**TOP KCSE EXAMINATIONS – 2016**

**312/1**

**GEOGRAPHY**

**MARKING SCHEMES**

**PAPER 1**

(a) The relationship between Geography and Physics

* Physics deal with matter, energy, light, heat, sound, gravity and magnetism while studying the atmosphere;

Geography focuses on heat from the sun as its responsible for movement of air, evaporation or water and distribution of moisture in the atmosphere.

* Physics is a branch of Science concerned with study of matter and its properties; Physics is important in

Geography as it is used to explain how important process such as faulting, folding and vulcanicity happen. (1 x 2 = 2mks)

(b) Three main layers of he atmosphere from the earth’s surface upwards.

* + - Troposphere
		- Stratosphere
		- Mesosphere (3 x 1 = 3mks)

2.

(a) (i) Type of rainfall shown on the diagram

 Convectional (1 x 1 = 1mk)

(ii) Type of cloud marked (a)

 Cumulonimbus clouds (1 x 1 = 1mk)

1. Three weather conditions associated with the above (a) rainfall.
	* + - Thunderstorm and lightening
			- Hailstones

Warm air near surface in the afternoon hours.

2. a)

* Anabatic winds are local winds which ascend from valley bottoms to hill tops. Katabatic winds are local winds which descend from hill tops to valley bottoms.

b) Factors hindering weather forecasting.

* Inadequate data
* Inaccurate or unreliable data
* intervening factors e.g. slope, nature of vegetation , soil , moisture and winds
* Inadequate skilled personnel in most developing nations.
* Use of defective / obsolete equipments.
* Natural hazards e.g. Earthquakes and storms.
	+ - * (1 x 3 = 3 mk)
				1. **The tables below represent temperature and rainfall for two stations A and B. Study them and answer the questions that follow.**

**Station A**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Months**  | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **Temperature (0C)** | 27 | 27 | 27 | 26 | 25 | 25 | 25 | 26 | 27 | 27 | 26 | 26 |
| **Rainfall (mm)** | 65 | 85 | 150 | 250 | 225 | 125 | 75 | 75 | 75 | 112 | 125 | 125 |

**Station B**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Months**  | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **Temperature (0C)** | 27 | 28 | 27 | 27 | 26 | 24 | 23 | 23 | 24 | 24 | 26 | 27 |
| **Rainfall (mm)** | 68 | 81 | 142 | 286 | 187 | 28 | 28 | 28 | 36 | 55 | 68 | 78 |

1. **(i) Calculate the annual range of temperature for the stations A and B.**
* ***X*** *; 270 – 250 = 20C* ***1×1mk=1mk***
* ***Y*** *; 280C – 230C = 50C* ***1×1mk=1mk***

**(ii) Calculate the annual rainfall for station B.**

* *68+81+142+286+187+28+28+28+36+55+68+78 = 1085mm* ***1×1mk=1mk***
1. **Describe the characteristics of rainfall for station A.**
* *The station experiences high rainfall/heavy.*
* *The rain falls throughout the year/it has no real dry season.*
* *The station experiences a double maxima rainfall regime/two peak rain seasons.* ***2×1mk=3mks***

**4.** a) An air mass is a large volume of air whose temperature and humidity are fairly uniform and which covers a large area (extensive surface area) ***2 marks***

b) - Windy conditions.

- Light showers to heavy rainfall.

- Humid air

- It occurs in an area of low pressure. **Any 3**

5

a) Valley glacier.

 Ice sheet.

 Piedmont glacier.

b)

* + Ice accumulation results to pressure at the bottom, side and middle of ice mass.
	+ Weight and pressure leads to particles melting and due to low temperatures freezing occurs immediately leading to freeze - thaw action.
	+ The freezing and thawing leads to inter-granular shipping movement in whole ice mass gradually moves down slope.

 (Any 3 x 1 =3mks)

6. (a)

(i) 0015’N, 34015E

(II)

* trigonometry station
* contours

(b)

(i) 7100 **show working**

(ii) 233o **show working**

(iii)

* recreation services
* administration services
* transportation services
* security services
* commercial services

(c)

* Rivers are the main drainage features.
* Other drainage features are swamps, reservoirs and dams.
* There are several rivers in the area.
* These rivers are permanent ones.
* The rivers form dendritic pattern.
* River Sio is the main river and it flows south westwards.
* some rivers wind/meander/bend.
* Some rivers like Kiround and Wakgungu are short and disappear underground.
* Some rivers originate from the highlands.

