



**MUTHAYAMMAL ENGINEERING  
COLLEGE**  
(An Autonomous Institution)



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Rasipuram - 637 408, Namakkal Dist., Tamil Nadu

2021-22

MKC

ECE

**Must Know Concepts (MKC)**

Subject		19GES23 – ANALOG AND DIGITAL COMMUNICATION		
S.No	Term	Notation (Symbol)	Concept/Definition/Meaning/Units/Equation/Expression	Units
<b>UNIT – I AMPLITUDE MODULATION</b>				
1	Modulation		Modulation is changing of any one parameter (amplitude, frequency, phase)	
2	Types of Modulation		Frequency Modulation Phase Modulation Amplitude Modulation	
3	Amplitude Modulation		Amplitude of the carrier wave is modified accordance to the message signal	
4	Frequency Modulation		Frequency of carrier wave is modified accordance to the message signal	
5	Phase Modulation		Phase of the carrier wave is modified accordance to the message signal	
6	Bandwidth	$f_{max} - f_{min}$	Bandwidth is the difference between highest and lowest frequency	
7	Perfect modulation		For perfect modulation the value of modulation index should be 1	
8	Over modulated		The value of modulation index is greater than 1	

	wave			
9	Envelope		The imaginary line on the carrier wave is called envelope	
10	Maximum envelope carrier signal	$E_c$	Peak amplitude of the unmodulated carrier voltage	
11	Single sideband suppressed carrier	SSBSC	Carrier signal is transmitted in single side	
12	Double sideband suppressed carrier	DSBSC	Carrier signal is transmitted in both sides	
13	Vestigial sideband suppressed carrier	VSBSC	Carrier signal is transmitted in both sides along with message signal	
14	Amplitude shift keying	ASK	Amplitude is shifted along with message signal	
15	Frequency shift keying	FSK	Frequency is shifted along with message signal	
16	Sideband		Sideband is the band of frequencies containing power	
17	Power of DSBSC	$P_{usb} + P_{lsb}$	Equal to sum of powers of upper sideband and lower sideband	
18	DSBSC Demodulators		Coherent detector Costas loop	
19	SSBSC Demodulators		Coherent detector	
20	Coherent detection		Coherent wave is used to detect the message signal.	
21	Frequency translation		Process of shifting a signal from one frequency to another without	

			the loss of information	
22	Frequency division multiplexing		Total band width available in a communication medium is divided into a series of non-overlapping frequency bands.	
23	AM Transmitter		Takes audio signal as input and delivers amplitude modulated wave.	
24	Super heterodyne receiver		It uses frequency mixing to convert a received signal to a fixed intermediate frequency.	
25	AM Receiver		Takes amplitude modulated wave as input and produce audio signals as output	

### UNIT – II ANGLE MODULATION

26	Angle modulation		Frequency or phase of the carrier wave is varied accordance with the message signal	
27	Frequency Deviation		The difference between FM modulated frequency and normal frequency	
28	Carrier Swing	$2 \times \text{frequency deviation}$	The deviation of the frequency of the carrier signal from high to low or low to high	
29	FM Types		Narrowband FM Wideband FM	
30	Narrow band FM	NBFM	Narrowband FM has smaller bandwidth	
31	Wideband FM	WBFM	Wideband FM has infinite bandwidth	
32	Generation of NBFM		Direct method Indirect method	
33	Methods to demodulate FM wave		Frequency discrimination method Phase discrimination method	
34	Direct method		Generation of Wideband FM wave directly	

