	R.M.D.ENGINEERING COLLEGE
	Question Bank
	EC8395 – Communication Engineering
	Part-A
1	Define Modulation.
2	List out the reasons/need for using modulation.
3	Define amplitude Modulation.
4	Define Modulation index and percent modulation for an AM wave.
5	Draw the voltage spectrum of AM wave when one modulating signal is involved.
6	Define Single sideband suppressed carrier AM.
7	What are the advantages of DSB transmission?
8	Mention the use of Envelope Detector.
9	Compare AM and FM.
10	Let Vm(t)=sin(2πX2000t) be the information signal and Vc(t)=5sin(2πX10 ^{6}t) be the carrier signal. Calculate Modulation Index.
11	Define angle modulation.
12	Compare NBFM and WBFM.
13	State Carson's rule for Bandwidth of FM wave..
14	Define instantaneous frequency deviation.
15	Draw the spectrum of AM signal.
16	State Bessel's formula.
17	Define Deviation Ratio (DR)forAngle modulation.
18	Define percent modulation for FM.
19	In an amplitude modulation system, the carrier frequency is f_c = 100 kHz. If the maximum frequency of the signal is 5 kHz, determine the lower and upper side bands and the bandwidth of AM signal.

20	Define modulation index for FM and PM.
21	Define angle modulation
22	A 400W carrier is modulated to a depth of 80%. Calculate the total power in AM wave.
23	Define VSB
24	What is the bandwidth required for FM signal in which the modulating frequency is 2KHZ and maximum deviation is 10 KHZ.
25	Define PSD for analog communication.
26	Draw AM waves.
27	Define pulse modulation and list its types.
28	Define sampling theorem.
29	What is the need for sampling?
30	Define Nyquist rate and Nyquist interval
31	What is line coding?list the types.
32	List the type of PAM and its Uses
33	Draw the NRZ and RZ code for digital data 10110001
34	What is meant by aliasing
35	What is meant by quantization and mention its types
36	Mention the types of quantization
37	Define companding
38	Define vocoders
39	List the types of vocoders
40	What is delta modulation?
41	State the principle of ADM.

42	What is ADPCM
43	State the principle of DPCM
44	Mention the drawbacks of DM.
45	What are the advantages of Delta Modulation?
46	What is FDM
47	What is TDM
48	Compare FDM with TDM
49	Define bit rate and baud rate.
50	Define Shannon's limit for information capacity.
51	What are the requirements of digital modulation schemes?
52	Define M-ary encoding
53	State the important advantages of digital modulation.
54	Define Phase Shift Keying (PSK).
55	Draw the PSK output waveform for the following binary signal 1 0 1 0 1 1
56	Draw the BPSK output waveform for the following binary signal 1 0 1 0 1 0 1
57	Define QPSK.
58	Difference between PSK and QPSK.
59	What is the relation between bit rate and baud for a QPSK system?
60	Draw the Phasor diagram of PSK.
61	Draw the constellation diagram for PSK.
62	Draw the block diagram for BPSK transmitter
63	Draw the constellation diagram for QPSK.
64	For QPSK digital modulation systems, operating with an information bit rate of 12kbps, determine bandwidth And baud rate.

65	What are the advantages of QPSK?
66	For 8-PSK digital modulation systems, operating with an information bit rate of 24kbps, determine bandwidth And baud rate.
67	Draw the constellation diagram of 8-PSK.
68	Define Quadrature Amplitude modulation (QAM).
69	Give constellation diagram of 8-QAM.
70	Give the bandwidth and baud rate of 16-QAM.
71	Define DPSK.
72	Define Duo binary encoding,
73	Define Equalizer.
74	Define the term Entropy.
75	List out the properties of Entropy.
76	What is meant by the term information?
77	What are the properties of information?
78	What are the properties of Entropy.?
79	An event has four possible outcomes with probabilities 0.6, 0.4,0.1, 0.2 Find the entropy of the system.
80	An event has four possible outcomes with probabilities 1/2, 1/8, 1/16, 1/32; Find the entropy of the system.
81	Define source coding and Name any two source coding technique.
82	Define information rate.
83	List the types of codes used in error control codes.
84	State channel capacity theorem in communication systems.

