1. (a) What is the relationship between Geography and Mathematics?

- Mathematics principles/formulae are used in Geography to calculate distance/area/ population density.
- Geography information can be analysed/presented accurately through the application of mathematical techniques.
- Geographical concepts are applied in calculating direction/bearing in mathematics.

any 2 x 1 = 2 marks

(b) State four reasons why it important to study Geography

- It helps to develop mental skills.
- It enables learners to understand/appreciate different environmental influences.
- It encourages international awareness/co-operation.
- It helps learners to appreciate important social values, such as time management/ responsibility.
- It promotes positive attitudes towards protection/conservation of resources.
- It leads to development of career opportunities.
- It helps learners to manage time properly.
- It enables learners to explain the origin/formation of the earth/landforms.

any 4 x 1 = 4 marks

2. (a) Name the two layers of discontinuity that make up the interior structure of the earth.

- mohorovicic/moho.
- Gutenburg.

2 x 1 = 2 marks

(b) State three characteristics of the outer core in the interior structure of the earth.

- outer core is composed of molten rock material.
- it is made up of iron and nickel.
- it is estimated to be about 2100km to 2890km thick.
- it has temperatures ranging from 3700°C to 5000°C.
- it has an average density of 10.0gm/cc to 12.3gm/cc.

any 3 x 1 = 3 marks

3. (a) Name two forms of precipitation that commonly occur in Kenya.

- rain.
- hail.
- dew.
- fog/mist.

any 2 x 1 = 2 marks

(b) What is a stevensons screen?

It is a white wooden box in which meteorological instruments are kept at a weather station.

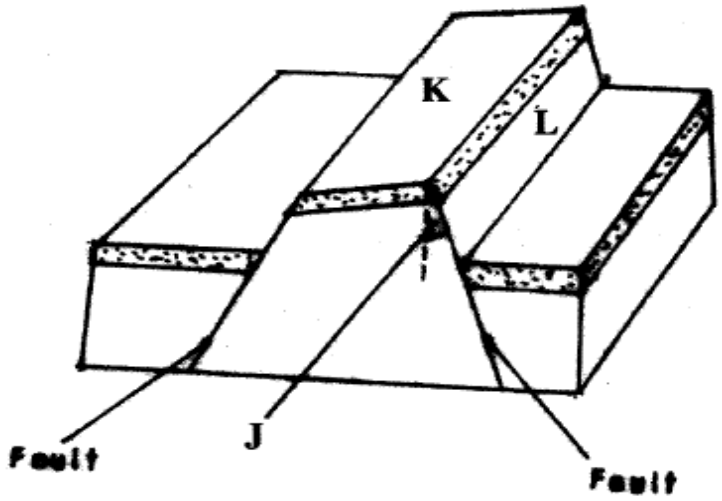
(2 marks)

4. (a) Identify two causes of earth movement.

- magma movement within the crust
- gravitational pull/quantitative pressure
- convectional currents in the mantle.
- isostatic adjustment.

any 2 x 1 = 2 marks

The diagram below shows some features formed as a result of faulting. Use it to answer question b.



(b) Identify the;

(i) angle marked J.

- Hade. (1 mark)

(ii) the feature marked.

- **K** - tilt block. (1 mark)
- **L** - fault scarp/escarpment (1 mark)

5. (a) Identify two sources of water found in a lake.

- rainwater;
- rivers;
- underground water;
- glacial melt waters.

any 2 x 1 = 2 marks

(b) Give three characteristics of lakes formed due to faulting.

- most are narrow;
- most are steep-sided;
- most are deep/some are shallow
- most of them are salty/some are fresh
- most of them are long.

any 3 x 1 = 3 marks

6. Study the map of Kitale 1:50,000 (sheet 75/3) provided and answer the following questions.

(a) (i) Identify two human made features found at the grid square 2320.
- bridge/mc call's bridge.
- All weather loose surface road. 2 x 1 = 2 marks

(ii) What is the altitude of the highest point in the area covered by the map?
2362 metres. (2 marks)

(iii) Give three types of natural vegetation found in the area covered by the map.
- forest
- scrub
- woodland
- scaltered trees
- riverine trees
- papyrus vegetation
- thicket

any 3 x 1 = 3 marks

(b) (i) What is the bearing of the Air Photo Principal Point at gridsquare 3426 from the air photo principal point at gridsquare 2931?
132± 1. (2 marks)

(ii) Measure the distance of the dry weather road (C640) from the junction at point M (345142) to the junction at point N (416201). Give your answer in kilometres.
12.1km ± 0.1. (2 marks)

(c) (i) Using a scale of 1cm to represent 40 metres, draw a cross-section from grid reference 410180 to grid reference 500180.

