

Total No. of Questions : 10]

SEAT No. :

P2028

[Total No. of Pages : 2

[5059] - 634

B.E. (E&TC)

SPEECH AND AUDIO SIGNAL PROCESSING

(2012 Pattern) (Endsem)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Q1. OR Q.2, Q.3 OR Q.4 , Q.5.OR Q.6, Q.7 OR Q.8, Q.9 OR Q.10.*
- 2) *Right side figures indicate marks.*
- 3) *Assume suitable data.*

Q1) a) Explain voiced and unvoiced speech signal? Explain its significance in speech processing [6]

b) What is Pitch of speech signal? What is formant frequencies in speech signal [4]

OR

Q2) a) Explain LTV model of speech signal [5]

b) Explain the concept of critical band and auditory systems as a filter bank? [5]

Q3) a) What is spectrogram? What are their types? Explain its significance and applications in speech processing [5]

b) Explain Mel Scale and Bark Scale [5]

OR

Q4) a) How Short time energy, short time average magnitude short time average zero crossing rate is useful in speech processing? [4]

b) Explain the concept of Spectral entropy and Spectral Roll-off. [6]

P.T.O

- Q5)** a) Explain basic principal of Linear Predictive Analysis? Explain autocorrelation method for formant analysis [8]
b) Explain the Cholesky Decomposition method for solution of LPC equations. [8]

OR

- Q6)** a) Explain frequency domain interpretation of LP analysis? [8]
b) Explain Durbin algorithm in LPC analysis [8]

- Q7)** a) Explain how pitch is estimated using cepstrum analysis? [8]
b) Explain in detail estimation of formant and pitch parameters using cepstrum [8]

OR

- Q8)** a) What is cepstrum? Explain in detail computation of Mel Frequency Cepstral Coefficients (MFCC). [8]
b) What is long term complex cepstrum? What is short term complex cepstrum? Explain the properties of the complex cepstrum. [8]

- Q9)** a) Explain in detail automatic speech recognition system with suitable example [9]
b) What is the difference between speaker identification and speaker verification? What are the features used for speaker recognition/verification system and how? [9]

OR

- Q10)** a) What is DTW? Explain with suitable example. [4]
b) What are the techniques of speech enhancement spectral subtraction method? [10]
c) What are the various methods used for TTS. [4]

