Geography and environment

Date: 22 June 2023

Period: 8H30'-11H30'

NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

END OF TERM III EXAMINATIONS

GRADE / LEVEL: **LOWER LEVEL**

COMBINATIONS: **S1**

DURATION: **3HOURS**

MARKS: ..... /100

INSTRUCTIONS

There are 18 questions in this paper
This paper has two section A and B.
SECTION A: This section is compulsory. (55marks)
SECTION B: Attempt any three question. (45marks)
Use only a blue or black pen.

SECTION A: ANSWER ALL QUESTIONS (55 Marks)

1) State any three indicators of relief on the topographical map. **(3 marks)**
2) Mention any four characteristics of moon. **(4 marks)**
3) Outline the main minerals that make up the outer layer of the earth. **(2 marks)**
4) List any four characteristics of sedimentary rocks. **(4 marks)**
5) Mention any four characteristics of natural rainforests. **(4 marks)**
6) Identify the main forms of continental relief. **(5 marks)**
7) Explain any three the main components of soils. **(6 marks)**
8) Explain reasons determining the heavy rain fall recorded under equatorial climate. **(4 marks)**
9) Differentiate primary and secondary economic activities. **(4 marks)**
10) Using diagrams, Explain the radial, Dendritic and centripetal drainage patterns. **(6 marks)**
11) Identify any five ways through which volcanoes cause hazards. **(5 marks)**
12) Identify any four advantages of population census. **(4 marks)**
13) Suppose you are at any weather station, identify the instrument that you would use to measure:
    a) Rainfall. **(1 mark)**
    b) Snowfall. **(1 mark)**
    c) Atmospheric pressure. **(1 mark)**

SECTION B: Attempt any three questions of your choice. (45 marks)

14) (a) Calculate the time at Alexandria located at 30° east when the time at Greenwich is noon. **(3 marks)**
    (b) Differentiate between Latitude and Longitude. **(4 marks)**
    (c) Assess the evidences showing the spherical shape of the earth. **(8 marks)**

15) (a) What is soil erosion. **(1 mark)**

(b) Explain any two types of soil erosion. **(4 marks)**

(c) Discuss measures for protecting soil from erosion. **(10 marks)**

16) (a) Mention any five characteristics of Desert Vegetation. **(5 marks)**

(b) Examine the importance of Forest to Rwanda. **(10 marks)**

17) (a) Draw a sketch of a river profile and show the following parts:
Meander, Confluence, and mouth. **(5 marks)**

(b) Evaluate the relationship between water bodies and human activities
. **(10 marks)**

18) (a) Evaluate the effects of the ozone layer depletion. **(5 marks)**

(b) Explain factors that affect temperature. **(10 marks)**

- end -

MARKING GUIDE – GEOGRAPHY AND ENVIRONMENT

LEVEL: SENIOR ONE

SECTION A: ANSWER ALL QUESTIONS (55 Marks)

1. State any three indicators of relief on the topographical map. **(3 marks)**

   Hachures, contours, form lines, spot heights, bench marks, trigonometrical points, hill shading, layer-colouring.

2. Mention any four characteristics of moon. **(4 marks)**

   Moon is characterised by:

   - Cold surface
   - Dry globe
   - Surface dominated with meteoritic craters
   - Its land scape is made up of rocks and dust
   - No or low gravitation force
   - With very limited atmosphere.

3. Outline the main minerals that make up the outer layer of the earth. **(2 marks)**

   SiAl :silicon and Aluminium

   SiMa: silicon and Magnesium.

4. List any four characteristics of sedimentary rocks. **(4 marks)**

Sedimentary rocks are characterised by:

- They contain fossils
- They are layered/ stratified
- They are soft and elastic
- They are made by compacted sediments
- They are derived from pre-existing rocks.

5. Mention any four characteristics of natural rainforests. **(4 marks)**

Natural rainforest is characterised by the following:

- Many tree species.
- Hard wood forest
- Buttress roots
- Evergreen forests
- Little or no under-growth
- Three canopies
- Broad leaved trees

6. Identify the main forms of continental relief. **(5 marks)**

The main forms of continental relief include the following.

