ii.	Explain pre emphasis and de emphasis process.	5	3	2	2,3
	(OR)				
b.	With a detailed description on SNR of matched filter, derive an equation of its probability of error.	10	4	3	1
29. a.	Derive the probability of error for frequency shift keying.	10	4	3	1
	(OR)				
b.	Elaborate OFDM communication system with neat diagram.	10	4	3	1
30. a.	Construct a non systematic cyclic code (7, 4) using generator polynomial $g(x)=x^3+x^2+1$ with message 1010.	10	4	5	2
	(OR)				
b.i.	Describe spread spectrum communication system with neat diagram.	5	4	5	2
ii.	Mention its advantages and disadvantages.	5	4	5	2

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Reg. No.															

B.Tech. DEGREE EXAMINATION, MAY 2022
Fifth Semester

18ECC205J – ANALOG AND DIGITAL COMMUNICATION
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours Max. Marks: 75

PART – A (25 × 1 = 25 Marks)
Answer **ALL** Questions

		Marks	BL	CO	PO
1.	The value of bandwidth and power required to transmit a given amount of information are reduced in (A) Vestigial sideband modulation (B) Single side band modulation (C) Amplitude modulation (D) Double side band modulation	1	1	1	1
2.	The parameter constant in the case of frequency modulation is (A) Amplitude (B) Wavelength (C) Phase (D) Frequency	1	1	1	1
3.	In AM with modulation index as 'm' and carrier power as Pc, the total radiated power is (A) $Pc\left(1+m^2/2\right)$ (B) $Pc\left(1+m^2/8\right)$ (C) $Pc\left(1+m^2\right)$ (D) $Pc\left(1+m^2/4\right)$	1	1	1	1
4.	The Maximum transmission efficiency of an AM signal is (A) 64.44 % (B) 33.33% (C) 56.66% (D) 75.55%	1	1	1	1
5.	Carson's rule is used to calculate (A) Bandwidth of FM signal (B) Signal to noise ratio (C) Modulation index (D) Noise figure	1	1	1	1
6.	In a commercial super heterodyne AM receiver, if the image frequency is 2110 kHz, the received signal frequency would be (A) 2565 KHz (B) 1655 KHz (C) 1200 KHz (D) 3020 KHz	1	2	2	2,3
7.	Aperture effect is observed in (A) Instantaneous sampling (B) Natural sampling (C) Flat-top sampling (D) Ideal sampling	1	2	3	1
8.	The image signal can be rejected with (A) RF stage (B) IF stage (C) IF stage and detector (D) RF, IF stages and detector	1	2	2	2,3

9.	_____ is not the advantage of TRF receiver (A) Better alignment (B) Better tracking (C) Improved sensitivity (D) Simple and cheap	1	2	2	2,3
10.	Pre-emphasis circuit is used as (A) Low pass filter (B) High pass filter (C) Band pass filter (D) Band reject filter	1	2	2	2,3
11.	In DSI, signal, each of 24 voice channels is sampled at _____ with _____ per sample. (A) 4 KHz, 4 bits (B) 4 KHz, 8 bits (C) 8 KHz, 4 bits (D) 8 KHz, 8 bits	1	2	3	1
12.	What is the Nyquist sampling rate when sampling a signal whose highest frequency is 1360Hz and lowest frequency is 250Hz? (A) 3760 Hz (B) 3260 Hz (C) 2760 Hz (D) 2220 Hz	1	2	3	1
13.	The _____ line code may not pass through transformers and many amplifiers (A) Unipolar – NRZ (B) Unipolar – RZ (C) Bipolar – NRZ (D) Bipolar – AMI – RZ	1	2	3	1
14.	Fidelity means _____. (A) Equally amplifies all signal frequencies at receiver (B) Ability to amplify weak signals (C) Minimum magnitude of input signal required to produce a specified output (D) Ability to choose wanted signal from incoming singals	1	2	2	2,3
15.	In a digital compact disc audio system, the audio signals are sampled at (A) 40000 samples/ scc (B) 42000 samples/ sec (C) 444000 samples/ sec (D) 46000 samples/ sec				
16.	External modulation for _____ modulation format allows the most sensitive coherent detection mechanism. (A) Frequency shift keying (B) Digital shift keying (C) Phase shift keying (D) Amplitude shift keying	1	2	3	1
17.	Each constellation point in a 16QAM constellation diagram represents (A) Tribit (B) Quadbit (C) Pentabit (D) Dibit	1	2	3	1
18.	_____ system uses QAM. (A) Digital microwave relay (B) Dial up modem (C) Digital microwave relay and amp, dialup modem (D) Amplitude only	1	4	4	4
19.	The modulation technique in which the FSK signal gently shifts from one frequency level to another is (A) Differential FSK (B) Continuous PSK (C) Differential PSK (D) Continuous phase modulation	1	4	4	4

20.	PSK is a _____ process which covneys data by changing the _____ of a constant frequency reference signal. (A) Digital modulation, amplitude (B) Analog modulation, amplitude (C) Digital modulation, phase (D) Analog, modulation phase	1	4	4	4
21.	The cyclic codes are designed using (A) Shift registers with feedback (B) Shift registers without feedback (C) Flip flops (D) Counters	1	4	5	2
22.	The received code contains an error if the syndrome vector is (A) Zero (B) Non zero (C) Infinity (D) Negative	1	4	5	2
23.	The channel capacity is defined by Shannon's theorem is by (A) $B\log_2(1+SNR)bps$ (B) $2B\log_{10}(1+SNR)bps$ (C) $B^2\log_2(1+SNR)bps$ (D) $(B+1)\log_2(1+SNR)bps$	1	4	5	2
24.	A cyclic code can be generated using (A) Generator polynomial (B) Generator matrix (C) Generator polynomial and matrix (D) Polynomial only	1	4	5	2
25.	In a frequency hopping signal the frequency _____. (A) Is constant at each time ship, but varies with chip to chip (B) Is constant both individual time chip and chip to chip (C) Changes at each time and also chip to chip (D) Changes at each time chip, but is constant with chip to chip	1	4	5	2

PART – B (5 × 10 = 50 Marks)

Answer **ALL** Questions

		Marks	BL	CO	PO
26. a.i	Write down the AM wave equation and explain each term with the help of frequency spectrum.	6	2	1	1
ii.	Also obtain an expression for its power saving and its efficiency.	4	2	1	1
	(OR)				
b.i.	With a neat block diagram explain the construction frequency modulation.	6	2	1	1
ii.	Obtain an expression for FM wave equation.	4	2	1	1
27. a.i.	Sketch an eye pattern with suitable diagram.	5	3	3	1
ii.	Elaborate on noise in delta modulation.	5	3	3	1
	(OR)				
b.	Derive an expression for the figure of merit of FM receiver in the presence of noise.	10	3	3	2,3
28. a.i	Describe with a neat diagram, the various building block of PLM code generation.	5	3	2	2,3