(e) Perform the image substraction and image Averaging on the given images:

$$a = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix}, b = \begin{bmatrix} 2 & 3 & 5 \\ 4 & 2 & 4 \\ 1 & 2 & 1 \end{bmatrix}.$$

(f) What do you mean by Gaussian Law pass and High Pass Filters?

3. Attempt any **Two** of the following questions: **6 x 2 = 12**

(a) A 4x4, 4 bits per pixel original image is given by:

$$\begin{matrix} 10 & 12 & 8 & 9 \\ 10 & 12 & 12 & 14 \\ 12 & 13 & 10 & 9 \\ 14 & 12 & 10 & 12 \end{matrix}$$

(i) Apply the histogram equalization in the image by reundring image pixel to integers.

(ii) Sketch the histogram of the original image.

(b) Explain the Gaussian low-pass filter.

(c) Discuss the following (any **Two**):

(i) Fourier transformation **(ii)** Frequency domain

(iii) High-pass filter

4. Attempt any **Two** of the following questions: **6 x 2 = 12**

(a) Explain about image restoration using mean square error filtering.

(b) Explain the blind image restoration.

(c) Discuss the degradation of image with applications.

5. Attempt any **Two** of the following questions: **6 x 2 = 12**

(a) Explain the procedure of converting color from RGB to HSI.

(b) Discuss the color segmentation.

(c) Write the morphological algorithm using in boundary extraction.

Roll No. | | | | | | | | | | |

B.C.A.

FIFTH SEMESTER EXAMINATION, 2017-18

IMAGE PROCESSING

Time : **3 Hours** Max. Marks : **60**

Note : **(i)** Attempt **ALL** questions.
(ii) Choices are given in each question set.

1. Attempt any **Four** of the following questions: **3 x 4 = 12**

(a) Write the components of Image processing system.

(b) Discuss the image model and also write its applications.

(c) Define the sampling and quantization of Image.

(d) Derive the histogram equalization $S_k = \sum_{j=0}^{k} p(rj)$ on given image

$$a = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix}.$$

(e) Explain the virtual perception of Image.

(f) Discuss the image transformation with suitable example.

2. Attempt any **Four** of the following questions: **3 x 4 = 12**

(a) Explain the grey level transformation and write its applications.

(b) Explain the spatial filtering with example.

(c) Explain the following (any **Two**):

(i) Sharpening filter **(ii)** Homomarphic filter

(iii) Laplacian filter

(d) Explain the correspondence between filtering in spatial and frequency domain.