

**SIAYA GEOGRAPHY ASSOCIATION JOINT
EXAMINATION (SIGEA) 2023**

Kenya Certificate of Secondary Education

OCTO M B. D.

312/1 – GEOGRAPHY – Paper 1
JUNE - 2023

2 ³/₄ Hours

MARKING SCHEME

1.(a) Define the term ecology.

(2marks)

- ✓ Is the set of external conditions that influence the development and behavior of living things

(b) State three reasons why it is important to study geography

(3marks)

- ✓ Leads to development of career opportunities
- ✓ Enables the learners to explain the origin/foundation of the earth /landforms
- ✓ Helps in development of mental skills
- ✓ Promote positive attitude towards conservation of resources
- ✓ Helps learners appreciate important social values such as time management.
- ✓ It encourages international awareness/cooperation.
- ✓ It enables learners to understand different environmental influences

2.(a) Name the two theories that seek to explain the origin of the solar system (2marks)

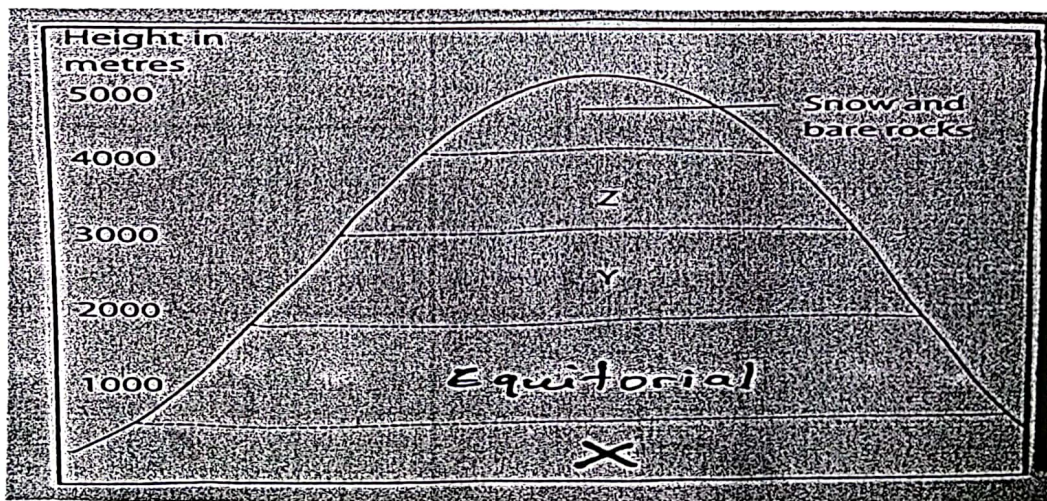
- ✓ Nebula cloud theory
- ✓ Passing star theory

(b) Give three characteristics of the oceanic crust

(3marks)

- ✓ Consist of basaltic rocks
- ✓ It is 6-10km thick
- ✓ Composed of silica and magnesium
- ✓ It has a higher density than the continental crust.

3. The diagram below represents zones of natural vegetation on a mountain. Use it to answer questions (a) and (b)



(a) Name the zones marked X, Y and Z

(3marks)

- ✓ Savanna vegetation
- ✓ Bamboo vegetation

✓ Health and Moorland ✓

3 3

(b) Give two reasons why the mountain top has no vegetation

(2marks)

- ✓ The area has thin soils/ very rocky
- ✓ The ground is frozen most of the time
- ✓ Very low temperature ✓

4. Describe granular disintegration as a process of physical weathering

(5marks)

- Takes place in heterogeneous rocks with different mineral composition. Different minerals expand at different rates.

The process takes place in homogenous rocks having numerous joints and bedding planes.

It is caused by large diurnal temperature range especially in desert.

High temperature during the day causes the rocks to expand.

At night, rapid cooling takes place as temperatures drop suddenly making the rocks to contract considerably

- ✓ The process is repeated over a long period of time.
- ✓ Stress develops within the rock along the joints and cracks, causing the blocks of rocks to detach along the lines of weak crust.

