Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 Level 1st Semester Examination – June/July 2017

Uva Wellassa University

MRT 377-2 Geochemistry

Part II: Answer in separate answer book provided

1.

(a) Discuss Big Bang theory in relation to the evolution of solar system.

(b) Briefly state the types of nucleosynthesis and their relevance to the formation of elements.

(c) Briefly outline the elemental composition of the earth in different zones.

(d) Comment on Goldschmidt classification of elements.

2.

(a) State different zones of Earth's atmosphere.

(b) State ozone formation mechanisms in different atmospheric zones.

(c) What are secondary and primary atmospheric pollutants? Discuss their origin.

(d) Why is CO_2 increasing in the atmosphere on a yearly basis?

3.

(a) Discuss uses of stable isotopes in geochemistry.

(b) Discuss the meaning of following abbreviations:
(i) SMOW (ii) PDB

(c) The pyroxene and plagioclase feldspar in a gabbro have $\delta^{18}O$ values relative to SMOW standard of 7 ‰ and 7.77 ‰ respectively. Calculate the absolute $^{18}O/^{16}O$ ratios of these two minerals.

(d) Discuss the variations of δD and $\delta^{18}O$ values in compartments of water cycle.

4.

(a) State Pauling bond valence rules.

(b) Discuss the difference between triochtahedral and diochtahedral structures.

(c) Employ Pauling's electrostatic valence principle and show that the residual charge on
O^{2-} bound to Si^{4+} in tetrahedral coordination can be satisfied by two Al^{3+} atoms in octahedral coordination or by three Mg^{2+} atoms in octahedral coordination.

(d) Discuss biological importance of following elements: Se, F and I.