(ii) On the cross-section mark and name the following:
- A dry weather road.
- River Kaptarit.
- A ridge. (3 x 1 = 3 marks)

(iii) Calculate the vertical exaggeration (VE) of the section.

$$VE = \frac{VS}{HS}$$

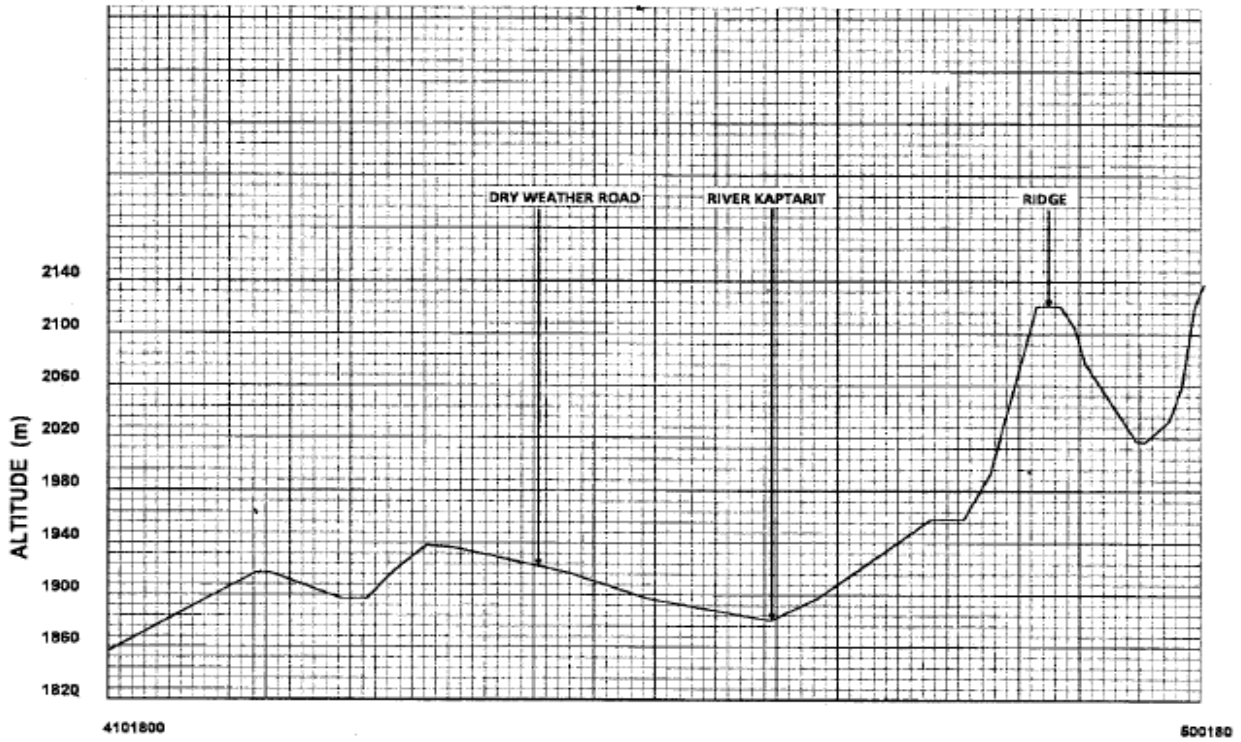
$$VE = \frac{1}{4000} \div \frac{1}{50,000}$$

$$= \frac{1}{4000} \times \frac{50,000}{1}$$

$$= 12\frac{1}{2} \text{ /12.5}$$

(2 marks)

(c)



A CROSS-SECTION FROM GRID REFERENCE 410180 TO GRID REFERENCE 500180

(d) Citing evidence from the map, identify five social services offered in Kitale Municipality.

Service	Evidence
Health/medical	Presence of hospital
Recreational services	Sports club/Kitale Club/Golf Course
Religious services	Church
Security services	Police station/D.C's Office
Housing	Built-up areas/huts
Water supply	Water tower/tank
Burial services	Cemetery

5 x 1 (5 marks)

7. (a) (i) What is a mineral?

Mineral is an inorganic substance with a definite chemical composition at/ beneath the surface of the earth/a social inorganic substance occurring naturally.

(2 marks)

(ii) Describe the following characteristics of minerals.

- **Lustre** - minerals differ in their brightness depending on the nature of their reflective surfaces. Smooth surfaces are shiny whereas rough surfaces are dull. (2 marks)

- **Colour** - different minerals display different colours. Minerals that have iron/magnesium have dark colours. (2 marks)

- **Density** - minerals have different weight per unit volume of water/ minerals have different specific gravity/some minerals are heavier while others are light. (2 marks)

(b) (i) Name two examples of extrusive igneous rocks.

