Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER B.TECH. (E & C) DEGREE END SEMESTER EXAMINATION
JANUARY 2020
SUBJECT: SPREAD SPECTRUM COMMUNICATION (ECE - 4012)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.
- Show all intermediate steps while solving numerical or in a derivation.

1A. Find the first 7 chips of a Gold code created from the following two *m*-sequences. Provide the shift register implementation for the *m*-sequences and the Gold code. Clearly show all intermediate steps.

	Generator polynomial	Initial State
m-sequence 1	[203]	1 0 1 1 0 1 1
m-sequence 2	[217]	1 0 0 0 1 1 1

1 B What are the advantages of spread spectrum communication? Also, find the processing gain (in dB) and jamming margin (in dB) for direct sequence spread spectrum (DSSS) system with chip duration of 0.5μs and bit duration of 0.2ms, desired received SNR after despreading of 20 dB and system loss of 3dB.

(5+5)

2A. Describe the working principle of frequency hopping spread spectrum (FHSS) system with the help of a neat labelled block diagram for transmitter and receiver.

2B. Explain slow FHSS system with the help of a pictorial representation of the transmitted signal. A FHSS system uses fast-hop technique at the hop rate of 12 hops per information bit. If the information bit rate is 2400 bps, what is the frequency separation?

(5+5)

3A. Explain the working of non-coherent delay-lock tracking loop. Support your answer with the necessary block diagram, the appropriate equations and discriminator S-curve for $\Delta = 1$.

3B. Describe RAKE receiver with the help of a block diagram.

(5+5)

4A. Describe the direct-sequence parallel search acquisition system with the help of a neat labelled block diagram. Support your answer with suitable expressions wherever necessary.

4B. Describe the RASE acquisition system with the help of a neat labelled block diagram.

(5+5)

5A. Describe the direct-sequence CDMA with the help of a neat labelled block diagram. Support your answer with suitable expressions wherever necessary.

5B. Explain the two power control strategies for CDMA system. With the help of a neat labelled block diagram, describe the functioning of the closed-loop power control scheme for CDMA system.

(5+5)