Subject Code: BEC401

PAPER ID-411522

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

BTECH
(SEM IV) THEORY EXAMINATION 2023-24
COMMUNICATION ENGINEERING

TIME: 3 HRS **M.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.	State the need of modulation in communication system.
b.	If modulation percentage of an amplitude modulated system is 100 %, then determine its efficiency.
c.	What is the effect of modulating signal's amplitude on bandwidth of FM system?
d.	Define the term figure of merit.
e.	State two disadvantages of delta modulation.
f.	Find the Nyquist rate and Nyquist interval for the signal $x(t) = 20\sin(100\pi t)\cos(200\pi t)$
g.	State difference between conventional phase shift keying and differential phase shift keying.

SECTION B

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

a.	Draw the block diagram of a communication system. The antenna current of an AM broadcast transmitter, modulated to a depth of 30 % by an audio sine wave is 10 A. It increases to 12 A as a result of sinusoidal modulation by another audio sine wave. What is the modulation index due to second wave?
b.	With the help of block diagram, explain the demodulation of FM wave using Phase Locked Loop (PLL).
c.	Determine the figure of merit for Double Side Band Suppressed Carrier (DSBSC) system.
d.	With help of a neat block diagram, discuss transmitter and receiver of PCM system.
e.	Discuss Quadrature Amplitude Modulation (QAM) in detail.

SECTION C

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

(a)	An Audio frequency signal 40 Sin ($6\pi \times 500$ t) is used to amplitude modulate a carrier of 200 Sin ($6\pi \times 10^6$ t). Calculate: (i)Amplitude of message signal (ii)Amplitude of each side band (iii)Total power delivered to the load of 5 KΩ (iv) Carrier Power (v) Transmission efficiency
(b)	With help of neat diagram, illustrate the working of ring modulator as DSB-SC Modulator.

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

(a)	Why Pre-emphasis and De-emphasis is done in frequency modulation. Discuss in detail.
(b)	With help of neat block diagram, discuss how FM wave is generated using AM wave and its vice-versa.

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

(a)	With help of a block diagram, discuss time division multiplexing.

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(b)	With help of neat diagram, explain the working of delta modulator.

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

(a)	State various types of noises that are encountered in a communication system.
(b)	Prove that for a PCM signal, Signal to Quantization Noise Ratio (SQNR) in dB is given as 1.8+6R, where R represents no. of bits per sample.

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

(a)	With help of wave forms, explain amplitude shift keying. Also draw the block diagram of its modulator and demodulator.
(b)	Write a short note on Minimum Shift Keying (MSK).