35	Indirect method		Generation of wideband FM wave indirectly	
36	Multiplexing		Multiplexing is the process of combining multiple signals	
37	MUX		Multiplexer	
38	DEMUX		De multiplexer	
39	Streo multiplex		Output of two channels is transmitted in the same carrier.	
40	PLL		Phase locked loop	
41	Models of PLL		Linear Model Non linear Model	
42	FM Broadcast Receiver		Electronic device that receives radio waves and convert it to usable form	
43	Pre emphasis		Pre emphasis is a way to boost only the original power.	
44	De emphasis		De emphasis used to restore the original power	
45	Multi tone modulation		Modulation done for message signal with more than one frequency	
46	Types of FM Detector		Slope detector Phase discriminator	
47	Disadvantages of FM		High bandwidth requirement Equipment's are costly	
48	Phase modulation		Phase of the carrier wave is changed accordance to the message signal	
49	Types of diversity reception		Space diversity Frequency diversity	
50	Carson's rule		Carson's bandwidth rule defines the approximate bandwidth requirements	
		<b>UNIT 3</b>	<b>PULSE MODULATION</b>	

51	Pulse Modulation		In pulse modulation signal can be transmitted in the form of pulses	
52	Types of Pulse Modulation		Pulse Amplitude Modulation Pulse Width Modulation Pulse Position Modulation	
53	Pulse Amplitude Modulation	PAM	Amplitude of the pulse carrier wave varies according to the instantaneous amplitude	
54	Pulse Width Modulation	PWM	Width or time of the pulse carrier wave varies according to the instantaneous amplitude	
55	Pulse Position Modulation	PPM	Position of the pulse carrier wave varies according to the instantaneous amplitude	
56	Transducer		Transducer is a device which converts energy from one form to another	
57	Types of transducer		Input Transducer Output Transducer	
58	PCM		Pulse Code Modulation	
59	Generation of PCM Signals		Ramp encoder Feedback encoder	
60	TDM		Time Division Multiplexing	
61	PCM Process		Quantization Digitization Code	
62	Time Division Multiplexing	TDM	It is the process of transmitting and receiving independent signals over a common path	
63	Multiplexing		Multiplexing is the process of combining multiple signals	
64	Two kinds of multiplexing		Frequency Division Multiplexing Time Division Multiplexing	
65	Applications of FDM		Used in TV and Radio transmission	

66	Types of TDM		Synchronous TDM Asynchronous TDM	
67	STDM		Statistical Time Division Multiplexing	
68	Types of Pulse Amplitude Modulation		Single polarity PAM Double polarity PAM	
69	Advantages of Pulse Amplitude Modulation		No complex circuit Simple and easy to construct	
70	Generation of PWM		Pulse Width Modulated wave can be produced using comparator	
71	PAM		Pulse Amplitude Modulation	
72	PWM		Pulse Width Modulation	
73	PPM		Pulse Position Modulation	
74	Differentiator		Produces constant output	
75	Integrator		Produces steadily changing output	

#### **UNIT – IV PULSE DIGITAL MODULATION**

76	Analog Communication		It consists of continuous time varying signals	
77	Digital Communication		It consist of non continuous signals	
78	Periodic Signals		Any analog or digital signal that repeats its pattern over a period of time	
79	Aperiodic Signal		Any analog or digital signal that does not repeat its pattern over a period of time	
80	Disadvantages of Analog signal		Lower quality Not potable Cost of Analog wire is high	
81	Advantages		More reliable	

	of Digital signal		Easy to design	
82	PCM		Pulse Code Modulation	
83	Elements of PCM		Sampling Quantization Coding	
84	Binary digit		The basic quantum unit for conveying information. It is represented by either 0 or 1	
85	PCM Systems		Systems making use of transmission of digitized signals	
86	Advantages of PCM Systems		Stability Reliability	
87	Delta Modulation		Delta Modulation is analog to digital and digital to analog conversion technique	
88	Features of Delta Modulation		Moderate Quality Simple Design	
89	ADM		Adaptive Delta Modulation	
90	Noise		Noise is an undesired random disturbance	
91	Examples of Noise		Environmental noise, Physiological noise, Impairment noise.	
92	Types of Noise Source		External Source Internal Source	
93	PCM noise		Amount of noise power on frequency division multiplexing	
94	Quantization noise		Quantization noise is a model of quantization error introduced by quantization in the analog to digital communication	
95	Bandwidth efficiency		No of transmitted bits per second	

