

(3 Hours)

[Total Marks: 80]

N.B: 1. Question No 1 is Compulsory**2. Answer any 3 questions from the remaining questions**

- Q1 Answer **any four** questions
- With examples, describe basic discrete signals. **05**
 - What are stops and fricatives? How are they produced? **05**
 - How do we use audio processing for musical applications? **05**
 - What are the different properties of STFT? **05**
 - What is the need for auditory modelling? Discuss any two models with neat diagrams **05**
 - Compare Hamming window with rectangular window. **05**
- Q2
- Derive Goertzel algorithm. What is the use of Goertzel algorithm? **10**
 - With neat block diagram, analyze human speech production mechanism **10**
- Q3
- Derive the transfer function for uniform lossless tube model. Plot the response. **10**
 - What are adaptive quantizers? Differentiate feed forward adaptation from feed backward adaptation. Support your answer with neat diagrams. **10**
- Q4
- Justify the need for direct digital code conversion. Discuss the steps involved in converting LDM to PCM. **10**
 - How do you discriminate speech from silence? **10**
- Q5
- Define short time energy and zero crossing rate. How the voiced /unvoiced decision is taken using these parameters? **10**
 - Justify the need for short time analysis in speech processing. Discuss the steps involved in short time autocorrelation calculation. What is the use of short time auto correlation? **10**
- Q6
- With necessary equations, implement linear filter interpretation. **05**
 - What do you mean by Filter bank summation method for short time synthesis of speech signals? **10**
 - Explain the working of voice excited LPC. **05**
