Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SIXTH SEMESTER B.TECH. (E & C) DEGREE END SEMESTER EXAMINATION
APRIL/MAY 2019
SUBJECT: ADVANCED DIGITAL SIGNAL PROCESSING (ECE - 4005)

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

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. Explain the design of an uniform DFT filter bank. Discuss the two different polyphase implementations of uniform DFT filter bank. What are the benefits of polyphse decomposition

1B. Explain the following Multirate system applications
i. Sub band coding ii. Analog voice privacy systems

(6+4)

2A. What are the errors in Quadrature Mirror Filter bank? How perfect reconstruction is achieved in such systems?

2B. Why the analog music is oversampled before the digitization in digital audio system? Show the complete block diagram and explain the digital audio system.

(6+4)

3A. Compare STFT and Wavelet transform. Propose a scheme to obtain the variable bandwidth BPFs from a uniform filter bank. How this can be used for DWT implementation? Explain.

3B. Discuss the choice of window and time-frequency trade-off in Short Time Fourier Transform.

(7+3)

4A. An ECG waveform obtained from a human body is corrupted with 50 Hz interference. Develop an adaptive algorithm to remove this interference.

4B. With the relevant mathematical expressions and waveform explain the steepest decent method. Mention the limitations on the adaptation parameter.

(5+5)

5A. What is the need for Homomorphic filtering in signal processing? With suitable signal model and cepstral plots, explain the homomorphic filtering of voiced speech signal for determination of fundamental frequency of voicing.

5B. What are the advantages of adaptive filters? List four classes of adaptive filtering techniques. Give example for each.

(7+3)