UNIVERSITY
OF
JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF GEOLOGY

MODULE CODE	**APG2A01**
MODULE NAME	**Applied Geological Maps and Geospatial Techniques**
CAMPUS	**APK**
EXAM	**July 2014 (Supplementary Exam)**

Date	**July 2014**
Assessor(S)	**Mrs Lauren Blignaut & Dr Herman van Niekerk**
Internal Moderator	**Prof Axel Hofmann**
External Moderator	
Duration	
Marks	**180**

Number of pages	**4**
Instructions	**Answer all the questions**

SECTION 1   **Total marks: 90**

1.   State whether the following are true or false.

      a)   The dip angle of a tabular rock body is at 90 degrees to the strike of the rock body.   (1)

      b)   Compasses for use in South Africa should be calibrated for magnetic zone 3. (1)

      c)   An back azimuth is measured at 90 degrees from an azimuth.   (1)

      d)   On compasses marked in Grads, 90 degrees equals 100 Grads.   (1)

      e)   Large scale maps typically have scales larger than 1:1 000 000.   (1)

2.   Fill in the missing words or phrases. Please write down the words in the correct order for each statement

      a)   A graphic scale or bar scale is used to convert _____ distances measured on the map _____ directly into ground distances.   (2)

      b)   A representative fraction scale (RF) = _____ divided by _____   (2)

      c)   There are _____ centimeters in 10 kilometers.   (1)

      d)   The map datum to be used on global positioning systems units in South Africa is _____.   (1)

      e)   With the use of the sliding ruler method for determining coordinates from a map, or plotting coordinates on a map, the accuracy of angular distance determination can be increased by increasing the _____. (1)

      f)   The UTM grid reference system divides the surface of the Earth into _____ zones, each spanning _____ degrees,, starting at the _____ and proceeds _____.   (4)

      g)   The MGRS grid reference system uses the _____ zones of the UTM grid reference system, but subdivides it into horizontal bands spanning _____ degrees of _____.   (3)

3.   Give the generic map symbol and map colour associated with the following rock types

      a)   Granite   (2)
      b)   Basaltic lava   (2)
      c)   Coarse grained conglomerate   (2)
      d)   Diamictite   (2)
      e)   Limestone   (2)

4.   Make a sketch indicating how compass bearing can be used to bypass an obstacle in the field while navigating between two points.   (8)

5.   Explain in detail how you would orientate a map if you do not have a compass available Use sketches to supplement your explanation.   (15)

6.   Explain how you would calculate your pace length and name four factors that will affect your pace length.   (8)

7.   Explain in detail the compass technique of "compass resection" and how it can be employed in the field while mapping. Use sketches to supplement your explanation.   (20)

8)   Make a sketch of a hypothetical map that explain the relationships between two tabular rock units that are in contact with each other in a valley. Note that these rock units dip in the same direction as what the water will flow in this valley. Indicate on this map the contact between these two rock units as well as contour lines representing the topography of the valley. Also indicate the following on the map:

        a) Strike lines
        b) Dip direction of the beds
        c) Strike of the beds   (10)

SECTION 2   **Total marks: 90**

1. Using diagrams, explain how map projections are generated. Discuss which type of map projection is most often used in GIS and describe in detail how this map projection is generated, and what the advantages and disadvantages of this projection are   **(20 marks)**

2. What are the central elements to a GIS database and what type of data is stored in each element? **(10 marks)**

3. What is spatial resolution in remote sensing, how is it determined and what is the relationship between spatial resolution and pixel size in a remotely sensed image?

(20 marks)

4. Explain the difference between Active and Passive remote sensing and the advantages and disadvantages of these different techniques   **(15 marks)**

5. What is spectral resolution and explain the role of spectral resolution in remote sensing

(15 marks)

6. What is the Landsat program, what type of data does is acquire and how can this data be used in GIS   **(10 marks)**