Con/1390-07.

OT-5840

(3 Hours) [Total Marks : 75

NB : 1) Attempt any FIVE questions but not more than THREE questions from any section.
2) Answers to the two sections must be written in separate answer books and should be submitted separately.
3) Figures to the right indicate full marks. Each question is of 15 marks.

Section I

Q.1 A] Explain with suitable illustration the process of digital image acquisition process. [06]
B] Define Histogram of an Image. State the characteristics of histogram equalization. [06]
C] Write short note on Image Averaging. [03]

OR

Q.2 A] Describe in brief the fundamental steps in Image Processing [05]
B] Describe different types of neighborhood of a pixel. Explain how neighborhood of a pixel can be used to find connected components for subset of pixels of image? [07]
C] Explain Quantization with example. [03]

Q.3 A] What are filters in image processing? Explain in brief Ideal Low pass filters. [05]
B] Compare and contrast Error-free and Lossy compression techniques. Give example of each. [06]
C] State the properties of Fourier transform. [04]

OR

Q.4 A] Explain with example LZW coding technique. [05]
B] What is brightness adaptation and discrimination? Explain with suitable illustrations. [05]
C] Define fidelity criteria and state its importance. [05]

Q.5 A] What are Morphological Operations? Briefly describe Opening and Closing using suitable structuring element. [06]
B] What is thickening? Explain with example. [05]
C] Write short note on Logical operation on a Digital Image. [04]

OR

Q.6 A] Explain Region based segmentation technique. [05]
B] Describe with block diagram the model of Lossless Predictive Coding technique. [07]
C] Define Hit-or-Miss transform. [03]

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Section II

Q.7 a) With the help of suitable model, explain the sound production mechanism in human being. (5)

b) Describe the production of nasal consonant and the nature of the spectrum of nasal consonants. (5)

c) Explain acoustic phonetic vowel classifier. (5)

OR

Q.8 p) Explain the role of physics (acoustics) and signal processing in developing the speech recognition branch. (5)

q) Briefly explain the meaning of following knowledge sources: acoustic, lexical, syntactic, semantic and pragmatic. (5)

r) What are the problems associated with acoustic-phonetic approach to speech recognition. (5)

Q. 9 a) Draw the diagram of complete bank of filter analysis model. Describe the effect of each block on speech signal. (8)

b) Writing the LPC analysis equations, give the matrix form presentation of autocorrelation function and predictor coefficients. [Derivation of the matrix form is not expected]. What does the following LPC parameter represent: N, M, P, Q and K. (7)

OR

Q.10 p) Explain the importance of speech end point detection. What are the various approaches adopted for speech end point detection. (8)

q) Discuss the end point constraint, monotonicity conditions and local continuity constraints and their effects on time alignment procedure. (7)

Q.11 a) Explain how one can deal with advance conditions in speech recognition. (7)

b) What is HMM? What is the underlying assumption of this model? Describe the types of HMM. (8)

OR

Q.12 p) Explain voice repertory dialer and automated call type recognition. (8)

q) What is subword speech unit? What are the possible choices for such units? (7)