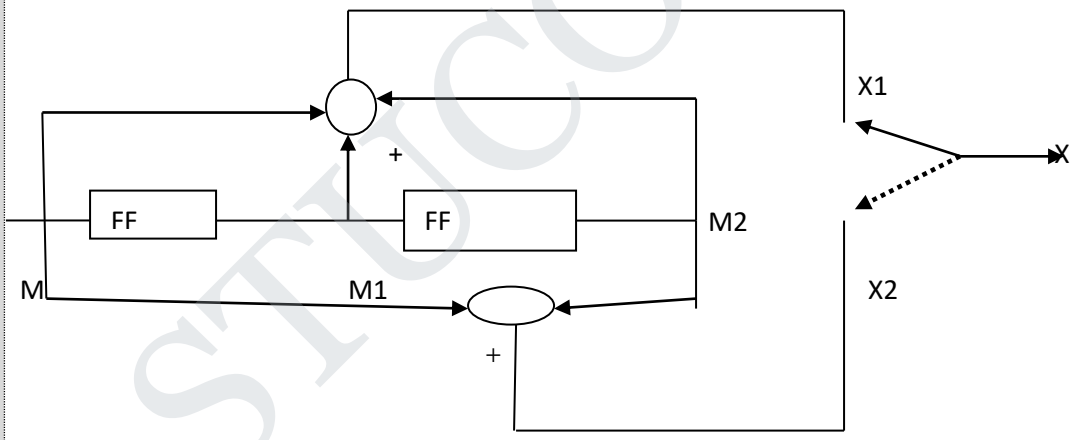
85	Define efficiency and percentage of a source encoder.
86	What is channel encoding?
87	List the error control capabilities.
88	Define code vector.
89	Define syndrome decoder.
90	Write the general equation for polynomial generator in Cyclic codes
91	Differentiate code tree with code trellis.
9	Draw the block diagram of convolutional encoder for n=2,k=1.
93	List out the properties and types of cyclic codes.
94	The generator polynomial of a (7,4) cyclic code is G(P)=p3+p+1 find the code vector for the code [1 0 1]in nonsystematic form.
95	The generator polynomial of a (7,4) cyclic code is G(P)=p2+p+1 find the code vector for the code [1 1 0] in nonsystematic form.
96	Define convolution code and list the different approach methods.
97	The generator polynomial of a (7,4) cyclic code is G(P)=p3+p^2+1 find the code vector for the code in systematic form.
98	What is meant by LZ code?
99	Define spread spectrum.
100	Need of spread spectrum
101	List the applications of spread spectrum
102	List the advantages and disadvantages of spread spectrum
103	Define PN sequences

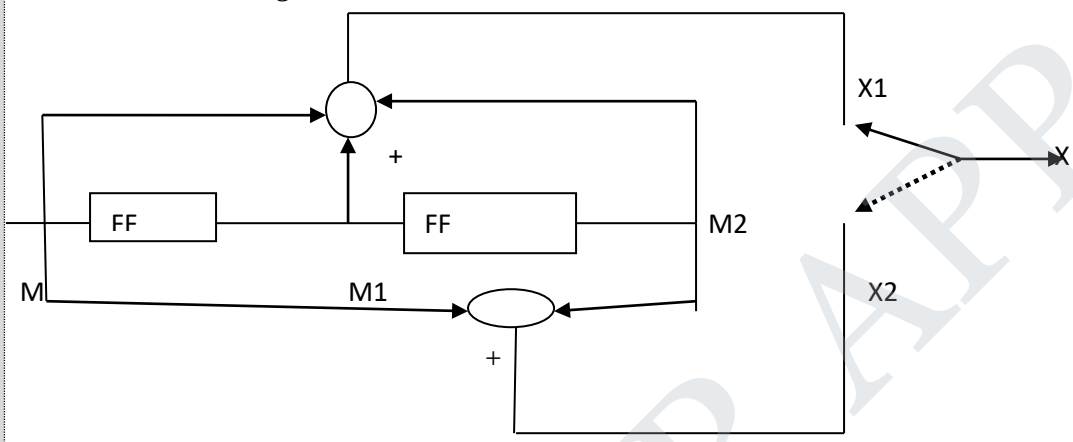
104	Define M sequence and list the property
105	Define DSSS
106	Define FHSS
107	Define Jamming in DSSS
108	Differentiate between FHSS and DSSS
109	Define TDMA
110	Define FDMA
111	Define CDMA
112	Differentiate between CDMA and FDMA
113	Differentiate between TDMA and FDMA
114	List the real time applications of Multiple access
	PART -B
1	Explain about Amplitude modulation transmitter and superhetrodyne receiver with relevant diagrams (13)
2	Derive the expression for AM wave and draw its corresponding spectrum. Also derive the expression for transmitting power.(13)
3	With the help of mathematical expressions explain about amplitude modulation and derive its efficiency.
4	Explain the Low level and high level modulators in AM and detection of AM using envelope detection.
5	Explain in detail about non-linear square law modulator and balanced modulator of conventional AM technique.(13)
6	A Amplitude modulating signal $20\sin(2\pi*10^3 t)$ is used to modulate a carrier signal $40\sin(2\pi*10^4 t)$ find out: 1. Modulation index (2) 2.Percentage modulation (2) 3. Frequencies of the sideband components and their amplitudes. (4)

