZ is a line code used in telecommunications signals in which the signal drops (returns) to zero between each pulse	Understand	CO 3	CLO 9	AEC009.09
21	Define pulse shaping.	In electronics and tele communications, pulse shapingis the process of changing the waveform of transmittedpulses.	Understand	CO 3	CLO 7	AEC009.07
22	What are the advantages pulse shaping?	The intersymbol interference caused by the channel can be kept in controlled with the help of pulse shaping	Understand	CO 3	CLO 7	AEC009.07
23	Types of pulse shaping filters.	There are three types, 1.Sinc shaped filter 2.Raised-cosine filter 3.Gaussian filter	Understand	CO 3	CLO 7	AEC009.07
24	define inter symbol interference.	In telecommunication, intersymbol interference (ISI) is a form of distortion of a signal in which one symbol interferes with subsequent symbols.	Understand	CO 3	CLO 8	AEC009.08
25	Define Equalization.	The process of correcting the channel-induced distortion is called equalization	Understand	CO 3	CLO 8	AEC009.08
26	Define Correlative-Level Coding.	adding ISI to the transmitted signal in a controlled manner	Understand	CO 3	CLO 8	AEC009.08
27	Define Duobinary Signaling.	doubling of the transmission capacity of a straight binary system.	Understand	CO 3	CLO 9	AEC009.09
28	Define Eye diagrams.	an eye pattern, also known as an eye diagram, is an oscilloscope display in which a digital signal from a receiver is repetitively sampled and applied to the vertical input.	Understand	CO 3	CLO 9	AEC009.09
29	What is the need of eye diagram?	It is a tool for the evaluation of combined effects of channel noiseand intersymbol interference on the performance of a base band pulse-transmission system.	Understand	CO 3	CLO 9	AEC009.09
30	What an open eye corresponds ?	An open eye pattern corresponds to minimal signal distortion	Understand	CO 3	CLO 9	AEC009.09
31	Define Decision feedback?	Technique of using a stored estimate of the previous symbol	Remember	CO 3	CLO 7	AEC009.07

32	Define Precodin.	practical means of avoiding the error propagation phenomenon before the duobinary coding	Remember	CO 3	CLO 7	AEC009.07
33	Define Duo binary signaling.	doubling of the transmission capacity of a straight binary system	Understand	CO 3	CLO 8	AEC009.08
34	Define Roll-off .	Roll-off is the steepness of a transmission Function with frequency	Remember	CO 3	CLO 7	AEC009.07
35	Define raised-cosine filter .	ThIS is a filter frequently used for pulse-shaping in digital modulation	Understand	CO 3	CLO 8	AEC009.08
36	What is block coding?	Block coding techniques map a fixed number of message symbols to a fixed number ofcode symbols.	Understand	CO 3	CLO 8	AEC009.08
37	Define Crosstalk.	Crosstalk is a disturbance caused by the electric or magnetic fields of one telecommunication signal affecting a signal in an adjacent circuit	Remember	CO 3	CLO 7	AEC009.07
38	What is the bandwidth of a raised cosine filter?	The bandwidth of a raised cosine filter is most commonly defined as the width of the non-zero portion of its spectrum	Remember	CO 3	CLO 7	AEC009.07
39	What are the applications of nyquist filter?	Nyquist filter has the property of eliminating ISI, as its impulse response is zero	Remember	CO 3	CLO 7	AEC009.07
40	Define correlative level coding.	Correlativelevel coding is used to transmit a baseband signal with the signaling rate of 2Bo over the channel of bandwidth Bo.	Understand	CO 3	CLO 8	AEC009.08
UNIT-IV						
1	Define Information.	Information is the source of a communication system, whether it is analog ordigital.	Understand	CO 4	CLO 10	AEC009.10
2	DefineEntropy.	Entropy can be defined as a measure of the average information content per source symbol.	Understand	CO 4	CLO 10	AEC009.10
3	What is channel capacity?	It is denoted by C and is measured in bits per channel used.		CO 4	CLO 10	AEC009.10
4	What is Mutual information.	$H(x)-H(x\|y)H(x)-H(x\|y)$ must represent the uncertainty about the channel input that is resolved by observing the channel output. This is called as the Mutual Information of the channel.	Understand	CO 4	CLO 11	AEC009.11
5	What is Conditional Entropy.	The amount of uncertainty remaining about the channel input after observing the channel output, is called as Conditional Entropy.	Understand	CO 4	CLO 11	AEC009.11
6	Define S/N Ratio.	SNR is defined as the ratio of signal power to the noise power, often expressed in decibels.	Understand	CO 4	CLO 12	AEC009.12
7	Define DSSS.	A collective class of signaling techniques are employed before transmitting a signal to provide a secure communication, known as the Spread Spectrum Modulation.	Understand	CO 4	CLO 12	AEC009.12

