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B.Tech.
PET6J013

6th Semester Regular Examination 2017-18
SPEECH PROPAGATION
BRANCH : ECE, ETC
Time : 3 Hours
Max Marks : 100
Q.CODE : C446

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1. Answer the following questions: *multiple type or dash fill up type :* **(2 x 10)**

a) Improvement made by hearing-impaired adults in speech production and self-monitoring skills under two conditions: visual feedback from the …….. and feedback from a speech-language pathologist.
   A. Speech Spectrographic Display (SSD)
   B. Acoustic Phonetics
   C. Sampling Speech
   D. Quntization

b) In digital transmission, the modulation technique that requires minimum bandwidth is
   A. Delta modulation
   B. PCM
   C. DPCM
   D. PAM

c) DPCM suffers from
   A. slope over load distortion
   B. quantization noise
   C. both A. and B
   D. none of the above

d) The process of converting the analog sample into discrete form is called
   A. Modulation
   B. Multiplexing
   C. Quantization
   D. Sampling

e) In Delta Modulation, the bit rate is
   A. N times the sampling frequency
   B. N times the modulating frequency
   C. N times the nyquist criteria
   D. None of the above

f) …… tool from signal processing can be used for finding the similarity among the two sequences and refers to the case of having two different sequences for correlation.
   A. Auto-correlation
   B. Crosscorrelation
   C. Both A & B
   D. None of the above

g) If the number of zero crossings are more in a given signal, then the signal is changing …….. and accordingly the signal may contain high frequency information.
   A. Rapidly
   B. Slowly
   C. Moderately
   D. None of the above

h) The speech coding technique that is dependent on the prior knowledge of the signal is
   A. Waveform coders
   B. Vocoders
   C. Sub band coding
   D. Block transform coding

i) In voice excited vocoders, PCM transmission helps in transmission of
   A. High frequency bands of speech
   B. low frequency bands of speech
   C. multiplexed signals
   D. modulated signals

j) Vocal tract cepstral coefficients and excitation coefficients are separated by
   A. Sampler
   B. Linear filters
   C. Encoders
   D. Multiplexers

Q2. Answer the following questions: *Short answer type :* **(2 x 10)**

a) Describe the significance of prediction order 'p' in LP analysis.
b) What are the demerits of PCM and DPCM?
c) Explain vector quantization.
d) What do you mean by phase vocoder?
e) Describe the problems of speech detection.
f) Describe the role of Speech Spectrographic Display.
g) What is the need of Auto Correlation Function in terms of speech estimation?
h) Explain the term Short Term Processing (STP).
i) What do you mean by psycho acoustics?
j) Distinguish between discrete-time STFT and discrete STFT of speech.

Part – B (Answer any four questions)

Q3. a) Describe the speech production mechanism and identify the source system components. Also explain the classification of speech sound according to mode of excitation. **(10)**
b) Explain the operation of pitch period estimation using auto correlation with neat diagram. **(5)**

Q4. a) Explain the technique to separate voiced and unvoiced region of speech signal using ZCR. **(10)**
b) Describe the method for extracting the parameters energy. **(5)**

Q5. a) Describe the short time average zero crossing rate. **(10)**
b) How DM is used for speech propagation. **(5)**

Q6. a) With the help of block diagram explain homomorphic speech processing? **(10)**
b) Distinguish between narrowband and wideband spectrograms. **(5)**

Q7. a) Explain the Cepstral Analysis of Speech. **(10)**
b) State properties of Complex Spectrum. **(5)**

Q8. a) Explain the VELP and CELP with neat diagram. **(10)**
b) Explain the basic principal of linear predictive analysis? **(5)**

Q9. a) Explain the method to determine pitch period of speech signal using LPC analysis? **(10)**
b) Write short notes on Durbin's Recursive Algorithm. **(5)**