A 1138

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Sixth Semester

Computer Science and Engineering

CS 040 — DIGITAL SPEECH AND IMAGE PROCESSING

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the various steps in digital speech processing?

2. What is the limitation of Fourier Transform?

3. Expand CELP. What is the basic idea of CELP?

4. List the different methods of speech recognition.

5. Define Hadamard Transform.

6. What are the various point processing techniques for image enhancement?

7. How will you detect isolated points in the image?

8. How will you convert RGB to YIQ color model?

9. What is thinning operation?

10. Define a Tree Grammar.

PART B — (5 × 16 = 80 marks)

11. (a) Discuss the spectrographic analysis of speech using DFT. (16)

Or

(b) (i) What is the basic idea behind linear prediction analysis? Explain. (10)

(ii) How will you evaluate the accuracy of the linear prediction analysis in time domain? (6)

12. (a) (i) With neat block diagram describe the zero and minimum phase synthesis system. (8)

(ii) Explain filterbank summation method for speech synthesis. (8)

Or

(b) (i) Discuss MELP, a model based coding technique. (8)

(ii) Explain minimum distance classifier algorithm for speech recognition. (8)

13. (a) (i) Explain in detail histogram specification approach used in image enhancement. (8)

(ii) Explain various spatial filtering approach to image enhancement. (8)

Or

(b) (i) Explain the basic degradation model and inverse filter approach to restore the images. (12)

(ii) Write a brief note on interactive restoration. (4)

14. (a) (i) Explain the region splitting and merging technique of segmenting the image with an illustrative example. (10)

(ii) What is the use of motion in segmentation? Explain. (6)

Or

(b) (i) With a neat block diagram, explain the lossless predictive coding approach for image compression. (8)

(ii) Explain in detail any two boundary representation schemes with illustrative examples. (8)

15. (a) (i) Explain the Image analysis system with neat block diagram. (8)

(ii) Explain Hit or Miss Transform for shape detection. (8)

Or

(b) (i) Explain the use of semantic network with example. (4)

(ii) Explain the basic components of Expert system with neat diagram. (6)

(iii) Explain the Expert system model for airport interpretation problem. (6)