5/3

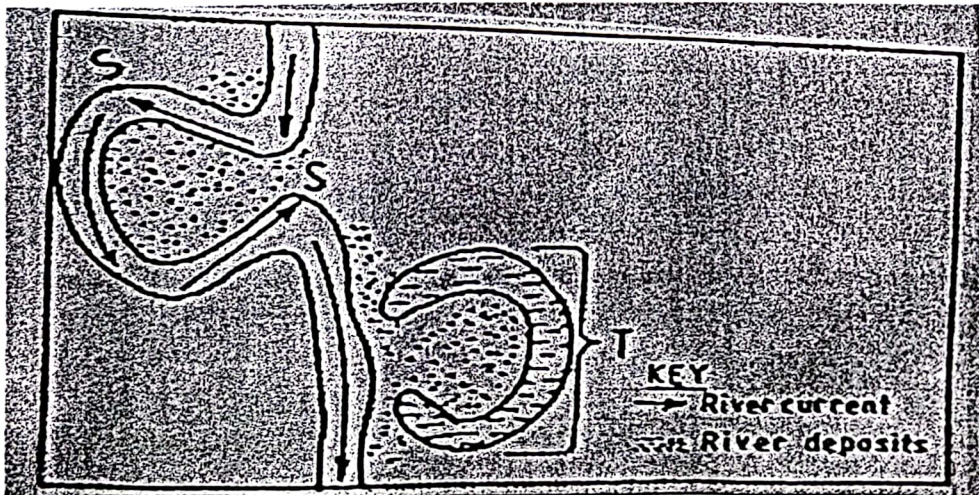
5.(a) Differentiate between a watershed and a catchment area

(2marks)

- ✓ A water shed is a boundary or line separating any two drainage basins while a catchment area is a highland area where rivers originate.

2 2

(b) The diagram below shows a section of a river. Use it to answer the question that follow.



(i) Name the process that takes place at the part of the river marked S

(1mark)

- ✓ Erosion / lateral erosion

(ii) State two conditions necessary for the formation of the feature marked T (2marks)

- ✓ Feature ~~R~~ - Oxbow lake
- ✓ Periodic flooding (to cut off ~~rocks~~ ^{neck} of pronounced meander)
- ✓ Deposition on the inner side of river banks.
- ✓ Erosion on the outer side of river banks.
- ✓ Presence of pronounced ~~manors~~ ^{meanders}.
- ✓ Heavy load being carried by the rivers.
- ✓ Reduction on river gradient / Low velocity.

SECTION B

Answer Question 6 And Any Other Two Questions From This Section.

6. Study the map of Kisumu East 1:50,000 (Sheet 116/2)

(a) i) What type of Map is Kisumu East? (1mark)

- ✓ Topographical map

ii) In what hemisphere does Kisumu East lie? (1mark)

- ✓ Southern hemisphere

iii) Give the altitude of the highest point in the area covered by the map (2marks)

- ✓ 1872 m

iv) Give the six figure grid reference of the Air Photo Principal found in the lake at the South ~~East~~ ^{WEST} of the area (2marks)

- ✓ 958805

(b) i) What is the bearing of trigonometric station at grid square 0383 from Air Photo Principal point at grid square 0286 (2marks)

- ✓ $153^{\circ}/S27E \pm 1^{\circ}$

ii) Measure the length of the Provincial boundary to the west of Easting 00. Give your answer in kilometers. (2marks)

- ✓ 7 KM $\pm 0.1 km.$

iii) Identify two forms of land transport in Kisumu East (2marks)

- ✓ Railways transport
- ✓ Road transport

(ii) On the cross section mark the following

- River
- Hill
- Footpath

(iii) Calculate the vertical exaggeration (V.E) of the section

(2marks)

$$V.E = \frac{V.S}{H.S}$$

$$\frac{1}{5000} \times \frac{50000}{1}$$

$$= 10$$

(2x1)

(d) Describe the long profile of River

(4marks)

- ✓ River Ombeyi has many meanders
- ✓ Drain waters in a seasonal swamp
- ✓ Flows westwards
- ✓ Has two tributaries

(4x1=4marks)

7.(a) i) What are hypabyssal rocks

(2marks)

- ✓ Are igneous rocks resulting from magma being intruded into other rocks, found at shallow depths beneath the surface

shallow

(ii) Name three examples of hypabyssal rocks.

