MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institution of Manipal University

SEVENTH SEMESTER B.Tech. (E & C) DEGREE END SEMESTER EXAMINATION, NOV/DEC 2017

SUBJECT: SPREAD SPECTRUM COMMUNICATIONS (ECE - 4012)

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.
- 1A. Draw neat block diagrams of parallel MSK direct sequence modem. Discuss the salient features of each block in the transmitter and receiver.
- 1B. With the help of relevant diagrams, illustrate slow and fast frequency hop for a 4-ary FSK.
- 1C. Mention any two benefits of Spread spectrum communication system

(5+3+2)

- 2A. With the help of relevant waveforms, explain how spread spectrum technique rejects single tone jamming signal. Write the expression for the processing gain. Draw the block diagram of a BPSK modulated spread spectrum system
- 2B. Find the generator polynomial for a primitive polynomial represented as octal number 45. Draw the Galois and Fibonacci configuration for the same.
- 2C. Draw the PSD plots of jammer waveforms versus a communicator's FH/MFSK tone for the transmission of symbols G_1,G_2 in the following cases:
 - a) Stepped tones
 - b) Broad band noise

(5+3+2)

- 3A. Draw the block diagram of a DS-CDMA Tx/Rx system with BPSK data modulation illustrating direct path and one multipath interference. With necessary expressions, prove that the code-correlation receiver cancels the multipath interference completely
- 3B. What are Hadmard codes? Discuss with example how Walsh codes are derived from Hadmard codes.
- 3C. Find the hopping bandwidth required to achieve an antijam margin of 25 dB in a FHSS scheme, if the data rate is 100 kbps, EIRPT=30 dBW, EIRPJ=50 dBW and E_B/J_{O REQD}=10 dB

(5+3+2)

- 4A. List the factors affecting the maximum allowable number of users per cell in the case of CDMA and discuss each of them. What are the assumptions made to determine the same?
- 4B. Discuss the properties of pilot and paging channels in IS-95.
- 4C. Mention the names of channels used in the reverse link of IS-95.

(5+3+2)

- 5A. Discuss the following issues in a mobile phone call scenario:
 - i. Turn on and sync
 - ii. Idle state handoff
 - iii. Call initiation
 - iv. Soft handoff
- 5B. Draw the block diagram of a direct sequence serial search acquisition scheme and discuss the salient features of the same
- 5C. Draw the block diagram of a forward channel used in IS-95.

(5+3+2)