

Time: 3 hours

Marks: 80

NB: 1. Q.1 is compulsory

2. Attempt any three questions from remaining.

- Q.1 a) Is the speech signal a stationary or non-stationary signal? Justify your answer. (04)
b) What is vowel triangle? (04)
c) Explain discrete time model for speech production. (04)
d) Justify the need for short time analysis in speech processing. (04)
e) What are the properties of auto correlation function? (04)
- Q.2 a) Explain how median smoothing is applied for speech signal. (10)
b) Explain the mechanism for production of nasal /m/ /n/ phonemes. (10)
- Q.3 a) Draw and explain the schematic representation of the ear. Emphasize on the human hearing mechanism. (10)
b) Explain voice excited channel vocoder. (10)
- Q.4 a) With related equations explain the terms: i) short time energy ii) short time average magnitude iii) short time zero crossing rate. How do you distinguish between voiced and unvoiced segments based on these parameters? (07)
b) Explain the applications of speech processing in detail. (05)
c) Describe Differential Quantization with the help of diagram. (08)
- Q.5 a) Explain overlap addition method for short time synthesis. (10)
b) Write short notes on: (10)
i) Speech recognition using Artificial Neural Network.
ii) Speech recognition pattern comparison techniques.
- Q.6 a) Explain Fourier Transform Interpretation of STFT. (05)
b) Explain in detail the procedure for speech Vs silence discrimination. (08)
c) Compare PCM, DM, and DPCM. (07)