(3marks)

- ✓ Diabase
- ✓ Dolerite
- ✓ Porphyry
- ✓ Porphyrite
- ✓ Granophyre
- ✓ Quarts
- ✓ Lamprophyre

b) i) State three factors that influence rock metamorphism

(3marks)

- ✓ Resistance of the rock to crushing
- ✓ Mineral composition of the rocks
- ✓ Porosity of the mineral
- ✓ Texture of the rock.

— Age of the rock

— Intensity of heat / pressure

(ii) Describe the following processes of formation of Metamorphic rocks

• **Dynamic Metamorphism**

(4marks)

- ✓ Original rock is subjected to intense pressure
- ✓ Pressure is caused by compressional force when crustal plate collide.
- ✓ The rock changes their physical appearance. And characteristic forming a new rock.

• **Thermal Metamorphism**

(4marks)

- ✓ Rocks are subjected to intense heat.
- ✓ Heat may be due to rocks being buried at great depth/due to contact with magma.
- ✓ The hot magma melts the minerals of the original rocks, they cool and solidify to form a totally different rock/recrystallize the rock grains.

(c) explain the significance of rocks to the economy of Kenya under the following sub headings

(i) Agriculture

(2marks)

- ✓ Volcanic rocks weather to form fertile soils that support agriculture

(ii) Energy

(2marks)

- ✓ Some sedimentary rocks may contain coal which can be harnessed for production of fuel.

(d) You are planning to carry out field study on the rocks within your school environment

(i) Name two secondary sources of information you would use to prepare for the field study

(2marks)

- ✓ Journals/ Magazines/Periodical/ Newspapers/Pamphlets
- ✓ Extracts from internet
- ✓ Maps/ Geological maps
- ✓ Photographs/ Pictures/ Video tapes/ Slides/Films.
- ✓ Tape recorded information.

(ii) State three activities you would carry out during the study

(3marks)

- ✓ Observation
- ✓ Collecting samples
- ✓ Taking notes
- ✓ Taking Photographs
- ✓ Asking/ Answering questions
- ✓ Study geological maps
- ✓ Drawing sketches

8.(a) i) Apart from nappe fold, name three other types of folds.

(3marks)