- Basalt	- Rhyolite	- Phonolite
- Pumice	- obsidian	- Trachyte
- Tuff	- Andesite	- Scoria
- Tefra		

any 2 x 1 = 2 marks

(ii) Describe three ways in which sedimentary rocks are formed.

Mechanically formed sedimentary rocks - rock fragments are transported by wind/water/ice. They are deposited in layers. Over a long period of time, they are compacted into a hard rock.

Organically formed sedimentary rocks - remains of plants/animals are deposited in layers. Over a long period of time, the remains are compacted forming a hard rock.

Chemically formed sedimentary rocks - dissolved minerals are transported into water bodies. They are then precipitated/evaporated over a long period of time, the precipitates/evaporites are then compacted to form a hard rock.

3 x 1 = 3 marks

(c) Explain the significance of rocks to the economy of Kenya under the following:

(i) **Tourism**: Some rocks form unique features that attract tourists earning the country foreign exchange/income. (2 marks)

(ii) **Energy**: Some sedimentary rocks contains fossil fuels which are sources of energy for domestic/industrial use. (2 marks)

(iii) **Water**: Some rocks act as storage for water which can be supplied for domestic / industrial / agricultural use. (2 marks)

8. (a) Explain the following processes of weathering:

(i) **Hydration**: In hydration certain rock minerals absorb water and expand. This causes internal stress in the rock and it eventually disintegrates. (2 marks)

(ii) **Oxidation**: Oxidation takes place in rocks that contain iron. The iron combines with oxygen forming iron oxides/Ferric oxide Such rocks change colour and crumble easily. (2 marks)

(iii) **Frost action**

- In temperate/high mountain areas, water may occupy services/cracks in the rocks during the day.
- At night the temperatures drop below freezing point causing the water to freeze/expand, exerting pressure in the cracks.

- During the day, temperatures rise, causing the ice to melt thus releasing pressure in the cracks.
- This alternate freeze-thaw action weakens the rock causing it to disintegrate.

(3 marks)

(b) Describe how an exfoliation dome is formed.

- In arid/semi arid areas, there is large diurnal ranges of temperature.
- During the day, a homogenous rock is intensely heated/at night, the rock looses heat rapidly.
- The differential heating causes the outer layer to expand/contract faster than the inner layer.
- When this expansion and contraction takes place repeatedly, stress develops in the outer layer of rocks. Cracks appear on the surface layer.
- Eventually, the outer layer peels off.
- The peeling off leaves behind a rounded mass of rock known as exfoliation dome.

any 6 x 1 = 6 marks

(c) Explain three physical factors that enhance movement of materials along a slope due to gravity.

Nature of materials.
- Heavy and large materials move faster on a slope as they are more likely to be overcome by gravity/thinly bedded layers have a tendency to move faster.

Angle of slope.
- The steeper the slope, the faster the rate of movement/where rocks are dipping steeply, movement is faster.

Climatic factors/amount of water.
- The more saturated the rock/soil/materials is, the more likely it is to move as water adds weight and lubricates/alternate freezing and thawing encourages movement.

Vegetation cover

- Bare surfaces are more likely to experience mass wasting because there is no vegetation to bind the materials together.

Earth movements.
- Earthquakes/volcanic eruptions/isostatic adjustments cause vibrations which may trigger widespread movement of weathered rock materials.

any 3 x 2 = 6 marks

(d) (i) Give two processes of rapid mass movement.
- landslides/slumping/rockslide/rockfall/debris slide/debris fall/avalanche
- mudslides/mudflow
- Earthflows/earthslide

any 2 x 1 = 2 marks

(ii) State four indicators of occurrence of soil creep in an area.
- Telephone/fence poles that are inclined down a slope/bent tree trunks.
- Accumulated soil at the foot of a sloop/behind obstacles such as walls.

- Some rivers are habitat to dangerous animals which may attack human beings/destroy crops.

any 3 x 2 = 6 marks

(d) Your class is planning to carry out a field study of a river in its old stage.

(i) State three reasons why it would be necessary to pre-visit the area of study.

- it helps to assess the suitability of the area of study.
- It helps to draw up objectives/hypothesis for the study.
- It helps to prepare a route map.
- it helps to design a working schedule.
- it helps to identify the probable problems/how to solve problems.
- it helps to estimate the cost of the study.
- it helps to identify suitable methods of collecting data.
- it helps to identify appropriate equipment to be used during the study.

any 3 x 1 = 3 marks

(ii) State three activities you would carry out to determine why deposition occurs at this stage.

- Measuring of gradient.
- Finding out the nature of the load.
- Finding out the amount of the load.
- Establishing the velocity of the river.
- Observing obstacles in the stream channel/distributaries.
- Measuring of the width/depth of the river. any 3 x 1 = 3 marks

10. (a) (i) Define the term soil.

