Printed pages: 01 **Sub Code: NEC502**

Paper Id: | 3 | 0 | 5 | 1 | **Roll No:** | | | | | | | | | | |

B TECH

(SEM V) THEORY EXAMINATION 2017-18

PRINCIPLES OF COMMUNICATION

Time: 3 Hours ***Total Marks: 100***

Notes: *Attempt all Sections. Assume any missing data.*

SECTION A

Q1. Attempt all parts in brief. **(2*10=20)**

a) What is baseband signal?
b) Draw block diagram of analog communication System.
c) What VSB Signal. How it is used for reduction of Bandwidth.
d) Draw phasor diagram for AM system along with its application.
e) What is Modulation? Why it is required.
f) Why is Line Coding required in Communication System?
g) What is Quantizer? What role does it play in Digital Transmission?
h) List Comparison between Narrowband & Wideband FM.
i) What is White Noise? Draw its Spectral Density Curve.
j) What is Noise Figure? List Sources of Noise.

SECTION B

Q2. Attempt any three question .All question carry equal marks **(10*3=30)**

a) Calculate the percentage saving when the carrier and one of the sideband are suppressed in an AM wave modulated to a depth of i) 100% ii) 75%.
b) Draw & Explain the block diagram of Phase shift method for generating the SSB Signal.
c) Explain modulation and demodulation of PWM system using suitable waveform?

d) What do you mean by Noise? Show the effect of certain types of filter on the noise What is slope overload distortion and granular or Idle noise
e) What is Differential Pulse Code Modulation? Explain working of DPCM with a proper block Diagram.

Q3. Attempt any one question .All question carry equal marks **(10*1=10)**

a) The efficiency η of ordinary AM is defined as the percentage of the total power carried by the sidebands, that is

$$\eta = P_s/P_t$$

Where P_s is the power carried by the sidebands and P_t is the total power of the AM signal.

i) Find η for $m_a = 0.5$ (50% modulation)

ii) Show that for a single tone AM η max is 33% at m_a=1.

b) Assuming sinusoidal modulation prove that AM system with envelop detection the output signal to noise ratio(SNR) is given by

$$(S/N) = (m^2/2+m^2)\,\gamma$$

Where m is modulation index for AM and $\gamma=(S_i/\, nf_m)$

Q4. Attempt any one question .All question carry equal marks **(10*1=10)**

a) In an FM system a 7 kHz modulating signal modulates 107.6Mhz carrier wave,so that the frequency deviation is 50Khz.Determine
i) Carrier Swing in the FM signal and modulation index.
ii) The Highest and lowest frequency attained by the FM Signal
b) Derive the expression for Narrowband FM signal and Wide Band FM. Explain advantage of Modulation Index

Q5. Attempt any one question .All question carry equal marks (10*1=10)

a) A PCM system uses a uniform Quantizer followed by a 7-bit Binary encoder. The bit rate of the System is equal to 50 x 10^6 bits/sec. Calculate

i) What is the maximum message signal bandwidth for which the system operates satisfactory?
ii) Calculate the output signal to noise ratio when full load sinusoidal modulating wave of frequency 1Mhz is applied to the input

b) Explain flat top sampling in detail?

Q6. Attempt any one question .All question carry equal marks (10*1=10)

a) Explain working of Adaptive Delta modulation with a proper block Diagram

b) Show that maximum quantization error in PCM is given by $\frac{\Delta^2}{12}$

Q7. Attempt any one question .All question carry equal marks (10*1=10)

a) For a given sequence 1011001011 construct Unipolar NRZ, Unipolar RZ bipolar NRZ, bipolar RZ, Alternate Mark Inversion (AMI), and Manchester format?

b) What is pre-emphasis and de-emphasis and how SNR improves by using pre-emphasis and de-emphasis? Find out the figure of merit in SSB-SC.