FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF PHYSICAL SCIENCES
DEPARTMENT OF GEOGRAPHY
SECOND SEMESTER 2015/2016 SESSION UNDERGRADUATE EXAMINATION

**COURSE CODE**: REM324P (3 Units)

**COURSE TITLE**: Advanced Digital Image Processing Time: 2hrs 30

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

1. Given in figure 1 is a 2 dimensional correlation mono plot of the coefficient of the first two PCA component for all the possible bands of Landsat 8 acquired over a part of Nigeria during the dry season:
a) Construct a table of correlation matrix angle between the various bands
b) Using the correlation mono plot, discuss the relationship between band 1 and other band sets stating.
c) Which of these bands will give a wrong inference on the 2 dimensional correlation mono plot and give reason(s) for this.
d) Identify all the band (s) that will give a superior inference on the 2 dimensional correlation Mono plot and give reason(s) for this
e) Which of the bands may be well capture or explained in the 3rd PCA and why?
f) Explain the implication of the variance for PCA1 and PCA2

2.Dicusss the concept of cluster analysis and its ablilty to facilitae the implementation of image spectral grouping.

3. Differentiate between the following concepts in Digital Image Analysis.

a) Soft classifier and Hard classifier
b) Supervised and Unsupervised classification
c) Lossless and Lossy compression of a look up table
d) Distance Based Vegetation Index and Slope Based Vegetation index
e) Land Cover map and Land Use map

4 a Explain the concept of digital change detection in remote sensing
b. Discuss the various ways of viewing a change detection problem in digital remote sensing.

5. Given in figure 2 is a type of image classifier
a) Identify the type and the name of classifier
b) Explain, in detail the concept of Spectral grouping by the classifier scheme in (1a)
c) Highlight the pros and cons of the classifier scheme in (1a)

6. Using any case study of the class presentations, discuss using hypothetical facts and figures the concept and the application of Principal Component Analysis (PCA)

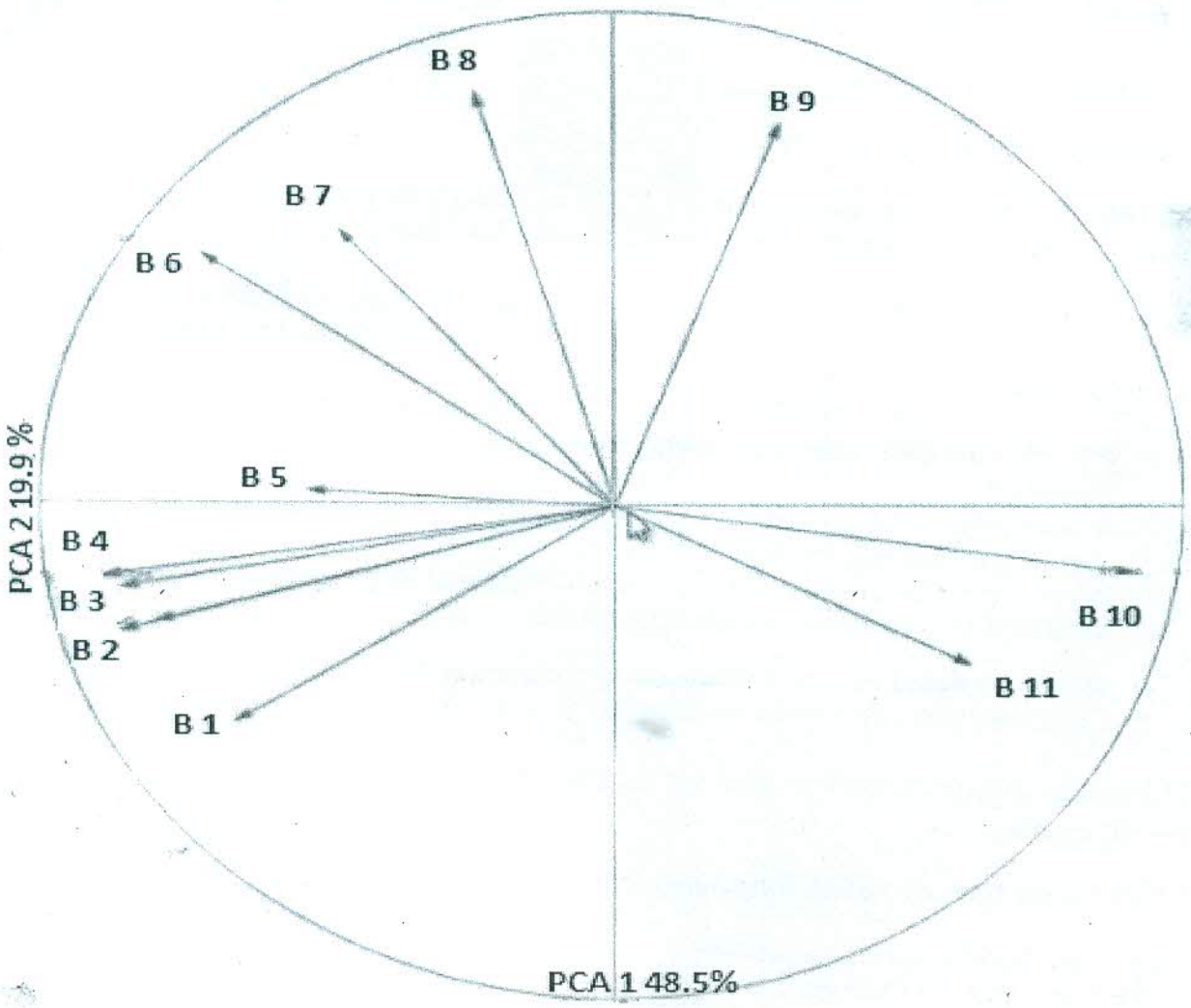


Figure 1

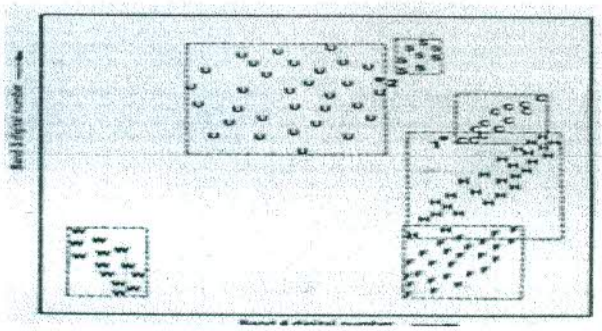

Figure 2