FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SCHOOL OF PHYSICAL SCIENCES

DEPARTMENT OF GEOGRAPHY

SECOND SEMESTER 2014/2015 SESSION UNDERGRADUATE EXAMINATION

COURSE CODE: REM324P (3 Units)

COURSE TITLE: Advanced Digital Image Processing

INSTRUCTIONS: Answer question one and any other three. Credit will be given for the use of specific examples and relevant illustrations.

TIME ALLOWED: 3 Hours

1. a). Given the Kernels default for a 3x3 Mean filter (figure 1); a 3x3 Gaussian filter (figure 2) and a raw Image (figure 3) movefig 1 and 2 over the raw image separately to generate a new image
   b). Explain the outcome image

1/9	1/9	1/9
1/9	1/9	1/9
1/9	1/9	1/9

Figure 1 Kernel Default for a 3x3 mean filter

1/180	4/180	1/180
4/180	160/180	4/180
1/180	4/180	1/180

Figure 2 Kernel Default for a 3x3 Gaussian filter

25	27	32	20	21
23	27	19	25	22
27	26	24	26	22
23	**25**	**26**	**30**	**27**
19	22	28	32	28

Figure 3 Raw Image

2. a. What is a Digital image?

b. Explain the benefits of using a digital image over an Analogue image

c. Image processing is application specific, explain.

3. Expatiate on any four of the following:

a. Principal Components Analysis (PCA)

b. Contrast Stretching

c. Histogram Equalisation

d. Image Auto Scaling

e. Hue Saturation and Intensity (HSI)

4. a. What is Image enhancement? Using specific examples, explain the three types of image enhancement techniques.

b. The business of contrast enhancement is histogram modification. Discuss?

5 a. Identify and explain any two types of filters

b. Explain filtering as a consequence of convolution box movement over a digital image or group of pixel.

6. Enumerate and explain the sources of errors in remote sensing imageries.