8	What is BIT?	A bit has a single binary value, either 0 or 1.	Understand	CO 4	CLO 12	AEC009.12
9	What is synchronization?	Synchronization is the most commonly used technique for recovering the sample functions from the received waveform.	Understand	CO 4	CLO 13	AEC009.13
10	What is information rate?	Information rate R is represented in average number of bits of information per second.	Understand	CO 4	CLO 13	AEC009.13
11	What is mean by Pseudo-Noise Sequence?	A coded sequence of 1s and 0s with certain auto-correlation properties, called as Pseudo-Noise coding sequence is used in spread spectrum techniques	Remember	CO 4	CLO 12	AEC009.12
12	What is frequency hopping?	The users are made to change the frequencies of usage, from one to another in a specified time interval, hence called as frequency hopping.	Remember	CO 4	CLO 12	AEC009.12
13	What is chipping code?	In DSSS,every bit of the user data is multiplied by a secret code, called as chipping code.	Remember	CO 4	CLO 12	AEC009.12
14	Define Shannon's first theorem.	Source coding theorem is called as noiseless coding theorem as it establishes an error-free encoding. It is also called as Shannon's first theorem.	Remember	CO 4	CLO 11	AEC009.11
15	What is correlator ?	Correlator is the coherent receiver. It correlates the received noisy signal .f(t)with .the .locally .generated .replica .of .the .unknown .signal .x(t). .It" s output .isdenoted as r(t).	Remember	CO 4	CLO 11	AEC009.11
16	What is mean by Dwell time?	The frequencies of the data are hopped from one to another in order to provide a secure transmission. The amount of time spent on each frequency hop is called as Dwell time.	Understand	CO 4	CLO 11	AEC009.11
17	Define Frequency-hopping spread spectrum (FHSS).	Frequency-hopping spread spectrum (FHSS) is a method of transmitting radio signals by rapidly switching a carrier among many frequency channels, using a pseudorandom sequence known to both transmitter and receiver.	Remember	CO 4	CLO 12	AEC009.12
18	Define (FH-CDMA).	It is used as a multiple access method in the code division multiple access (CDMA) scheme frequency-hopping code division multiple access (FH-CDMA).	Remember	CO 4	CLO 12	AEC009.12
19	What is Narrow band?	The size of the message sent via a narrowband technique utilizes lesser bandwidth than the cumulative bandwidth of the underlying channel.	Understand	CO 4	CLO 12	AEC009.12
20	Define code efficiency.	The code efficiency is the ratio of message bits in a block to the transmitted bits forthat block by the encoder i.e., Code efficiency= (k/n)k=message bits n=transmitted bits.	Understand	CO 4	CLO 13	AEC009.13
21	What is Wide Band ?	Wideband means that the transmission channel itself has a wider	Understand	CO 4	CLO 10	AEC009.10

		bandwidth than one voice channel.				
22	Define cross talk.	Crosstalk is normally a term used to describe interference between cables in a fixed network system	Remember	CO 4	CLO 10	AEC009.10
23	What is mean by fading?	Fading is a variation of the attenuation of a signal with various variables	Understand	CO 4	CLO 10	AEC009.10
24	Define fadility.	It is ability to reproduce the exact replica of the transmitted signals at the receiver output.	Understand	CO 4	CLO 10	AEC009.10
25	What is transducer?.	A device that converts variations in a physical quantity, such as pressure or brightness, into an electrical signal, or vice versa.	Understand	CO 4	CLO 11	AEC009.11
26	Define Huffman coding.	Huffman code is a particular type of optimal prefix codethat is commonly used for lossless data compression.	Remember	CO 4	CLO 11	AEC009.11
27	State the Shannon fano algorithm?	Shannon Fano Algorithm is an entropy encoding technique for lossless data compression of multimedia.	Understand	CO 4	CLO 11	AEC009.11
28	Define white noise.	White noise is a random signal having equal intensity at different frequencies, giving it a constant power spectral density.	Understand	CO 4	CLO 11	AEC009.11
29	Define guassion noise?	Gaussian noise is statistical noise having aprobability density function (PDF) equal to that of the normal distribution, which is also known as the Gaussian distribution.	Remember	CO 4	CLO 11	AEC009.11
30	What is CDMA?	Code-division multiple access (CDMA) is a channel access method used by various radio communication technologies.	Understand	CO 4	CLO 12	AEC009.12
31	What is jamming margine?	It is the ratio of avg power of interference j average power of data signal p.	Remember	CO 4	CLO 10	AEC009.10
32	Define Process gain.	Process gain =b/w of spreded signal/b.w of unspread signal	Understand	CO 4	CLO 10	AEC009.10
33	What is information rate?	Information rate R is represented in average number of bits of information per second.	Understand	CO 4	CLO 11	AEC009.11
34	Define FDMA.	The frequency band is divided into channels of equal bandwidth so that each conversation is carried on a different frequency	Understand	CO 4	CLO 11	AEC009.11
35	What is Forward Channels in CDMA?	The forward channel CDMA is the direction of the communication or mobile-to-cell downlink path.	Understand	CO 4	CLO 11	AEC009.11
36	Explain Pilot Channel?	Pilot channel is a reference channel using the mobile station to acquire the time and as a phase reference for coherent demodulation.	Remember	CO 4	CLO 10	AEC009.10
37	Define Chip rate.	In FH/MFSK the individual frequency of smallest duration is called 'chip'	Remember	CO 4	CLO 12	AEC009.12
38	Define Symbol rate.	The rate at which k-bits symbols of data input sequence are generated is called symbol rate	Understand	CO 4	CLO 11	AEC009.11