- **Mountain;** A mountain is a large landform that rises above the area surrounding and It usually has a peak.
- **Hill**: A hill is a landform that extends above the surrounding terrain
- **Plain:** A plain is an extensive tract of flat land or a gently undulating terrain.
- **Valley**: A valley is a sunken land or depression surrounded by mountains or ridges.
- **Ridge**: A ridge is a linear, steep-sided upland.
- **Plateau:** A plateau is an elevated tract of relatively flat land with a steep slope falling abruptly to a lower land. A plateau is higher than a plain.

7. Explain any three the main components of soils. **(6 marks)**

The main components of soil are:

- Mineral matter from rocks weathering
- Organic matter from decaying of necromass
- Soil water from rain and ice melting
- Gases from respiration and chemical reactions
- Abiotic factors like bacteria as environmental cleaners.

8. Explain reasons determining the heavy rain fall recorded under equatorial climate. **(4 marks)**

Heavy rain fall recorded under equatorial climate result from the reasons below:

- Convergence of trade winds: intertropical convergence zone (ITCZ)
- Luxuriant tropical rain forest
- Zone of doldrums which allow permanent ascendance of air and water vapour.
- Ascending of air masses above equatorial zone

9. Differentiate primary and secondary economic activities. **(4 marks)**

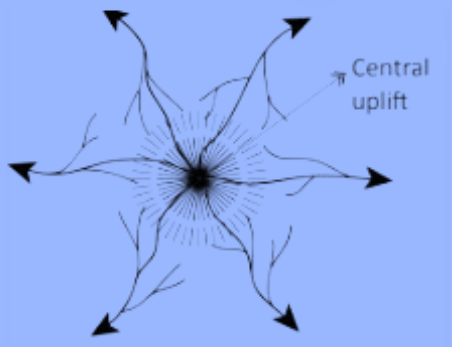
Answers:

Primary economic activities are those that involve the extraction raw materials from natural resources from the earth. While

Secondary economic activities are those that utilise the products from the primary economic activities. for changing the raw materials into semi-processed or finished products.

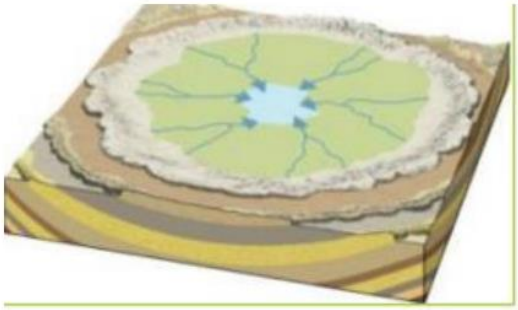
10. Using diagrams, Explain the radial, Dentritic and centripetal drainage patterns. **(6 marks)**

Radial drainage pattern occurs when rivers are flowing from the same source to different directions.



Dendritic Drainage Pattern: It is the most common form and resembles the branching pattern of tree roots.

Centripetal drainage pattern occurs when the rivers from different directions towards the common basin.



11. Identify any five ways through which volcanoes cause hazards.

(5 marks)

(5 marks)

- Massive volcanic eruptions result in the following.
- Displacement of people.
- Loss of lives.
- Destruction of settlement areas and property.
- Air pollution that occur s from the volcanic ashes and gases that are released.
- Destruction of transport and communication lines.
- Destruction of farmlands leading to food shortages.

12. Identify any fopur advantages of population census. **(4 marks)**

The advantages of population census include:

- To know the size of the population
- To know the population standard of living
- It helps governments to project the future growth and economic prosperity of countries.
- It provides the data that is used by policy makers and economic planners.
- The data is used when planning and budgeting for the nation.