	4. Bandwidth of modulating signal. (3) 5. Draw the spectrum of AM wave. (2)
7	Explain detail about DSB-SC generations and power saving efficiency in detail.(13)
8	Explain detail about DSB-SC Modulators(Balanced, switching) in detail.(13)
9	With a block diagram, explain in detail how DSBSC signals are generated?
10	With the help of a neat block diagram explain about the generation of SSB-SC signal and wave.(13)
11	Explain in detail about SSB-SC generation using phase shift And Modified phase shift method..(13)
12	Explain in detail about SSB-SC demodulators methods in detail.(13)
13	(i) Compare amplitude modulation and angle modulation.(10)
	(ii) Write a note on frequency analysis(FM) of angle modulated waves(3)
14	Explain in detail about SSB-SC generation using different type of demodulation technique.(13)
15	Define modulation index for FM and PM and obtain the relationbetween modulation index and modulating signal for FM and PM(13)
16	Explain the principle of Angle Modulation. Derive and explain PM and FM equations.(13)
17	Determine the following: (i) The peak frequency deviation and modulation index for an FM modulator with a deviation sensitivity k=5khz and a modulating signal Vm(t)=2cos(2 π*2000t) (ii) The peak phase deviation for a PM modulator with deviation sensitivity k=2.5 rad/v and a modulating signal Vm(t)=2cos(2 π*2000t)

18	A Amplitude modulating signal $10\sin(2\pi*10^3 t)$ is used to modulate a carrier signal $30\sin(2\pi*10^4 t)$ find out: 1. Modulation index (2) 2.Percentage modulation (2) 3. Frequencies of the sideband components and their amplitudes. (4) 4. Bandwidth of modulating signal. (3) 5. Draw the spectrum of AM wave. (2)
19	A Amplitude modulating signal $10\sin(2\pi*10^3 t)$ is used to modulate a carrier signal $30\sin(2\pi*10^4 t)$ find out: 1. Modulation index (2) 2.Percentage modulation (2) 3. Frequencies of the sideband components and their amplitudes. (4) 4. Bandwidth of modulating signal. (3) 5. Draw the spectrum of AM wave. (2)
20	For an DSBFC modulator with a carrier frequency Fc=100KHz and a modulating frequency of fm=10KHz, determine (a) Frequency limits of upper and lower sidebands. (b)Bandwidth. (c)Upper and Lower side frequencies (d) Draw the output frequency spectrum (13)
21	Explain the principle of PAM and generations of PAM signal in detail(13)
22	Explain the principle of PCM generations of PCM signal in detail(13)
23	Explain the principle of DM generations of DM signal in detail(13)
24	Explain the principle of ADM generations of ADM signal in detail(13)
25	Explain the principle of vocoders and explain the types in detail.
26	Explain in detail VSB modulator and signal generation.
27	Explain the principle of DPCM generations of DPCM signal in detail(13)
28	Explain the low pass sampling theorem in detail

29	Explain in detail about Phase Shift Keying with necessary diagram and find bit rate, baud rate and bandwidth requirements. (13)
30	Discuss the principle of operation BPSK transmitter and BPSK receiver detail.(13)
31	Explain the working of QPSK system with necessary diagrams.(13)
32	What is known as QPSK? Discuss in detail the QPSK transmitter and Receiver in detail. (13)
33	Explain the working of M-ary PSK system with necessary diagrams.
34	What is M-ary? Explain in detail the working of QPSK. Draw the phasor diagram, constellation diagram and truth table for the same.
35	Explain in detail QAM transmitter and receiver.
36	Explain Duo- binary encoder and decoder in detail.
37	Explain ISI and any one method to control.
38	Explain Eye Pattern in detail.
39	Describe equalizers with neat sketch.
40	A DMS has five symbols b1,b2,b3,b4,b5 ,b6,b7,b8 with probabilities 16/32,4/32,4/32,2/32,2/32,2/32,1/32,1/32 respectively. Then construct Shannon fano coding and calculate H(x),Average no of bits and Efficiency.
41	A DMS has five symbols s0,s1,s2,s3,s4 with probabilities 0.4,0.2,0.1,0.2,0.1 respectively. Then construct Shannon fano coding and calculate H(x),Average no of bits and Efficiency.
42	A DMS has five symbols m1,m2,m3,m4,m5 ,m6,m7,m8 with probilities 16/32,4/32,4/32,2/32,2/32,2/32,1/32,1/32 rspectivily.Then construct Huffman coding and calculate H(x),Average no of bits and Efficiency.
43	A DMS has five symbols s0,s1,s2,s3,s4 with probilities 0.4,0.2,0.1,0.2,0.1 rspectivily.Then construct Huffman coding and calculate H(x),Average no of bits and Efficiency.
44	Design the encoder for the generator polynomial $G(X)= 1 + X^2 + X^3$ and obtain the syndrome for the message word m= (1100101).
45	Find the syndrome calculator for the generator polynomial $G(X)= 1 + X^2 + X^3$ and obtain