39	Define SSMA.	SIGNALS of a particular transmitter are received by its intended receiver only ,even if manyusers are transmitting at the same time this method iscalled SSMA.	Understand	CO 4	CLO 12	AEC009.12
40	What is hop rate?	The rate of change of frequency 'hops'is called hop rate.	Remember	CO 4	CLO 12	AEC009.12
	UNIT-V					
1	What is Error coding	Error control coding is used to enable the receiver to detect or correct the errors by introducing some redundancies into the data to be transmitted.	Understand	CO 5	CLO 14	AEC009.14
2	What is Systematic codes	In the systematic block code, the message bits appear at the beginning of the code word. The message appears first and then check bits are transmitted in a block. This type of code is called systematic code.	Understand	CO 5	CLO 15	AEC009.15
3	What is Non Systematic codes	In the non systematic block code it is not possible to identify the message bits and check bits. They are mixed in the block	Understand	CO 5	CLO 15	AEC009.15
4	What is Block coding	The encoder generates a block of n coding bits from k information bits, called (n,k) block codes or code word symbols.	Understand	CO 5	CLO 16	AEC009.16
5	What is Linear Block coding	If the sum of any two code words is a code word, then the code is said to be linear.	Understand	CO 5	CLO 16	AEC009.16
6	What is Generator matrix	In coding theory, a generator matrix is a matrix whose rows form a basis for a linear code. The codewords are all of the linear combinations of the rows of this matrix, that is, the linear code is the row space of its generator matrix.	Remember	CO 5	CLO 17	AEC009.17
7	What is Parity check matrix	A parity-check matrix of a linear block code is a matrix, which describes the linear relations between the components of a codeword. It can be used to decide whether a particular vector is a codeword and is also used in decoding algorithms.	Understand	CO 5	CLO 17	AEC009.17
8	What is Hamming codes	Hamming code is a set of error-correction codes that can be used to detect and correct the errors that can occur when the data is moved or stored from the sender to the receiver. It is technique developed by R.W. Hamming .	Remember	CO 5	CLO 17	AEC009.17
9	What is Hamming weight(c)	Hamming weight (c) is defined as the number of non zero elements of c. For example, The hamming weight of c=(11000110) = 4.	Remember	CO 5	CLO 17	AEC009.17
10	What is Hamming distance d (c,x)	Hamming distance (d) is defined as the number of places where they differ. For example, The hamming	Remember	CO 5	CLO 17	AEC009.17

		distance(d) of (c,x) c=(110000110), x=(00100100) = 4.				
11	What is Minimum Hamming distance (dmin)	Minimum Hamming distance (dmin) is defined as the smallest distance between any pair of code vectors in the code.	Understand	CO 5	CLO 14	AEC009.14
12	What is Cyclic codes	In coding theory, a cyclic code is a block code, where the circular shifts of each codeword gives another word that belongs to the code.	Remember	CO 5	CLO 14	AEC009.14
13	What is Convolution codes	It generates parity symbols via. the sliding application of a boolean polynomial function to a data stream. The sliding application represents the 'convolution' of the encoder over the data.	Remember	CO 5	CLO 15	AEC009.15
14	What is Time domain approach	It refers to the analysis of mathematical functions, physical signals, with respect to time.	Remember	CO 5	CLO 17	AEC009.17
15	What is Frequency domain approach	The frequency domain refers to the analysis of mathematical functions or signals with respect to frequency, rather than time.	Understand	CO 5	CLO 17	AEC009.17
16	What is Transform domain approach	In order to decorrelate the signal transformation technique is used. Domain in which signal gets decorrelated is known as transform domain.	Remember	CO 5	CLO 17	AEC009.17
17	What is Viterbi algorithm?	The Viterbi algorithm is a dynamic programming algorithm for finding the most likely sequence of hidden states called the Viterbi path that results in a sequence of observed events, especially in the context of Markov information sources and hidden Markov models.	Remember	CO 5	CLO 16	AEC009.16
8	What is Sequential decoding ?	Sequential decoding is a limited memory technique for decoding tree codes. Sequential decoding is mainly used as an approximate decoding algorithm for long constraint-length convolutional codes.	Understand	CO 5	CLO 16	AEC009.16
19	What is interleaving?	Interleaving is a process or methodology to make a system more efficient, fast and reliable by arranging data in a noncontiguous manner.	Understand	CO 5	CLO 17	AEC009.17
20	What is Code rate ?	The ratio of the number of input bits(k) to the number of output bits(n) is called as code rate. It is a measure of the efficiency of the code	Understand	CO 5	CLO 16	AEC009.16
21	What is Constraint length?	The constraint length(L) of the code represents the number of bits in the encoder memory that affect the generation of the n output bits. It is expressed by Constraint Length, L = k (m-1).	Understand	CO 5	CLO 14	AEC009.14

