Registration no: ☐☐☐☐☐☐☐☐☐☐

Total Number of Pages: 02

8th Semester Regular / Back Examination 2016-17
DIGITAL IMAGE PROCESSING
BRANCH(S): AEIE, BIOMED, CSE, EIE, IEE, IT, ITE, TEXTILE
Time: 3 Hours
Max marks: 70
Q.CODE: Z148
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions:**   **(2 x 10)**
- **a)** What is grey level slicing?
- **b)** Is there any advantage of frequency domain filters over spatial filters? Why?
- **c)** Why power law transformation is more versatile than log transformation?
- **d)** What is aliasing in image domain?
- **e)** What is the function of Gaussian High pass filter?
- **f)** What is a structuring element?
- **g)** Differentiate between image Enhancement and Restoration.
- **h)** What is a Median filter?
- **i)** What are the effects of applying Butterworth low pass filter to the noisy image?
- **j)** What is simultaneous contrast?

Q2 **a)** Explain the properties of 2D Fourier Transform.   **(5)**

   b) Find the DCT Transform and its inverse for the given 2X2 image [3 6 ; 6 4]   **(5)**

Q3 **a)** Construct a Huffman code for the source symbol as given in the table.   **(5)**

Source symbol	A1	A2	A3	A4	A5	A6
Probabilities	0.1	0.4	0.06	0.1	0.04	0.3

   Compute its Entropy.

   b) What do you mean by Histogram Equalization? Describe the process of Histogram Equalization with illustrating a 3 bit (8 intensity level) image into Histogram processing.   **(5)**

Q4 Explain the concept of colour image processing fundamentals. Also **(10)** describe the converting of colours to different models.

Q5 a) Discuss the limiting effect of repeatedly applying a 3 X 3 low pass spatial **(5)** filter to a digital image. You may ignore border effects.

b) Describe how homomorphic filtering is used to separate illumination and **(5)** reflectance components?

Q6 a) Let the RGB values of a point be (0.4,0.6,0.8).Find the HSV equivalent of **(5)** RGB.Also verify whether the original point can be obtained by the inverse transform from HSV to RGB.

b) Discuss different categories of noise models with noise function. **(5)**

Q7 a) What is the importance of median filter? Discuss the advantages of **(5)** Adaptive median filter with an example.

b) What do you mean by multi resolution expansion? Why it is used in image **(5)** processing? Explain with an example.

Q8 **Write notes on (any two):** **(5 x 2)**

a) Unsharp Masking
b) Zooming and Shrinking Digital Images
c) Properties of Opening and Closing Operations

d) Wavelet transformation