- ✓ Monoclonal folds
- ✓ Isoclinal folds

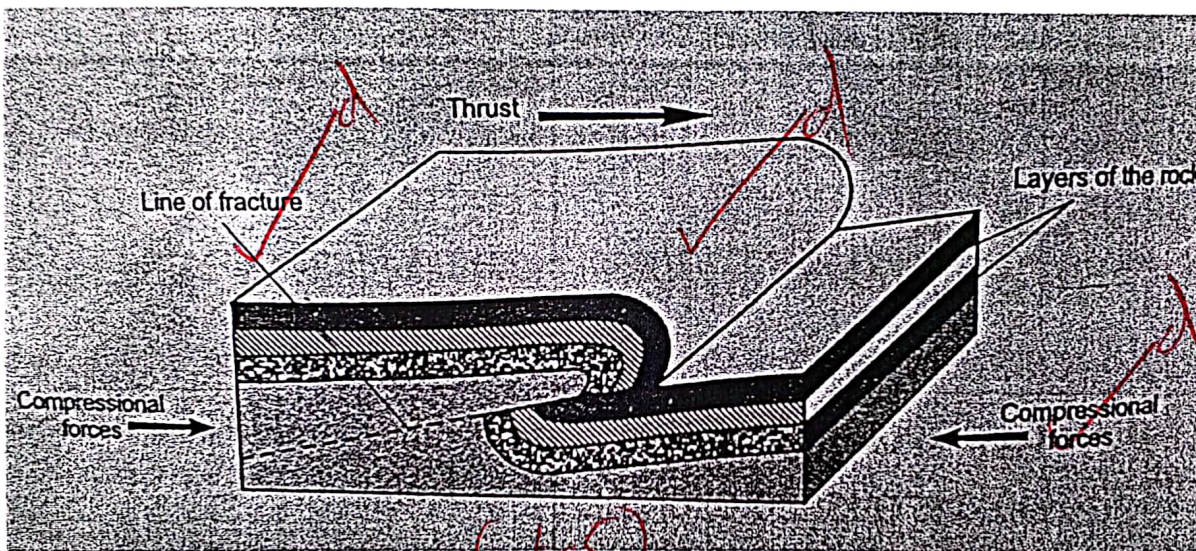
- overfold ✓
 - Recumbent ✓

- ✓ Simple /symmetrical fold ✓
- ✓ Asymmetrical folds ✓

- Anticlinorium - synclinorium ✓

(ii) With an aid of well labelled diagram, describe how a nappe fold is formed (8marks)

- ✓ Layers of sedimentary rocks are subjected to compressional forces.
- ✓ Intense folding results in the formation of an over fold.
- ✓ With increases pressure become intense, a fracture occurs along the axis in the recumbent folds producing a thrust plane. *over fold is pushed*
- ✓ When pressure becomes intense, a fracture occurs along the axis in the recumbent fold producing a thrust plane. *nappe*
- ✓ The upper part of the recumbent fold slides forward over the lower part along the plane to form an over thrust fold.



(b) i) Identify any two orogenies known to exist in the geological time scale (2marks) 8

- ✓ Hercynian orogeny ✓
- ✓ Alpine orogeny ✓
- ✓ Charnian Orogeny ✓
- ✓ Caledonian Orogeny. ✓

(2x1=2marks)

(ii) Name three countries where Alps Mountains are found (3marks)

- ✓ Austria ✓
- ✓ Switzerland ✓
- ✓ Italy ✓
- ✓ France ✓
- ✓ Germany ✓
- ✓ Slovenia ✓
- ✓ Liechtenstein ✓

(3x1=3marks)

(iii) Describe how fold mountains could have formed by contraction theory (4marks)

- ✓ During the formation of the earth, surface rocks cooled and contracted faster than those of the interior.
 - ✓ As the interior cooled at a lower rate, surface rocks wrinkled/crumpled to fit on the contracting interior rocks.
 - ✓ The wrinkles formed the folds *mountains*.
- (4x1=4marks)

(c) You are planning to carry out a field study of an area affected by faulting

(i) State three reasons why it is important for you to go for a pre-visit of the area (3marks)

- ✓ To seek permission from relevant authorities
 - ✓ To identify problems likely to be encountered during the study.
 - ✓ So as to adjust /review the objectives/hypothesis
 - ✓ To identify suitable methods of data collection.
 - ✓ To estimate the cost of study.
 - ✓ To enable preparation of work schedule.
 - ✓ To draw a route map.
 - ✓ So as to identify necessary tools and equipment for the study
 - ✓ To identify features and location before the study.
- (3x1=3marks)

