Total No. of Questions : 10] **SEAT No. :**

P4944

[Total No. of Pages : 2

[4959]-1114

B.E. (Electronics)

SPEECH AND AUDIO SIGNAL PROCESSING

(2012 Pattern) (Elective - III)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:-

1) ***Attempt Q1 OR Q2, Q3 OR Q4, Q5 OR Q6, Q7 OR Q8, Q9 OR Q10.***
2) ***Right side figures indicate marks.***
4) ***Assume suitable data.***

Q1) a) Explain anatomy and physiology of speech production systems. **[5]**

b) Explain LTI model of speech production systems. **[5]**

OR

Q2) a) Explain speech signal characteristics. Explain LTV model of speech production systems. **[5]**

b) What is homomorphic processing of speech signal? Explain its significance. How it is used for pitch detection? **[5]**

Q3) a) What is pitch? Explain how pitch and formant estimation is calculated? **[4]**

b) What is spectrogram? Explain significance of narrow band and broad band Spectrogram. **[6]**

OR

Q4) a) What is speech coding? How to evaluate speech quality? **[5]**

b) Explain any one speech coding techniques. **[5]**

P.T.O.

Q5) a) Explain basic principle of Linear Predictive Analysis. Explain autocorrelation method for formant analysis. **[8]**

b) Explain the Covariance method for computing Linear Predictor Coefficients. **[8]**

OR

Q6) a) Explain covariance method for Linear Predictive Analysis. **[8]**

b) Explain Durbin algorithm in LPC analysis. **[8]**

Q7) a) What are the nature of interfering signals? What is speech enhancement. What are the different types of speech enhancement techniques? **[8]**

b) Explain spectral subtraction methods of speech enhancement. **[8]**

OR

Q8) a) Explain adaptive noise cancellation technique for speech enhancement. **[8]**

b) Explain harmonic filtering and resynthesis of speech signal. **[8]**

Q9) a) Explain in detail automatic speech recognition system with suitable example (e.g. automatic telephone dialling system). **[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 Dynamic Time Warping (DTW)? Explain with suitable example. **[6]**

b) Write a short note on Hidden Markov Model (HMM) in speech processing. **[6]**

c) Write a short note on Gaussian Mixture Model (GMM) in speech processing. **[6]**