

Total number of printed pages – 4

B. Tech  
CPEC 5402

Seventh Semester Examination – 2008

DIGITAL IMAGE AND SPEECH PROCESSING

Full Marks – 70

Time – 3 Hours

Answer Question No. 1 which is compulsory  
and any **five** from the rest.

The figures in the right-hand margin  
indicate marks.

1. Answer the following questions : 2×10
- (i) What do mean by Gray level resolution ?
  - (ii) What is histogram based processing ?
  - (iii) How a discrete time signal is different than a digital signal ?

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- (iv) How wavelet transform is different from Fourier transform ?
- (v) What is Image Morphology ?
- (vi) What are the advantages of FIR systems over IIR systems ?
- (vii) Give the mathematical models of digital image and digital speech.
- (viii) What is image blur ? How it can be removed ?
- (ix) What is adaptive quantization ?
- (x) Write the principle of a speaker recognition system ?
- 2. (a) Explain different image formation models. 7
- (b) What are the components of an Image Processing system ? 3
- 3. Explain how image enhancement is achieved using Gray level transformation and using logical operations. 10

- 4. Describe the image degradation model using a neat diagram. Explain different image restoration techniques. 10
- 5. (a) Suppose a digital image is subjected to histogram equalization. Show that the second pass of histogram equalization will produce the same result as the first pass. 5
- (b) How DFT is different from DTFT ? Describe the properties of DFT. 5
- 6. Explain different time domain methods of speech processing. 10
- 7. (a) What are the basic principles of Linear Predictive Analysis ? 7
- (b) Give a block diagram for speech production. 3

8. Write short notes on the following : 2.5×4

- (i) Color image processing
- (ii) Image Compression
- (iii) Homomorphic Filtering
- (iv) Multispectral Image Processing.

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