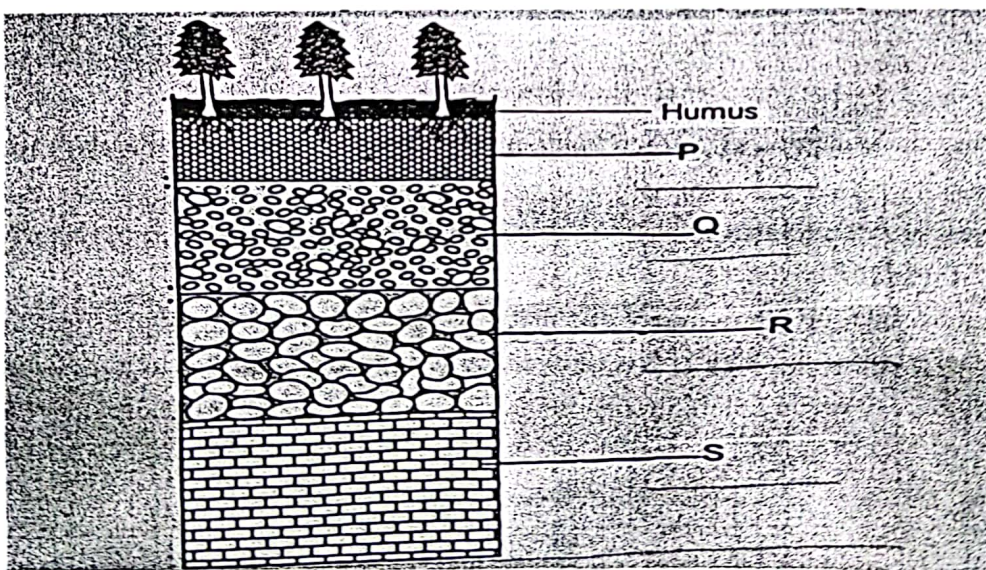
(ii) State two follow up activities you would do after the study

(2marks)

- ✓ Read more on the topic.
- ✓ Draw diagrams
- ✓ Write reports
- ✓ Display photographs or items collected
- ✓ Analyze or assess information collected against the hypothesis

9. The diagram below represents a well-developed soil profile. Use it to answer question

(a)



(i) Name the soil layers marked Q, R and S

(3marks)

- ✓ Q-Horizon B/Subsoil
- ✓ R-Horizon C/Partly weathered material
- ✓ S-Horizon D/Parent rock/Bedrock

(ii) Describe the characteristics of the layer marked P

(4marks)

- ✓ It is subdivided into five layers/A₀₀, A₀₁, A₁, A₂, A₃
- ✓ Soil is grey in colour
- ✓ A₃ is a transitional zone.
- ✓ There are redeposition of soil nutrients from horizon B.
- ✓ Soluble minerals are leached (iron, aluminum and silica)

(4x1=4marks)

(b)(i) What is soil catena?

(2marks)

- ✓ It is the sequence of different soils from the same parent rock on a slope

(1x2=2marks)

(ii) Identify three types of soil based on soil order

(3marks)

- ✓ Zonal
- ✓ ~~Intrazonal~~
- ✓ Azonal

Intrazonal

(3x1=3marks)

(c) (i) Explain how the following factors influence soil formation

• Parent rock

(4marks)

- ✓ The nature of rock influences the rate of weathering in that soft rock weather faster while hard rocks are resistant and weather slowly.
- ✓ The parent rock determines the soil texture in that large/coarse grained rocks produce large/coarse grained soils/while fine grained rocks produce fine grained soils.
- ✓ Type of mineral in the parent rock are transferred to the soil during formation

The colour of the parent rock is transferred to the soil. (2x2=4marks)

• Climate

- ✓ During the wet season, mineral salts on the top layer of the soil dissolve in rain water
- ✓ The dissolved minerals percolate or seep downwards from the top soil to the sub soil (silica and bases)
- ✓ The dissolved minerals move and are deposited further downwards to the layer.
- ✓ Insoluble minerals such as iron and aluminum accumulate on the top layer to form crust of laterites hence laterization

(3x1=3marks)

→ Rainfall provides water which makes it possible for minerals to decay.
→ Rainfall influences leaching processes.
→ High temp. increase the rate of weathering.
→ water, wind, ice erode / transport & deposit soil particles in other areas (Loess).