**Any 8 1 mark each**

7. a) i)

* it is the accumulation zone for leached
* mineral from horizon A
* the soils are red / brown in colours / soils are generally dark in colours
* the zone sometimes forms the hard pan / murram lateritic dun crust
* it is divided into B1, B2 2mks

 ii) Other components of soil

* air / soil air
* water / soil water
* rock particles / weathered materials / minerals particles
* living organisms

 iii)

* it helps improve soil texture
* it provides essential minerals to the soils from the decomposed plant matter / humification and nitrification.
* it enables soils to retain moisture
* it facilitates aeration of the soil
* humus is source of food for micro organisms in the soil

 b) i) Difference between soil structure and soil texture.

* soil structure is the way the individual soil particles are arranged into aggregate compound particles while soil texture is the degree of fineness or coarseness of the soil particles.

 ii) Topography

* Valley bottoms encourage formation of deep fertile soils due to deposition / accumulation of weathered materials.
* steep slopes encourage rapid removal of top soil thus slowing down formation of soil / they have thin soil / poorly developed soils.
* flat areas may be saturated with waters / water logged at this slows down formation of soil / they may form peat. Gently sloping areas have well developed soils because they are well drained.
* slopes influences the arrangement / sequence of soil/ soil catena causing variations in the types of soil profiles at different parts of the slopes
* aspect / some slopes are more exposed to the sun / rain which enhances the rate of weathering of the parent / soil formation 2x3=6mks
* Time
* Where soil formation process takes a short duration the soils are generally immature / where the process takes a long period of time, soils are generally well developed.
* (young soils retain the characteristic of the parent rock because they have not been exposed to the factors that may cause change / mature soils may not display the characteristics of the parent rock. Any 1 = 2mks

c) i) Overgrazing

* it leads to removal of vegetation cover thereby exposing soil to agents of erosion which removes the top soil. 2mks

 ii) Frequent ploughing

* this weakens soil structure making it easy for agents of soil erosion to carry it away. (to fertile soil)
* it increases oxidation which results in loss of organic matter.
* it causes compaction of soil which reduces porosity preventing percolation of water. any 1x2=2mks

 iii) Continuous irrigation

* it causes leaking of soil nutrients making the top soil deficiency of soluble minerals / it causes salinity. 2mks

**8.**

**a) i) Three types of faults**

* + Normal fault
	+ Reverse fault
	+ Shear/tear/transform fault
	+ Thrust fault
* Anticlinal fault ***any 3 × 1 = 3 marks***

**ii) Explain two processes that may cause faulting**

* + Faulting may be caused by forces acting horizontally away from each other which causes tension on crustal rocks.
	+ Due to tension rocks stretch and fracture causing faults.
	+ Faulting may be caused by forces acting horizontally towards each other which causes compression in crustal rocks.
* Due to compressional force the rocks shorten and fracture causing faults.
	+ Faulting may occur where horizontal forces act parallel to each other in the opposite or same direction resulting to shearing.
	+ Faulting may occur due to vertical movements which may exert a strain in the rocks making them to fracture / regional upwarping. ***any 2 × 2 = 4 marks***

**b)** i) **Two other features resulting from faulting**

* + Fault scarp / escarpment / fault step.
	+ Tilt blocks
	+ Harst / block mountains ***any 2 × 1 = 2 marks***

 ii) **Explain how the Rift valley is formed by tensional forces**

* + Layers of rocks are subjected to tensional forces
	+ Lines of weakness occur leading to development of normal faults.
	+ The central block sinks or subsides as side blocks are pulled apart
	+ The sunken part forms a depression or graben called Rift valley







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**c) Explain four positive effects of faulting**

* + Faulting leads to formation of features that provide beautiful scenery which attract tourists.
	+ Faulting lead to formation of lakes that are important fishing grounds / mining sites / provide water for irrigation / domestic / industrial use.
	+ Faulting causes displacement of rocks which exposes minerals that are mined.
	+ Faulting causes formation of mountains /horst which attract rainfall that give rise to rivers which provide water for industrial / domestic/agricultural / production of HEP.
	+ Block mountains formed through faulting on the windward side which favours agriculture settlement / forest.
	+ When faulting occur across a ridge it may provide a dip which could form a mountain pass where transport and communication lines can be constructed.
	+ Springs that occur at the foot of fault scarps attract settlement.
	+ Faulting create deep faults that can be utilized for Geothermal power.
	+ Rivers flowing over fault scarps may farm waterfalls which may be harnessed for HEP generation. ***any 4 × 2 = 8 marks***

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a) Karst scenery is any rugged landscape whose surface rocks are limestone or dolomite and which has been acted on by carbonation and solution by rain and river water to produce features typical of limestone surfaces.

 ii) Conditions necessary for karst scenery formation.