It is a naturally occurring thin layer of loose/unconsolidated materials which overlies the crustal rocks and on which plants grow. /It is an accumulation of rock particles/minerals, organic matter, water and air found on the surface of the earth.

(2 marks)

(ii) Give **two** factors that determine soil leaching.

- nature of soil/solubility of minerals.
- amount of rainfall./Alternating wet and dry seasons.
- nature of the slope. any 2 x 1 = 2 marks

(b) Explain how the following factors influence soil formation.

(i) Parent rock

The nature of rock influence the rate of weathering in that soft rock weather fast while hard rock are resistant and weather slowly.
The parent rock determines the soil texture in that large/coarse grained rocks produce large/coarse grained soils.
The type of minerals in the parent rock are transferred to the soil during formation.

any 2 x 2 = 4 marks

- Existence of bare rock/exposed upper slope.
- Presence of a ribbed/stepped pattern across the slope.
- Presence of dipped rock strata in the direction of the slope.
- Presence of overhanging banks above roads/rivers.
- Presence of slope retreat.

any 4 x 1 = 4 marks

9. (a) (i) Outline two factors that influence the development of drainage patterns.

- Direction of the slope of the land.
- Difference in rock resistance /hardness.
- The arrangement of rock layers/rock structure.
- Faulting/fault guided.

any 2 x 1 = 2 marks

(ii) Outline five characteristics of a river in its youthful stage.

- the river has a steep river gradient.
- the river channel is narrow.
- the river has deep/steep-sided/V-shaped valley/gorges
- the river flows at a high speed/high stream velocity.
- the vertical erosion/down cutting is dorminant.
- the river channel is generally winding.
- Rapids/waterfalls/cataracts/cascades/interlocking spurs/potholes/plunge pools
- the type of flow is torrential.
- the river has a small volume of water.
- the river has a small load.

any 5 x 1 = 5 marks

(b) Describe the following processes of river erosion.

(i) **Attrition** : As rock materials are transported downstream, they constantly collideagainst each other.
The materials gradually wear down/reduce in size.

(2 marks)

(ii) **Corrasion** : As solid rock materials are transported downstream, they are hurled against the banks and dragged along the river bed.
The rock materials scour/erode/chip off pieces of rock from the channel and the river bed.
The rock materials scour/smoothen/grind the river bank/bed.
Eddy currents rotate pieces of rock around the hollows breaking/ grinding the river bed.

(4 marks)

(c) Explain three negative effects of rivers to the human environment.

- When rivers flood, they destroy a lot of property/crops/may lead to loss of human life/ displace people.
- Wide/deep rivers are a barrier to transport especially where bridges have not been constructed.
- River water can be a medium of spreading water-born diseases, since flood waters may spread chemicals from farms/human waste which contaminates sources of water

(ii) **Biotic factors.**
- Micro organisms in the soil assist in plant/animal decay to form humus.
- The micro organisms mix and aerate the soils.
- The rocks of plants penetrate the soil enabling it to become porous.
- ploughing/digging break up soil structure into small particles.
- when plants and animals die, they decay to form humus/organic matter in the soil.

Any 2 x 2 = 4 marks

(c) (i) **State three characteristics of desert soils.**
- The soils contain little or no humus.
- the soil are of sandy/stony texture.
- the soils are saline/contains alot of salts/high lime content.
- the soils lack moisture.
- the soils may be light coloured.
- the soils are thin/shallow
- the soils are lightly porous.

any 3 x 1 = 3 marks

(ii) **Give two economic uses of soil.**
- It is used as raw material in building/construction/industry/pottery/ glass making/brick making.
- Soils support agriculture/development of forestry
- Some soils contain valuable minerals.
- some soils have medicinal value.
- it is used in building/construction industry.

any 2 x 1 = 2 marks

(d) **You are supposed to carry out a field study of an eroded area.**

(i) **What information would you collect through observation that would indicate that the area is severely eroded?**
- rills/gullies/deep trenches.
- uneven surface.
- lack of or little vegetation.
- little/absence of topsoil/thin soil.
- exposed plant roots.

any 2 x 1 = 2 marks

(ii) **Identify three methods you would use to record the observations.**
- photograph taking/video recording.
- video recording.
- note taking.
- field sketching.
- tabulation.

any 3 x 1 = 3 marks

(iii) **State three recommendations you would give to control soil erosion.**
- construction of gabions.
- construction of check dams.
- afforestation/reafforestation.
- filling in the gullies.
- construction of drainage trenches.
- practising appropriate methods of farming/planting cover crops.

any 3 x 1 = 3 marks