The 19/01/2025

Corrigé type :

Geology :

Q1 / (08 pts) :

The Earth is divided into three main units separated by two major discontinuities:

1) What are the three units? Crust, mantle and core

2) What are these discontinuities? Two important discontinuities separate the crust, mantle and core:

1) The Mohorovicic discontinuity (MOHO) which marks a density contrast between the Earth's crust and the mantle.

2) The Gutenberg discontinuity which also marks a significant density contrast between the mantle and the core.

3) What is the composition of each unit (Lithological and chemical)?

1) The crust is formed mainly of sedimentary rocks, metamorphic rocks and igneous rocks with a granitic continental crust and a basaltic oceanic crust;

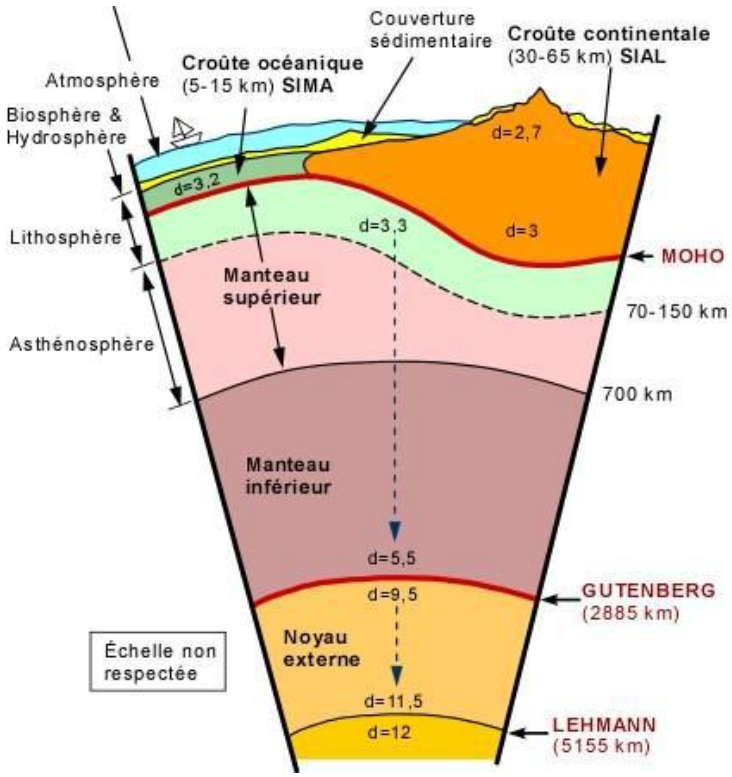
2) The mantle is composed of basic and ultrabasic igneous rocks, The plastic layer of the upper mantle is called the asthenosphere, while together, the two solid layers above it, i.e. the solid layer of the upper part of the upper mantle

3) The core, it is mainly formed of alloy and metallic meteorites; These molecular compositions show a dominance of:

¬Si and Al in the crust (SiAl)

¬Si and Mg in the mantle (SiMa)

¬Fe and Ni in the core (NiFe)

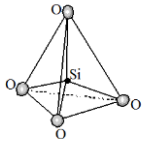
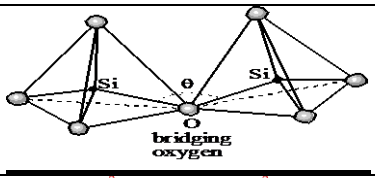
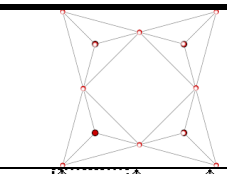
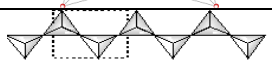
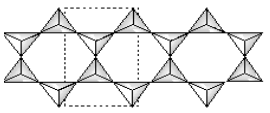
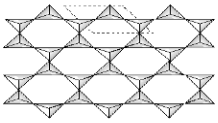
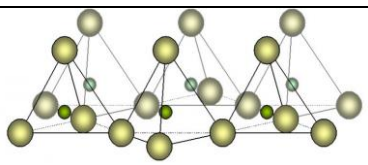


Q2 / (09 pts) :

• What are the most important minerals?

1) Silicates (SiO4): 90% of minerals are silicates
2) Carbonates (CaCO3).
3) Native elements: gold (Au), sulfur (S), diamond (C).
4) Sulfides (S): pyrite (FeS) iron ore.
5) Halides (Cl, Br, F, I) Chlorides: halite (NaCl): rock salt sylvite (KCl): potash.
6) Oxides (O): Metallic: magnetite (FeO4) iron ore that deflects the compass needle.
7) Sulfates (SO4): gypsum (CaSO4.2H2O) plaster manufacturing
8) Phosphates (PO4)

Give the structural schematization and chemical formulation of silicate structures?

Family	Structure	Formula
NESOSILICATES		SiO_4
SOROSILICATES		Si_2O_7
CYCLOSILICATES		Si_nO_{3n}
INOSILICATES (chaîne simple)		$(SiO_3)_n$
INOSILICATES (chaîne double)		(Si_4O_{11})
Phyllosilicates		$(Si_2O_5)^{-2}$
Tectosilicates		SiO_2

Q3 / (03 pts) :

Show in a table the different stages of the First Geological Era.

ERA	Stage
Primary Era Paleozoic	• Permian
	• Carboniferous
	• Devonian
	• Silurian
	• Ordovician
	• Cambrian