Menofia University	Subject: Image Processing
Faculty of electronic eng.	Date: 24/06/2019
Computer Science And Eng dept.	Time : 3 Hours
3RD year – 2nd semi stare	Final Term Exam

Answer The Following Questions

Question 1:

A. What is meaning of image acquisition? With drawing a schematic view, illustrate the image acquisition, formation and digitization process.
B. Explain the two most common ways of storing color image contents.

Question 2:

A. Distinguish between spatial and Transform Domains.
B. Explain the different spatial Domain Fillers.
C. What is the main difference between convolution and correlation.
D. Obtain the final result of the ID convolution operation of the original image. A={0,1,2,3,2,1,0} and convolution mask B={-1,0,1}.

Question 3:

With giving an example of each the following geometric operations:

i. Mapping function.
ii. Interpolation Methods.

Question 4:

A. What is the meaning of affine transformation.
B. Given a rectangle shape vertices A(-40,20), B(40,20), C(40,-20), D(-40, -20),

What is the new vertices after rotate clockwise the rectangle by 30° and shear by a factor [5,10].

Note that (sin 30° = 0.500, cos 30° = 0866).

Question 5:

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It is desired that the original histogram is changed to approach the histogram corresponding to the table below.

z_k	$\hat{p}(z_k)$
0	0.27
1/7	0.16
2/7	0.19
3/7	0.16
4/7	0.11
5/7	0.06
6/7	0.03
1	0.02

(a) Which pixels predominate in the original image, dark or bright? Explain.

(b) Assuming the histogram modification will be successful, what will be the probable effect of this modification on the original image?

(c) Equalize the original histogram using the function $s = T(r)$.

(d) Obtain the function $v = G(z)$ and its inverse.

(e) Plot the most relevant histograms: original, desired, equalized, and resulting.

(f) Fill out the table below with the final values for n_k and $\hat{p}(z_k)$ for the eight values of z_k, comparing with the desired values and explaining possible differences.

z_k	n_k	$\hat{p}(z_k)$
0		
1/7		
2/7		
3/7		
4/7		
5/7		
6/7		
1		