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Total No. of Pages : 02

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M.Tech.(ECE) (Sem.–2)

DIGITAL SPEECH & IMAGE PROCESSING

Subject Code : EC-508

Paper ID : [E0567]

Time : 3 Hrs. Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

Q1. Explain the FIR filter design methods with examples.

Q2. Explain human speech production in detail with the help of diagram and explain how resonance can be measured?

Q3. a) Explain the different components of music theory.

b) Explain speech synthesis with the help of neat diagram.

Q4. What is the image segmentation? What are the applications of image segmentation?

Q5. a) What is the general expression for intensity transformation? Explain the three basic types of intensity transformation functions used for image enhancement.

b) Explain with example :

i) Neighbors of pixel.

ii) Connectivity.

Q6. a) Show that the DFT of the discrete function $f(x,y)=\sin(2\pi u_0 x + 2\pi v_0 y)$ is

$$F(u,v) = \frac{j}{2}[\delta(u + Mu_0, v + Nv_0) - \delta(u - Mu_0, v - Nv_0)]$$

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b) Compute the 2D DFT of 4x4 grayscale image given below :

$$F(m,n)= \begin{vmatrix} 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 \end{vmatrix}$$

Q7. What do you understand by image compression? Discuss the DCT and KLT methods for image compression.

Q8. a) Why image filtering is done in frequency domain?

b) Explain mathematically Wiener filtering in image processing.

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