Total No. of Questions : 12]

SEAT No. :

P3368

[Total No. of Pages : 3

[4959]-102
B.E. (E & TC)
b : SPEECH PROCESSING
(2008 Pattern) (Semester - II) (404189) (Elective - III)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***All questions are compuslory.***
2) ***Figures to the right side indicate full marks.***

SECTION - I

Q1) a) Explain the following classes of speech signal with suitable examples. **[8]**

i) Affricates

ii) Fricative

iii) Semivowels

iv) Diphthongs

b) Explain in detail with suitable example the LTI and LTV model of speech production. **[8]**

c) What is the difference between nasal and vowels? **[2]**

OR

Q2) a) Classify the stops based on place of articulation and manner of articulation. What is the difference between production of /p/and/b/? How it is reflected in acoustic waveforms of/p/and/b/? **[8]**

b) An AMDF function of a pitch measurement has minimum value at n = 45. If the sampling rate of the speech segment is 8000 sam/sec., compute the pitch frequency. Compare autocorrelation and AMDF for computation of pitch period. **[8]**

c) Explain the classification of vowels /i :, a and u:/based on F_1 vs F_2 plot. **[2]**

P.T.O.

Q3) a) Explain the Covariance method for computing Linear Predictor Coefficients. **[8]**

b) What is prediction error filter? Derive normal equation and state the assumption for its derivation. **[8]**

OR

Q4) a) Compare MFCC with PLP coefficients. **[8]**

b) What are the different criterions on which selection of prediction order is based. **[8]**

Q5) a) Write short note on short time speech analysis. Comment on window duration and window shift size. **[8]**

b) Write a note on Mel scale and bark scale. How these scales are useful in speech recognition applications. Explain w.r.t. speech perception. **[8]**

OR

Q6) a) What is the filter bank approach related to speech processing? Explain in detail. **[8]**

b) How pitch is detected in cepstral domain? Elaborate with the help of Block diagram. **[8]**

SECTION - II

Q7) a) Explain spectral subtraction method with block diagram. **[9]**

b) Explain Wiener filter. How it is used for echo cancellation. **[9]**

OR

Q8) a) What is speech enhancement and explain different speech enhancement techniques in detail. **[9]**

b) Explain with suitable example the use of comb filter in speech enhancement. **[9]**

Q9) a) Explain with block schematic continuous digit recognition system. **[8]**

b) What is HMM. Explain how it is used for speech recognition? Explain the basic problems for HMMs. **[8]**

OR

Q10)a) State the condition on which optimization of DTW depends. Explain in detail. **[8]**

b) Define the elements of HMM and explain how the model generates observation sequences. What are the parameters are estimated while HMM training? **[8]**

Q11)a) Explain with block diagram text-to-speech synthesis system. **[8]**

b) Explain Unit Selection synthesis related to concatenative synthesis. **[8]**

OR

Q12)a) With the help of block schematic explain LPC-based speech synthesizer. **[8]**

b) Explain speaker recognition system in brief. What are the features used for speaker recognition and what is the importance of these features.**[8]**