FACULTY OF SCIENCE

FAKULTEIT NATUURWETENSKAPPE

DEPARTMENT OF GEOLOGY

MODULE **GLG2A01** METAMORPHIC ROCKS

CAMPUS **APK**

EXAM **JULY EXAM 2014**

DATE **SESSION**

ASSESSOR(S)

INTERNAL MODERATOR **PROF. H. MOURI**

EXTERNAL MODERATOR **B. SMITH**

DURATION 3 HOURS **MARKS 90**

NUMBER OF PAGES: 2 PAGES

INSTRUCTIONS: ANSWER ALL THE QUESTIONS

REQUIREMENTS: Please answer on the exam sheet for all the questions.

Question 1 (30/90):

Discuss the difference(s) between the different types of metamorphism listed below and provide examples from South Africa where necessary.

1.1) Regional Metamorphism

1.2) Contact Metamorphism

1.3) Shock Metamorphism

Question 2 (30/90)

2. 1) What is the difference between confining (hydrostatic P) and directed pressure. Explain and illustrate with examples.

2. 2) What is the rate at which temperature changes with depth in the earth under each of the following geological settings?

a) Within the stable interiors of old continents.

b) Regions with high surface heat flow, such as areas of active volcanism or mantle **upwelling beneath thinned continental crust.**

2.3) List at least 2 minerals and provide their chemical formulae that are typical of the rock 'Eclogite'. Which type of metamorphism is responsible for the formation of this rock and where does it occur?

2.4) Which type of metamorphism is very common under mid-ocean ridge settings and which type of rock is produced? Explain how this metamorphism takes place.

2.5) List at least 2 minerals with their chemical formulae that are typical of high pressure, low temperature metamorphic rocks. Discuss the geological setting under which this type of metamorphism takes place.

Question 3 (30/90):

Consider a sedimentary sequence composed of shale, limestone and sandstone intruded by an igneous body (magma).

a) Indicate the type of metamorphism we are dealing with in this situation.
b) What is affecting the size and the shape of the area affected by this intrusion?
c) Indicate what are the resulted metamorphic rocks. Discuss the textures and possible mineralogical composition of each rock.
d) Indicate the field on a P-T diagram where this type of metamorphism can occur.