PAPER ID-310125

Subject Code: REC502

Roll No: | | | | | | | | | | | | | |

B. TECH
(SEM V) THEORY EXAMINATION 2020-21
PRINCIPLES OF COMMUNICATION

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a.	Calculate the bandwidth of Amplitude Modulation for single tone 20 Hz signal.
b.	Define Pulse Code Modulation.
c.	Evaluate the instantaneous angular frequency of a wave having a instantaneous phase angle given by, $\Psi(t)=4000t + \sin 20t$.
d.	Discuss the lowpass sampling theorem.
e.	Explain the Carson's rule for the determination of the bandwidth of frequency modulated signal.
f.	Calculate the Nyquist sampling rate for the signals Sinc(200πt).
g.	Explain Figure of Merit.

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a.	Design a block diagram of analog. Explain the need for modulation and its classifications?
b.	A modulating signal 5 cos (2π 15000 t), angle modulates a carrier 10 cos $\omega_c t$. Evaluate the modulation index and the bandwidth for (a) the FM systems. Assume $K_p = K_f$ =15kHz/volt. Obtained the power of the modulated FM wave.
c.	Explain Pulse width Modulation and its generation and demodulation with the help of neat and clean block diagrams.
d.	Illustrate the Pulse Code Modulation in details with suitable block diagram and draw Quantization characteristics diagram.
e.	Construct the pre-emphasis and de-emphasis circuit for the frequency modulation. Explain their use in frequency modulation scheme.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Discuss the need of double side band-suppressed carrier (DSB-SC) amplitude modulated signal. Provide a mathematical model for single tone DSB-SC.
(b)	Describe the time domain mathematical representation and spectrum illustration of Single Side Band-Suppressed Carrier (SSB-SC) modulation scheme. Also provide a block diagram for the generation and synchronous detection of SSB-SC.

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4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Develop a general expression of Wide-band Frequency Modulated (WBFM) signals using Bessel Function.
(b)	Compare Frequency Modulation (FM) with Phase Modulation (PM) and explain the relationship between them with diagram.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Describe the delta modulation. Why is it said a 1-bit modulation? Sketch the block schematic for both transmitter and receiver.
(b)	Explain Time Division Multiplexing, T1 Digital System, TDM Hierarchy in brief.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Illustrate the Differential Pulse Code Modulation. Draw the block schematic for both transmitter and receiver.
(b)	Describe the Voice Coders and Sources of Noises.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Explain Phase Locked Loops in details.
(b)	Evaluate the Signal to Noise Ratio for Amplitude Modulation.