B.E. Electronics & Communication/Telecommunication Engineering (Model Curriculum)
Semester - VIII

8BEET05A / ET802M - Digital Image and Video Processing

P. Pages : 3 **GUG/S/23/14355**

Time : Three Hours * 3 0 4 3 * Max. Marks : 80

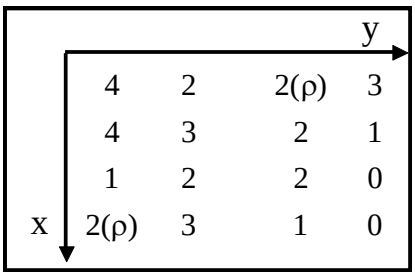
Notes : 1. All questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Define an image. List out and explain the various areas of applications of image processing. **8**

b) Describe GIF file format. What are the important features of GIF file format? Also mention advantages and disadvantages of GIF file format. **8**

OR

2. a) A 4 x 4 subimage is shown in fig. Let V={2, 4} and compute the D_4, D_8 and D_m distances between p and q. **8**



b) Define the following terms: **8**

i) Image ii) Resolution

iii) Pixel and iv) Digital image

3. a) Define Histogram. What is Histogram Equalization? Write the procedure to perform Histogram Equalization. **8**

b) Explain any two of the following Non-linear gray level transformation techniques. **8**
i) Thresholding.
ii) Logarithmic transformation
iii) Power law transformation

OR

4. a) Compute the median value of the marked pixels shown in fig. using a 3 x 3 mask. **8**

$$\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & (128) & (24) & (172) & (26) & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$$

b) Analyze 3 x 3 mean filter and in the frequency domain and prove that it behaves as a low pass filter. **8**

5. a) Explain about RGB color model. **8**

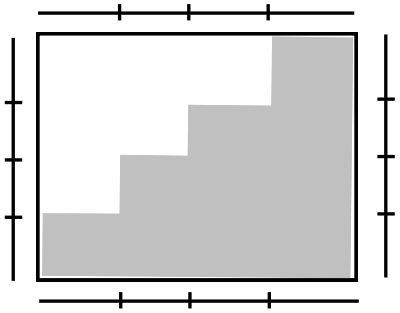
b) Explain pseudo color image processing and pseudo color coding approaches. **8**

OR

6. a) Explain the procedure for converting colors from RGB to HIS and vice versa. **8**

b) Describe the histogram based processing in color images. **8**

7. a) Segment the following image using region split and merge technique. Draw quad tree representation for the corresponding segmentation. **8**



b) Define image segmentation. Give classification. Explain region based segmentation. **8**

OR

8. a) Consider the image segment. **8**

$$t\begin{bmatrix} 128 & 128 & 128 & 64 & 64 & 32 & 32 & 8 \\ 64 & 64 & 128 & 128 & 128 & 8 & 32 & 32 \\ 32 & 8 & 64 & 128 & 128 & 64 & 64 & 64 \\ 8 & 128 & 128 & 64 & 64 & 8 & 64 & 64 \\ 128 & 64 & 64 & 64 & 128 & 128 & 8 & 8 \\ 64 & 64 & 64 & 128 & 128 & 128 & 32 & 32 \\ 8 & 128 & 32 & 64 & 64 & 128 & 128 & 128 \\ 8 & 8 & 64 & 64 & 128 & 128 & 64 & 64 \end{bmatrix}$$

Draw the histogram. Based on the histogram, segment the image into two regions.

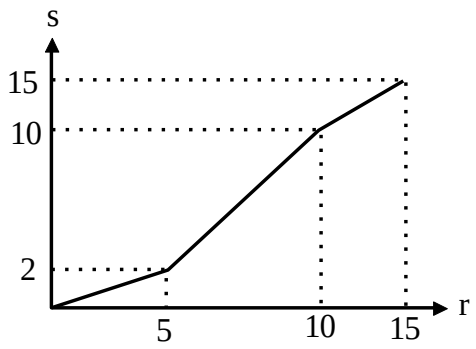
b) How will you detect isolated points in an image? Give the masks used for detecting horizontal, vertical and $\pm 45^{o}$ slanting lines. **8**

9. a) Write video frame classification and various digital video formats. **8**

b) For the digital image shown in fig, perform following operations. **8**

$$\begin{bmatrix} 10 & 2 & 13 & 7 \\ 11 & 14 & 6 & 9 \\ 4 & 7 & 3 & 2 \\ 0 & 5 & 10 & 7 \end{bmatrix}$$

i) Contrast stretching as per the characteristics given below.



ii) Draw the histogram of original and new image.
iii) Equalize the histogram.

OR

10. a) What are the different motion estimation criteria for video signal? Explain phase correlation method for motion estimation. **8**

b) Explain in detail optical flow equation for motion estimation in video signal. **8**

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