Reg. No. | | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

FIFTH SEMESTER B.TECH. (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER DEGREE EXAMINATIONS, NOVEMBER - 2019

SUBJECT: COMMUNICATION SYSTEMS [ICE 3103]

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

Include diagrams and equations wherever necessary

1A. Consider an angle modulated signal:

$$s(t) = 10\cos[(108)\pi t + 5\sin 2\pi(103)t]$$

Determine the maximum phase deviation and the maximum frequency deviation.

1B. Consider the message signal $m(t) = 20\cos(2\pi t)$ volts and the carrier wave $C(t) = 50\cos(100\pi t)$volts.

(a) Write the equation for resulting amplitude modulated(AM) wave

(b) Sketch the resulting AM wave for 75 percent modulation.

(c) Find the power developed across a load of 100 ohms due to this AM wave.

1C. Describe tuned radio frequency receiver and write its disadvantages.

(2+3+5)

2A. Find the approximate band of frequencies occupied by an FM wave with carrier frequency of 5kHz, K1 = 10 Hz/V and modulating signal as, cos 200 πt cos (5 sin 2πt) + sin 200 πt sin (5 sin 2πt).

2B. Describe direct FM transmitter.

2C. Explain DPCM transmitter and receiver.

(2+3+5)

3A. Discuss the significance of companding with relevant illustrations.

3B. Describe time division multiplexing technique.

3C. Compare natural and ideal sampling techniques.

(3+3+4)

4A. What is the purpose of a carrier recovery circuit? Describe Remodulator loop carrier recovery circuit.

4B. For a BPSK modulator with a carrier frequency of 80 MHz and an input bit rate of 15Mbps, determine the maximum and minimum upper and lower side frequencies, draw the output spectrum, determine the minimum Nyquist bandwidth, and calculate the baud.

4C. Explain QPSK receiver operation for an incoming QPSK signal of $-sinw_c t - cosw_c t$

(3+3+4)

5A. Compare TDMA and FDMA.

5B. Explain the idealized model of baseband spread-spectrum transmitter and receiver system.

5C. Explain Differential Phase Shift Keying Transmitter and Receiver operations for a binary input data 0110110110 with block diagrams. Assume the reference bit as 1 and reference phase as 0°.

(3+3+4)

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