	the syndrome for the received word y= (1000101).
46	Obtain the corrected code word by using the syndrome calculator for the generator polynomial $G(X)= 1 + X^2 + X^3$ and for the received word y= (1001101).
47	The generator polynomial of a (7,4) cyclic code is $G(P)= P^3 + P + 1$. Find all the code vectors for the code in non-systematic form (cyclic codes).
48	Explain the sequential algorithm for convolutional codes.
49	A rate of 1/3 convolution encoder has generating vectors as G1= (100), G2= (111) and G3= (101). Sketch the encoder configuration; draw code tree, code trellis and state diagram.
50	Explain the operation of 8 QAM transmitter receiver using block diagram, truth table, constellation diagram and phasor diagram.
51	Explain in detail the need of pulse shaping with help of duo binary encoding method.
52	Consider the following convolution encoder  Determine the following 1.Dimension of the code 2.Code rate 3.Constraint length 4. Generating sequences 5. o/p sequences for message sequence m=10111.

53	A rate of 1/3 convolution encoder has generating vectors as G1= (010), G2= (011) and G3= (100). Sketch the encoder configuration, draw code tree, code trellis and state diagram.
54	Explain in detail the need of Cosine filters and Equalizer.
55	Consider the following convolution encoder  Determine the following 1.Dimension of the code 2.Code rate 3.Constraint length 4. Generating sequences 5. o/p sequences for message sequence m=10111.
56	Explain PN sequences in detail with all properties.
57	Explain the Functionality of DSSS in detail
58	Explain the Functionality of FHSS in detail
59	Explain in detail the principle and working function of CDMA
60	Explain in detail the principle and working function of TDMA
61	Explain in detail the principle and working function of FDMA

62	Compare All technique Of Multiple Access(TDMA,CDMA,FDMA)
	PART C
1	Obtain the general expression for AM when modulated by several modulating sine waves. Derive the efficiency η of AM and show that for a single tone AM η_{max}=33.33% at μ= 1.(13)
2	Derive the expression for AM wave and draw its corresponding spectrum for two modulating signals (m1,m2).(13)
3	Compare all AM techniques in detail with some real time examples.
4	Compare all Analog Modulation techniques in detail with some real time examples.
5	Explain the detector methods of FM in detail
6	Explain the process of generating and detecting of DPSK signal with the help of block diagram and given binary data sequence 0010010011 assuming starting reference bit as '1'.
7	Design a modulator for Aviation communication which is receiving weaker signals that should be heard over other stronger signals. The system should allow for emergency transmissions to have more chance of being heard over other traffic.(15)
8	A DMS has five symbols s0,s1,s2,s3,s4 with probabilities 0.4,0.2,0.1,0.2,0.1 respectively. Then construct Shanon-Fano coding for the two different methods case 1 & case2, and calculate efficiency .(15)
9	Encode the given data stream using LZ coding. B(t)=0111010010100
10	The parity check matrix for(6,3)block code is given below H= $\left(\begin{array}{cc:ccc} 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 \end{array}\right)$ Find the following 1.Generator matrix G 2.list all the code vectors 3. What is the minimum distance between code vectors? 4. How many errors can be detected and corrected. 5. Find syndrome vector for any three code vectors.

11	The generator matrix for(6,3)block code is given below $\left(\begin{array}{ccc:ccc} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{array}\right)$ Find the following 1.list all the code vectors 2. What is the minimum distance between code vectors? 3. How many errors can be detected and corrected. 4. Find syndrome vector for any three code vectors.
12	The parity check bits of a (8,4) block code are generated by C1=x1+x2+x4 C2=x1+x2+x3 C3=x1+x3+x4 C4=x2+x3+x4 where x1,x2,x3,x4 are message bits 1.Find the generator matrix G 2.list all the code vectors 3. Find the error detecting and correcting capabilities. 4. Find syndrome vector for tow code vectors.