

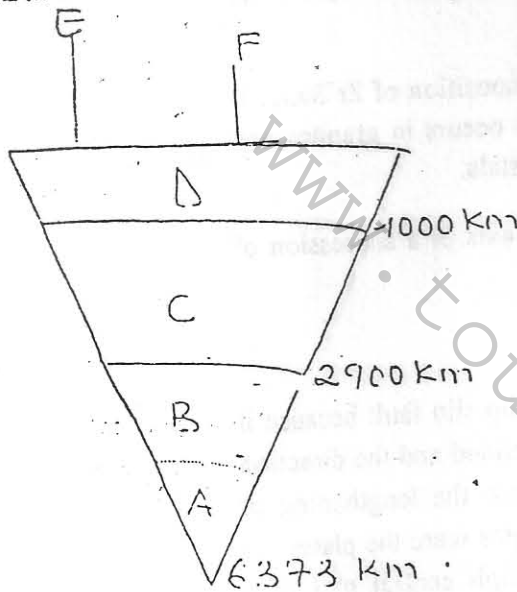
SERIES GEOLOGY, COEFFICIENT FOUR

MAJOR PAPERS GEOLOGY

TIME: 3 HOURS

INSTRUCTION: Give concise answers to the following questions

1) The figure below shows the composition of the earth (after Bott 1982) with depths from surface in Km. Sedimentary rocks, granite, basalt, peridotite and heavy metals present in the earth show mean mass density of 2.3, 2.7, 2.8, 4.0 and 8 respectively.



(1a) Give the correct name of A, B, C, D, E and F in the figure below (0.25mk x 6)

(b) Which part(s) of the figure support(s) directly the biosphere? (0.5mk)

(c) Classify A, B, C, D, E, F in order of increasing mass density. (0.5mk)

(d) Give the composition of each part named (A, B, C, D, E, F) in question 1a each part of question 1a is composed of one or more rock types or components mentioned above. (2mks)

(e) Give two examples of heavy metal present in the core of the earth. (0.25mks X 2)

(2) A volcano is essentially a conduit between the earth's surface and a body of magma within the crust beneath it. During an eruption lava is extruded from the volcanic vent and gases contained in the lava are separated from it. They may be discharged quietly if the lava is very fluid and gas content small but commonly they discharge with explosive violence.

(a) Name the two of conduit through which magmas may reach the surface. (1mk)

- (b) Give the name of 4 volatile products accounted in volcanic eruption. (1mk)
- (c) What is the pyroclastics product used for making "hydraulic cement" (1mk)
- (d) Mount Cameroon is the an active volcano located in the south west province. Give the name of volcano located in the coastal province and also that of a volcano located in the west province of Cameroon. (1mk)
- (e) Give the data (month and year) of the two most recent receipt eruptions Cameroon? (1mk)
- (3) Minerals are the solid constituents of all rocks, igneous, sedimentary, and metamorphic and occur as crystals. Properties such as colour, lustre, from hardness fracture and tenacity can be used to identify different mineral.
- (i) Under which circumstance does the mineral quartz which is usually colourless be white, gray, pink or yellow? (1mk)
  - (ii) What is the luster of the mineral quartz? (0.5mk)
  - (iii) What is the form of mineral quartz in a sample of granite? (0.5mk)
  - (iv) Give the name of the hardest and the softest mineral on the Mohs scale of hardness. (1mk)
  - (v) What are the main properties used to distinguish mica from pyroxene under the microscope. (0.5mk)
  - (vi) Name three minerals that are malleable. (1.5mks)
- (c) What is the property corresponding to the malleability of a mineral? (0.5mk)
- (4) Sediments form a relatively thin surface layer of the earth's crust, covering the igneous or metamorphic rocks that underlie them. The classification of sedimentary rock is a function of the origin and the size of grains of raw material from which the sedimentary rocks have been formed in a given environment of deposition.
- (i) Give sizes (in mm) of grains of sediments defined as sand, silt and clay. (1.5mks)
  - (ii) Give the names of the consolidated detrital (terrigenous) rocks composed mainly of sand, silt and clay. (1.5mks)
  - (iii) Explain the geological term "Rudaceous" used to classify some terrigenous sedimentary rocks. (1mk)
  - (iv) What is the geological term used for terrigenous sedimentary rocks composed mainly of sand? (0.5mk)

a) A = solid core, B = Fluid core, C = lower mantle, D = upper mantle, E = oceanic crust, F = continental crust.

b) E and F.

c) F - E - D - C - B - A.

d) A = Fe, B = Ni, Fe, C = Ni, Fe, D = Si, Al, E = Si, mg (SIMA), F = Si, Al (SiAl).

e) Ni and Fe

2a) fissures, veins -

(b) CO<sub>2</sub>, SO<sub>2</sub>, NH<sub>3</sub>, CH<sub>4</sub>, HF.

(c) Pouzolane (volcanic cinder)

(d) Costal province = mount Cameroon, West province = mount Bamboutos.

(e) 1999 (28/03 to 19/04), 2000 (28/05 to 23/07)

(3i) when it is contaminated by impurities.

(ii) Vitreous

(iii) Chalcedony (can be recognized in the rock as hard glassy grains of irregular shape with no cleavage).

(iv) Softest = Talc, Hardest = diamond.

(v) Cleavage planes (pyroxene = 2 cleavage, Micas = 1 perfect cleavage).

(vi) Native gold, Cu, Au, Hg.

(vii) Tenacity

(4i) sand - 2- 1/16mm, Silt = 1/16 - 1/256mm, Clay = <1/256 mm

(4ii) Sand = sandstone, clay = shale, silt = siltstone

(4iii) Rudaceous refers to coarse detrital rocks characterize by the dominance of pebbles greater than 2mm, for example conglomerate and breccia.

(4iv) Arenaceous.