

- 1) Question No. 1 is compulsory
- 2) Attempt any Three questions from the remaining Five questions
- 3) Figures to the right indicate full marks

Explain the procedure to calculate the short time energy of speech signal? [4]

What is prosody with regards to speech synthesis? [4]

Explain formation of vowels either by showing a vowel quadrilateral or a vowel triangle. [5]

Is the speech signal stationary or non-stationary? Justify your answer. [4]

Explain the use of wideband spectrogram of a speech signal. [3]

What are the various forms of STFT? Give expressions for each case.

Explain interpretation of short-time spectrum analysis as filters with suitable block diagram. [8]

Elaborate with suitable equations any three methods for estimating the pitch of a speech signal. [6]

Write a note on production of semivowels and nasals. How can we differentiate them on the basis of their formant values? [6]

Explain how Linear Prediction Filter for speech prediction represents an all pole filter? What should be the order of the filter to be considered for practical applications? [10]

Draw the lattice structure of an all pole filter of order one showing proper equations. [10]

Explain with a suitable block diagram and proper waveforms a procedure to separate the vocal tract frequency response from the excitation in a speech signal. [10]

Explain the necessity of the mel scale with reference to the hearing mechanism. [10]

Explain with suitable equations the Levinson Durbin algorithm for calculation of the predictor coefficients. [8]

Explain the applications of speech processing in detail. [5]

Explain with a suitable example the dynamic time warping algorithm. [7]

What is CELP? Explain the US federal standard 1016 using CELP? [10]

Draw the state diagram for HMM as a general case and explain how you would develop a transition matrix from the same. [10]
