Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐　　Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (ECE)　　(Sem.–5)
SPEECH AND AUDIO PROCESSING
Subject Code : BTEC-905E-18
M.Code : 78711

Time : 3 Hrs.　　　　　　　　　　　　　　　　Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Write briefly :

1) Define spectrogram? Explain why wideband spectrograms show periodicity in time?

2) Define Linear Predictive Coding (LPC).

3) What are the main differences between speech coding standard ITU-T G.726 and G.728 and G.729?

4) Define moving average prediction.

5) Define the term liftering, quefrency and cepstrum.

6) Why LPC transformation is required? Write the names of major types of LPC transformation.

7) Write the expression of logarithm quantizer and its advantages over uniform quantizer.

8) Write any two types of time domain pitch detection algorithms (PDAs) and their key features.

9) What is Waveform approximating speech coding technique?

10) What is the difference between Codebook Excitation and self-excitation?

SECTION-B

11) With the help of suitable diagrams, explain in detail the Human Auditory System.

12) How linear predictive coding used in speech production. Explain in detail the Covariance methods for LPC analysis.

13) Explain how pitch is estimated using cesptrum analysis?

14) Explain following Excitation codebook search method:

   a) State-save method

   b) Zero input zero output method

15) Explain levinson-Durbin algorithm for calculation of prediction coefficients.

SECTION-C

16) With the help of proper block diagram and mathematical expressions, explain forward and backward adaptive quantizer.

17) How is code book generated for CELP? What are the limitations of CELP? What are the modifications suggested in the basic CELP coder?

18) Explain LPC to LSF and LSF to LPC Transformation in detail with proper mathematical expressions.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.