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

Total No. of Questions : 09

B.Tech.(Electronics & Computer Engg.) (2011 Onwards)   (Sem.–7,8)
DIGITAL SPEECH & IMAGE PROCESSING
Subject Code : BTEL-701
Paper ID : [A3243]

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 has to attempt ANY FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt ANY TWO questions.**

SECTION-A

1. **Write Briefly :**

   a. What are applications of IIR filters?

   b. Define pitch and rhythm in speech processing?

   c. What are elements of speech synthesis?

   d. Why Wiener filter is used?

   e. Define unitary transforms.

   f. Name FIR filter design methods.

   g. How gray scale image modification is done?

   h. What are different methods of image edge detection?

   i. What is phasor mode in speech signal processing?

   j. How FFT is better than DFT?

SECTION-B

2. What is the role of Larynx in vocal tract for speech production? Explain with diagram.

3. What is the application of computer-human interface in speech recognition?

4. What are different image restoration techniques?

5. What is the significance of geometry and shape description in image processing?

6. Which factors are described while designing filters for image processing?

SECTION-C

7. Design a low pass FIR filter using frequency sampling technique having cutoff frequency of $\pi/2$ rad/sample. The filter should have a linear phase 4 and length of 17.

8. a. What are different elements of speech synthesis? Explain them.

    b. With mathematical support define the Hadmard transform, Slant and Cosine transform?

9. Write notes on :

    a. Music Theory

    b. Image Segmentation