ECE	18	1503		
Roll No. of candidate  2h/2/22 2021  B.Tech. 5th Semester End-Term Examination  DIGITAL COMMUNICATION				
Full I	Mark	ss - 70	Time - Three hours	
		The figures in the margin indicate full marks for the questions.  Answer question No. 1 and any four from the re-		
1.	Ansv	wer the following (MCQ/ Fill in the blanks):	$(10\times1=10)$	
	(ii) (iii)	(a) increases rapidly (b) remains constant (c) decreases rapidly (d) vary rapidly	nodulating signal	
	8	(a) 1.8 ab	[Turn over	

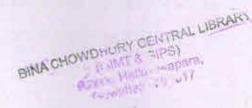
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(iv) For transmission of 4 kHz signal encoded by 8 bits, the required minimum bit rate is

- (a) 16 kHz
- (b) 32 kHz
- (c) 64 kHz
- (d) 8 kHz

(v) Power spectral density (PSD) of BPSK is similar to

- (a) DSB-SC
- (b) DSB with carrier
- (c) SSB
- (d) DSB



(vi) In line-coding, favourable power spectral density means

- (a) PSD = 1 at f = 0
- (b) PSD = 0 at f = 0
- (c) PSD = 0 at f = 1
- (d) PSD = 0 at f > 1

(vii) Detection scheme for FSK signal can be performed by

- (a) co-herent scheme
- (b) non-coherent scheme
- (c) both (a) and (b)
- (d) none of the above

(viii) In comparison to unipolar and polar line coding, the DC value of bipolar /AMI line coding is

- (a) more
- (b) equal
- (c) less
- (d) moderate

(ix) The capacity of Gaussian channel is

- (a)  $C = 2B\log(1+S/N)$  bits/s
- (b)  $C = B^2 \log(1+S/N)$  bits/s
- (c) C = Blog(1+S/N) bits/s
- (d) C = Blog(1+S/N)2 bits/s

		(a) amplitude limited		
		(b) not time limited BENA CHOWDHURY CENTRAL LIBRARY		
		(c) time limited		
		(d) Both (a) and (c)		
	(a)	Explain different types of sampling techniques with the help of waveform and expressions. (1)		
	(b)	Show that (SNR) of PCM = (SNR) of Delta modulation (DM)		
		Assume, Start up error = $0$ , Slope overloading error = $low(0)$ . (5)		
3.	(a)	A sinusoidal signal with peak to peak voltage of V sampled and thereafter linearly quantized into 'M' levels and in binary form. Find signal to noise ratio.		
	(b)	Derive a generalized expression with the help of Gram-Schmidt orthogonalisation procedure for a set of N energy signals represented by $S_1$ (t), $S_2$ (t), $S_3$ (t),, $S_N$ (t). (10)		
4.	(a)	Find an output expression for distortionless baseband binary transmission by using Nyquist's criteria. (5)		
	(b)	For what purpose matched filter is used? Find the frequency response of the matched filter to achieve maximum SNR at $t = t_m$ . (10)		
5.	(a)	What is source coding theorem? prove it. (10)		
	(b)	Explain discrete memoryless channel. Why it is called discrete memoryless? (5)		
6.	(a)	The probabilities of the five possible outcomes of an experiment are given as ½, ¼, 1/8, 1/16, 1/16. Determine the Entropy and information rate if there are 16 outcomes per second. (5)		
	(b)	Say, messages m <sub>1</sub> to m <sub>8</sub> have probabilities 1/2, 1/8, 1/8, 1/16, 1/16, 1/16, 1/32, 1/32. Find the coding efficiency and code redundancy using Shannon-fano coding.  (5)		
	(c)	Find out the probability of error expression for the scheme BPSK. (5)		
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(x) Any signal which is band limited is -

Write short note for the following (any three)

 $(3 \times 5 = 15)$ 

- Linear block codes
- Automatic Repeat Request (ARQ) (b)
- (c)
- Inter-symbol Interference (ISI) and CHOWDIAGY CENTRAL LIBRARY Azero Hamil mapara. (d)
- Different keying techniques (e)
- Nyquist and raised cosine pulses (f)