(ii) State three activities that may be undertaken in your school to conserve soil

(3marks)

- ✓ By planting trees
- ✓ By digging drainage trenches
- ✓ By practicing terracing
- ✓ By planting grass and designating paths in the school

(3x1=3marks)

10.(a) (i) *Constructing gabions.* The full moon is seen rising today at 7:00pm. What is the exact time that the moon will rise tomorrow

(1marks)

- ✓ 7:52 pm ✓

(1x1=1mark)

(ii) Name the three types of ocean islands

(3marks)

- ✓ Coral islands ✓
- ✓ Continental islands ✓
- ✓ Volcanic islands ✓

(3x1=3marks)

(iii) State the sources of salts in the ocean

(3marks)

- ✓ Rivers emptying various salts into the ocean. ✓
- ✓ Volcanic materials on the ocean floor may cause ocean water to be salty. ✓
- ✓ Ocean bedrock containing salts which are continuously dissolved by ocean water

(3x1=3marks)

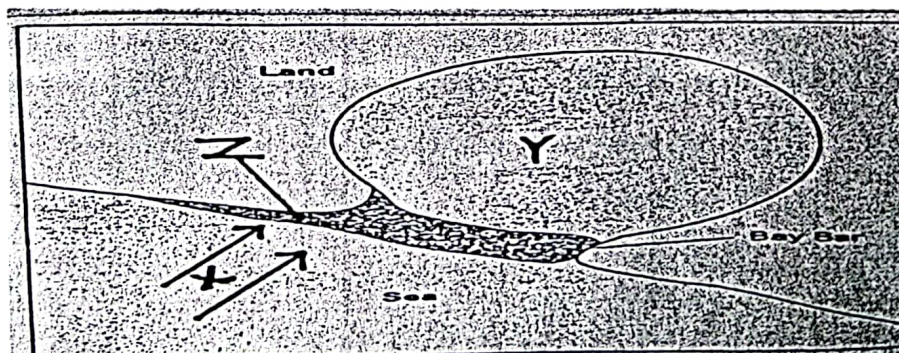
(b) Explain hydraulic action as a process of wave erosion

(4marks)

- ✓ **Direct wave force:** large amounts of wave water may continuously crush against a rock face weakening and eventually breaking.
- ✓ **Compressed air action:** waves crush against a cliff with cracks and crevices. The force of the water pushes air into cracks compressing it. Once the waves retreats, this air suddenly expands as pressure is suddenly released. This will make the rocks shatter as cracks get enlarged.

(2x2=4marks)

(c) Study the diagram below and answer the questions that follow



(i) Name the features marked X and Y

(2marks)

- ✓ X-Longshore drift
- ✓ Y-Bay / Lagoon

(ii) Describe the formation of the feature marked Z

(6marks)

- ✓ It forms on a shallow shore when movement of materials by longshore drift is halted causing deposition due to the coast changing its direction towards the land
- ✓ The deposition of materials continues forming an elongated low-lying ridge growing towards the sea.
- ✓ Waves carry sand to the inner end of the ridge creating a hook like feature.
- ✓ The low-lying ridge of sand, shingle and pebbles with one end attached to the coast and the other projecting to the sea is called a spit.

(6x1=6marks)

(d) Explain three ways in which Coastal land forms are significant to the economy of Kenya

(6marks)

- ✓ Rias favour development of deep and well sheltered harbors facilitating transportation
- ✓ Features such as caves, cliffs etc. are a tourist attraction sites earning the country foreign exchange used to develop other sectors of the economy.
- ✓ Coral rocks are a source of limestone for cement manufacture encouraging industrialization.
- ✓ Coral rocks are used locally as building materials

(3x2=6marks)

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- 4) — Occurs on rocks that are heterogeneous made up of different minerals, in arid and semi-arid areas.
- The different minerals expand and contract at different rates.
 - Differential expansion and contraction causes stress/strain within the rocks.
 - The alternate expansion and contraction of minerals at different rates is repeated over time.
 - Eventually the rock breaks into individual rock grains in a process called granular disintegration.