96	DPCM		Differential Pulse code Modulation	
97	Components of DPCM Transmitter		Quantizer Predictor Summer Circuits	
98	Quantizer		Maps input amplitude to output amplitude	
99	Components of DPCM Receiver		Decoder Predictor	
100	FDM		Frequency Division Multiplexing	

### UNIT-V DIGITAL MODULATION SCHEMES

101	Digital Modulation		Digital Modulation is the process of encoding a digital information signal into the amplitude, phase or frequency of the transmitted signal	
102	Amplitude Shift Keying	ASK	Amplitude is shifted along with message signal	
103	Frequency Shift Keying	FSK	Frequency is shifted along with message signal	
104	Phase Shift Keying	PSK	Phase is shifted along with message signal	
105	M-ary encoding		More than two bits are made to transmit are made to transmit simultaneously on a single signal	
106	Types of M-ary		M-ary ASK M-ary FSK M-ary PSK	
107	DPSK		Differential Phase Shift Keying	
108	DEPSK		Differential Encoded Phase Shift	
109	QPSK		Quadrature Phase Shift Keying	
110	MSK		Minimum Shift Keying	
111	GMSK		Gaussian Minimum Shift Keying	
112	Quantizer		Quantizer is a logarithmic	



			function that performs quantization	
113	Quantization noise		It is the error created on the transmitting circuit	
114	Output Of PCM		Binary digit	
115	Aliasing		Unwanted Overlapping of signals is termed as aliasing	
116	Quadrature Phase Shift Keying	QPSK	Phase shifted in four place	
117	Phase Shift Keying	PSK	Phase shifted in two place	
118	Inter Symbol Interference	ISI	.Effects of ISI are eliminated at the receiver end	
119	Frequency Shift Keying	FSK	Frequency is shifted along with message signal	
120	Amplitude shift keying	ASK	Amplitude is shifted along with message signal	
121	Sampling Rate		Sampling rate states that minimum sampling rate is equal	
122	Binary Phase Shift Keying		Two symbols are transmitted with the help of signals	
123	Minimum Sampling rate		Equal to twice the highest audio frequency	
124	Frequency reuse		N frequency channels that can serve N users simultaneously	
125	Personal Communication Network		Communicate the signals from both networks	

**Placement Questions:**

126	Noise		Noise is an undesirable sound	
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			added to the signal	
127	IOT		Internet of Things	
128	Types of Transducer		Input Transducer Output Transducer	
129	MUX		Multiplexer	
130	DEMUX		Demultiplexer	
131	Types of Modulation		Amplitude Modulation Frequency Modulation Phase Modulation	
132	FM Types		Narrowband FM Wideband FM	
133	Carson's Rule		According to Carson's rule, the bandwidth required to transmit an angle modulated wave is twice the sum of the maximum frequency deviation and the maximum modulating signal frequency.	
134	Examples of Noise		Environmental noise, Physiological noise, Impairment noise.	
135	LPC		Linear Predictive Coding	
136	ADPCM		Adaptive Differential Pulse code Modulation	
137	Carrier Swing		The total deviation of a frequency modulated or phase modulated wave from the lowest instantaneous frequency to the highest instantaneous frequency.	
138	Source		Sources are objects which encode message data and transmit the information, via a channel, to one or more observers.	
139	Transmitter		Component which transmits the signal to through the channel.	
140	Receiver		Component which receives the signal to through the channel.	
141	Types of		Analog Communication	

	communication		Digital Communication	
142	Communication		Communication is the exchange of information between Source and Destination	
143	MODEM		Modulator and Demodulator	
144	Bandwidth efficiency		No of bits per second	
145	Bandwidth		The difference between higher and lower frequency	
146	Examples for Communication		Verbal Communication Visual Communication Audio Conferencing	
147	Good Communication		If both sender and receiver are involved, Less Energy Consumption, Minimal Noise	
148	Narrowband FM	NBFM	Narrowband FM has smaller bandwidth	
149	Wideband FM	WBFM	Wideband FM has larger bandwidth	
150	Mobile Station	MS	A Station in the cellular radio service intended for the mobile network.	

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**HoD**