22	What is Metric?	Metric is the discrepancy between the received signal and the decoding signal at particular node.	Understand	CO 5	CLO 15	AEC009.15
23	What is Surviving path?	Surviving path is the path of the decoded signal with minimum discrepancy between the received signal and the decoding signal.	Understand	CO 5	CLO 16	AEC009.16
24	What is Syndrome decoding?	Syndrome decoding is a highly efficient method of decoding a linear code over a noisy channel, i.e. one on which errors are made. In essence, syndrome decoding is minimum distance decoding using a reduced lookup table.	Understand	CO 5	CLO 16	AEC009.16
25	What is Generator representation ?	Generator representation shows the hardware connection of the shift register taps to the modulo-2 adders. A generator vector represents the position of the taps for an output. A "1" represents a connection and a "0" represents no connection.	Remember	CO 5	CLO 16	AEC009.16
26	What is State diagram representation?	In the state diagram, the state information of the encoder is shown in the circles. Each new input information bit causes a transition from one state to another	Understand	CO 5	CLO 16	AEC009.16
27	What is Tree diagram representation?	It shows all possible information and encoded sequences for the convolutional encoder.	Understand	CO 5	CLO 16	AEC009.16
28	What is Trellis diagram representation?	The trellis diagram is basically a redrawing of the state diagram. It shows all possible state transitions at each time.	Remember	CO 5	CLO 16	AEC009.16
29	What is Turbo Codes?	A turbo-code is the parallel concatenation of two recursive systematic convolutional codes separated by a non-uniform interleaving.	Understand	CO 5	CLO 17	AEC009.17
30	What is Low density parity check code(LDPC)?	In information theory, a low-density parity-check (LDPC) code is a linear error correcting code, a method of transmitting a message over a noisy transmission channel.	Understand	CO 5	CLO 16	AEC009.16
31	What is Forward error correction?	The Forward error correction (FEC) codes are those which adds some redundant bits to the message bits and the transmitted data consists of both message bits and redundant bits.	Understand	CO 5	CLO 14	AEC009.14
32	What is Automatic repeat Request (ARQ)?	The decoder at the receiver checks the input sequence or data transmitted by the transmitter. When there is error, it discards the part of the input sequence and sends a request to retransmit.	Understand	CO 5	CLO 14	AEC009.14
33	What is Even parity check code	When the check bit is such that the total number of 1's in the code word is even.	Remember	CO 5	CLO 15	AEC009.15
34	What is Odd parity check code?	When the check bit is such that the total number of 1's in the code word is odd.	Remember	CO 5	CLO 15	AEC009.15

35	What is Random Errors.	Random errors are created due to the white Gaussian noise in the channel. It does not affect the performance of the system in subsequent intervals.	Understand	CO 5	CLO 15	AEC009.15
36	What is Burst Errors?	Random errors are created due to the white Gaussian noise in the channel. It does not affect the performance of the system in subsequent intervals.	Understand	CO 5	CLO 16	AEC009.16
37	What is Code word?	The encoded block of 'n' bits is called a codeword. It contains message bits and redundancy bits.	Understand	CO 5	CLO 17	AEC009.17
38	What is Block length?	The encoded block of 'n' bits is called a codeword. It contains message bits and redundancy bits.	Understand	CO 5	CLO 17	AEC009.17
39	What is Check bits.	Check bits are bits of data that are used to check for errors in data before it is accepted.	Understand	CO 5	CLO 16	AEC009.16
40	What is Block interleaving?	A block interleaver accepts a set of symbols and rearranges them, without repeating or omitting any of the symbols in the set. The number of symbols in each set is fixed for a given interleaver.	Understand	CO 5	CLO 16	AEC009.16

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