UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF GEOLOGY

MODULE CODE	**GLG3B10**
MODULE NAME	**Historical Geology**
CAMPUS	**APK**
EXAM	**December 2015**

Date **2 December 2015**

Assessor(s)

- Lecturer A. Hofmann
- External Moderator Z. Jinnah (Wits)

Duration **3 Hours**

Marks **180**

Number of pages: **5 pages**

Instructions: **Answer all the questions.**
Hand in the question paper.

1. Provide concise definitions for the following terms **(20)**:

- microbial mat
- banded iron formation
- stromatolite
- TTG
- kimberlite
- red bed
- Kibaran
- Hadean
- greenstone
- diamictite

2. With the aid of suitable diagrams outline the formation of the Earth and discuss its composition **(20)**.

3. Shown is a part of the geological map of South Africa. Where would you find the following geological features? Place a letter corresponding to the feature directly on the map **(10)**.

A. The oldest rocks of Africa.
B. The oldest glacial deposits.
C. The world's largest Mn deposits.
D. 2055 Ma old granites.
E. The Limpopo Belt.
F. The Pilanesberg Complex.
G. Granites of the Cape Suite.
H. Ecca Group turbidites.
I. Rhyolites of the Karoo igneous province.
J. Ammonite fossils.

4. Discuss in chronological order (use bullet points) the evolution of life from the Archaean to the modern day using examples from the southern African palaeontological record. **(20)**

5. Write a short essay on the Witwatersrand Supergroup. **(20)**

6. Which mineral commodities (minimum 5) occur in the Transvaal Supergroup of South Africa and in which stratigraphic units do they occur? Place your answers in the table below. **(10)**

	Type of commodity	Stratigraphic unit
1		
2		
3		
4		
5		

7. Provide a sketch of southern Africa showing the distribution of the various Archaean cratons (Kaapvaal, Zimbabwe, Congo cratons) and the different Proterozoic and Phanerozoic orogenic belts. Also provide information on the timing when these belts formed. **(20)**

8. Which stratigraphic units in southern Africa contain glacial deposits? When did they form? Place your answers in the table below. **(15)**

Stratigraphic unit	Age of deposition

9. Name (a) the likely cause of the Permo-Triassic mass extinction **(2)**, (b) the timing of the event **(1)** and (c) the evidence of the event as preserved in the geological rock record of South Africa **(2)**. **(5 total marks)**

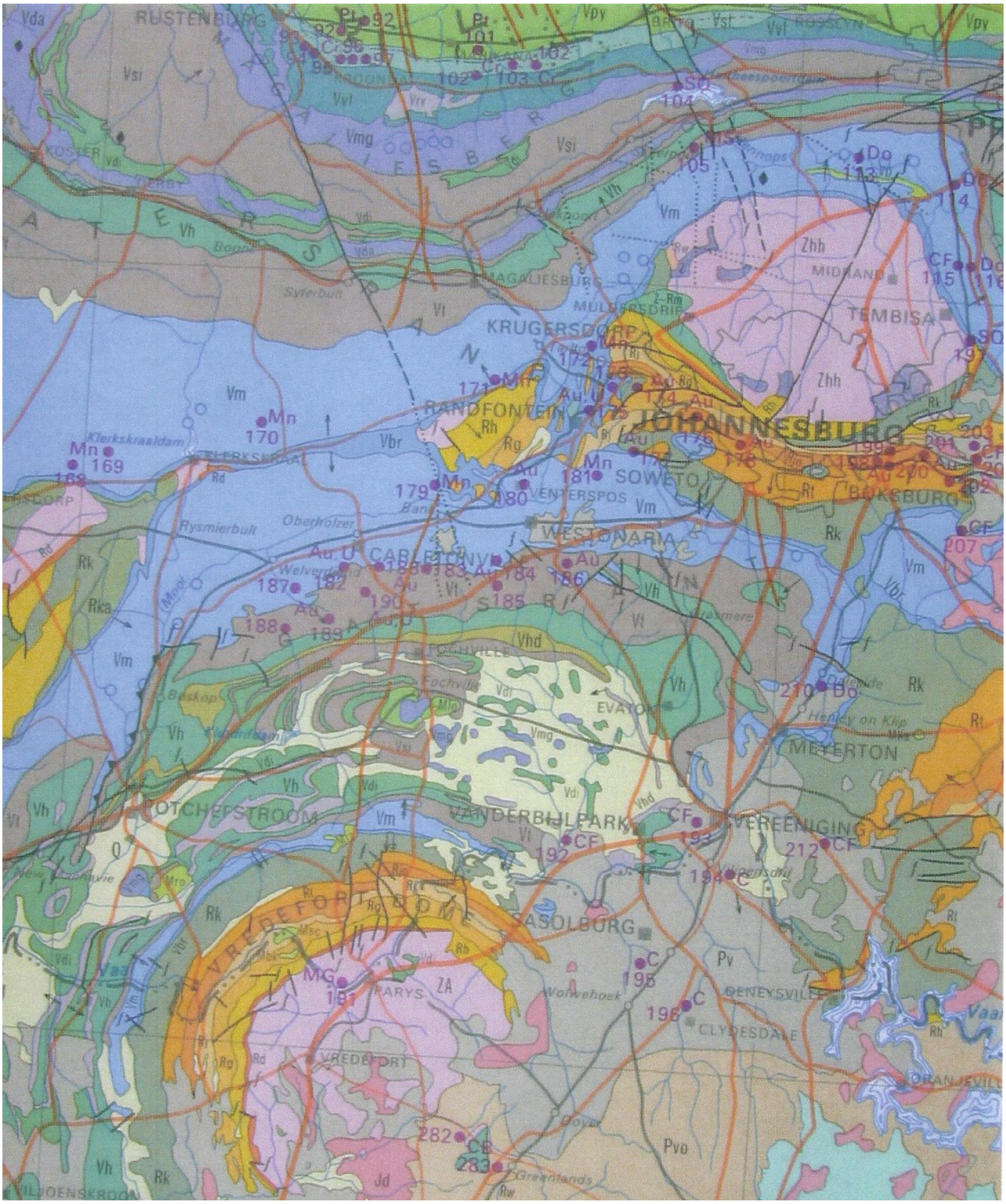
a) _____

b) _____

c) _____

10. Write short notes on meteorites, their origin and significance in Earth and solar system evolution. **(10)**

11. Using the map provided draw a SKETCH SECTION from the middle of the Vredefort Dome, through the Johannesburg Dome and into the Bushveld Complex.
On the section make sure you show the important relationships between Kaapvaal Craton basement, the Dominion Group, Witwatersrand Supergroup, Ventersdorp Supergroup, Transvaal Supergroup and the Bushveld Complex. Label the section and where possible provide radiometric ages of the units shown. Also add an approximate scale. **(30)**


RUSTENBURG
MAGALIESBURG
MULDERSDRIP
KRUGERSDORP
RANDFONTEIN
JOHANNESBURG
MIDRAND
TEMBISA
SOWETO
VENTERSPOS
WESTONARIA
BOKSBURG
KLERKSKRAAL
FOCHVILLE
EVATON
MEYERTON
POTCHEFSTROOM
VANDERBIJLPARK
VEREENIGING
SASOLBURG
PARYS
VREDEFORT
DENEYSVILLE
CLYDESDALE