* Surface rock and rock beneath should be thick limestone dolomite or chalk to allow seepage of acid rain.
* Rock should be hard and well jointed to enhance chemical process by solution process.
* Climate should be warm or hot.
* Rainfall should be moderate to high to enhance solution and carbonation process.
* Water table in the rocks should be deep below the surface. (3 x 2 = 6mks)

 Formation of:

b) Stalactiles

* Carbon IV Oxide of the atmosphere combines with rain water to form weak carbonic acid rain water.
* The acidic rain falls on the surface of the land and reacts with some rocks e.g limestone dissolving the soluble CaCO3 into CaHCO3 solution.
* The solution of CaHCO3 seeps through the joints into the cave.
* The temperatures in the cave is hot or higher
* Evaporation of water occurs in the cave leading to formation of precipitate of CaCO3 deposit from the top of the roof of the cave.
* Continuous deposition of CaCO3 downwards leads to formation of a fingure like projection from the roof hanging downwards This is called stalactite. *5 marks*

 Doline

* Atmospheric CO2 mixes with rain war to form weak carbonic acid rain.
* Acid rain falls on limestone rocks on the surface dissolving it by solution and carbonation process.
* Acid rain widens the joints forming swallow holes.
* iv) Continuous subsidence of swallow holes enlarges the sinkholes forming a large hollow called dolines *5 marks*

c) Ways in which limestone landscape influence human activities. (3mks)

* Features formed in limestone areas e.g dolines, uvulas, form unique attractions site to tourists earning forex.
* Limestone rock provide raw materials used in the manufacture of cement used in building and construction.
* Ruggedness of limestone area discourage settlements, agriculture and infrastructure development. (3mks)

d (i) Objectives of studying a karsts landscape.

* To find out features formed in limestone areas.
* To establish effect of limestone landscape on human activities. (2 x 1 = 2mks)

 ii) Reasons why karst landscape is unsuitable for settlement:

* The area is rocky.
* Area has thin soils.
* Area has poor vegetation.
* Area has inadequate surface H2O supply.
* Area has rugged landscape.

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a) (i)Name two types of river erosion (2mks)

* + Headward erosion.
	+ Vertical erosion.
	+ Lateral erosion.

 ii) State three factors influencing the rate of river erosion (3mks)

* + Large volume of water leads to a high rate of river erosion than a small volume of water.
	+ Steep gradient leads to high speed which enhances high rate of erosion.
	+ Less resistant bedrock is easily eroded than a more resistant rock on the river bed.
	+ Large and more resistant local encourages erosion than small and less resistant load.

b) Name and describe three way by which a river transports its load (6mks)

* + Suspension - Light load is carried a float.
	+ Siltation - Materials are lifted in a series of hydraulic lift/short jumps or hops.
	+ Traction - Heavy load are pushed and rolled along the river bed by the force of water.
	+ Solution - Mineral salts dissolved in water and carried farthest.

c) (i) Apart from deltas, give two river aA depositional features. (2mks)

* Alluvial fans. - River braids.
* Flood plains. - Natural levees.
* Meanders. - Deferred tributaries.
* Ox-bow lakes. - Distributaries.

 ii) Giving an example from Kenya, describe the formation of actuate delta. (3mks)

* + When a river deposits coarse seed.
	+ Strong currents form the sea spread the materials over a wide area on the seaward side.
	+ The river divides into several channels/distributaries e.g R. Tana and R. Sondu.

d) Describe the formation of the following river patterns;

i) Dendritic pattern (3mks)

* + Resembles a tree truck with its branches.
	+ Tributaries join the main river at acute angles.
	+ Confluences form accordant junctions.
	+ Drainage pattern forms in areas where rocks are of uniform structure and resistance/homogenous rocks.
	+ Direction of flow is governed by direction of slope.

ii) Centripetal pattern (3mks)

* + Made up of rivers flowing into a common inland basin or depression like a lake/sea/swamp.
	+ The depression is an area of inland drainage.
	+ Pattern is guided by slope.

e) State three positive significance of rivers (3mks)

* + River water is used for both domestic and industrial purposes.
	+ Rivers with flesh water are used for irrigation.
	+ Navigable rivers are used as transportation routes.
	+ Some rivers provide port facilities especially in their raise and estuaries e.g R. Mwachi.
	+ Some rivers are rich as fishing grounds Dammed rivers are sued for generation of HEP.
	+ River beds and valleys are sources of building materials like gravel, pebbles and sand.
	+ Some alluvial sediments may contain valuable minerals like gold, diamond e.t.c.
	+ Features formed by rivers, e.g waterfalls, gorges etc attract tourists who bring foreign exchange for developing others sectors of the economy.
	+ During flooding, fertile alluvial deposits may provide for fertile soils for agriculture.
	+ Some rivers form natural boundaries between administrative divisions like countries.