13. Suppose you are at any weather station, identify the instrument that you would use to measure:

a) Rainfall. **(1 mark)**

b) Snowfall. **(1 mark)**

c) Atmospheric pressure. **(1 mark)**

d) Humidity. **(1 mark)**

- Rain gauge
- b)Snow gauge
- Barometer/ aneroid barometer
- Hygrometer

SECTION B: Attempt any three questions of your choice. (45 marks)

14. (a) Calculate the time at Alexandria located at 30° east when the time at Greenwich is noon. **(3 marks)**

Solution

Step 1: Determine the difference in degrees between the two longitudes. The Prime Meridian and 30°. 0° + 30°= 30° east.

Step 2:

360°= 24 hours ;15° = 1 hour; 15°= 60 minutes 1° = 4 times Therefore, 30° = 30° X 4 minutes =120 minutes Convert the 120 minutes into hours. 1 hour = 60 minutes 120 minutes = 120/ 60 = 2 hours

Step 3:

2 hours + time at Greenwich 2 hours +12:000 GMT =14:00 hrs (24-hour clock) or 2:00 p.m. (12 hour clock)

The time at Alexandra is 14:00 hrs (24-hour clock) or 2:00 p.m. (12-hour clock) when it is noon at Greenwich.

(b) Differentiate between Latitude and Longitude. **(4 marks)**

A latitude is the angular distance of a place north or south of the earth's equator, while,

A longitudes is the angular distance of a place east or west of the Greenwich Meridian.

Longitudes are measured in degrees, minutes and seconds east.

(c) Assess the evidences showing the spherical shape of the earth.

(8 marks)

- Aerial photographs taken using satellites from high altitudes show the earth is round.
- The shadow cast onto the moon during the lunar eclipse shows the earth is round.
- Several voyages taken around the earth have all proven that the earth is round.
- Places on the Earth's surface do not receive sunshine at the same time.
- The sunrise and sunset show exactly the spherical shape of the earth
- The Earth's horizon is curved. This is evidenced by approaching ships.
- The polar star looks bigger at the poles and smaller away from the poles.
- All the planets in the solar system are spherical. The Earth being one of the planets has a similar shape.

15. (a) What is soil erosion. **(1 mark)**

This is the Removal of top soil. Due to the agents such as water, glacier and wind.

(b) Explain any two types of soil erosion. **(4 marks)**

Types of Soil Erosion

i) Splash Erosion

- Removal of soil by rain drops scattering loose particles and carrying them down slope by runoff.

ii) Rill Erosion

- Removal of top soil by rain water through small channels.

- Occurs when rate of runoff exceeds infiltration and rain water flows over the surface forming small channels called rills.

iii) Gulley Erosion

- Removal of soil through wide and deep channels.

- Occur when moving water or glacier widen and deepen the existing rills.

iv) Sheet Erosion

- Removal of top soil inform of a thin sheet.

- Common around L.Baringo and Marigat.

(c) Discuss measures for protecting soil from erosion. **(10 marks)**

a) Crop Rotation

- Growing crops which require different nutrients on the same piece of land on rotational basis to prevents exhaustion of particular mineral nutrients from the soil e.g. leguminous plants to improve nitrogen content of the soil.

b) Mixed Farming

- Growing crops and keeping animals on the same farm.

- Manure from animals is used to enrich the soil with minerals and improve its structure.

c) Contour Ploughing

- Ploughing across the slope rather than down the slope.

- Helps to trap water on horizontal furrows thus preventing excessive soil removal.

d) Terracing

- Dividing the slope into a series of wide steps and crops are grown on them.

- Trap the soil from being carried away by running water and also traps water allowing it to gradually infiltrate into the soil.

e) Afforestation and Reafforestation

- Leaves reduce the force of rain drops preventing soil particles from being removed.

- Vegetation increases the rate of infiltration of rain water into the soil thus reducing runoff.

- Roots bind the soil particles together.

- Decayed vegetation provides humus which binds the soil particles together.

f) Planting Wind Breakers

- Planting hedges or trees around plots in large fields.

- Act as wind breakers and also trap soil being carried by water.

g) Regulating Livestock Numbers

- Matching the number of animals kept to the carrying capacity of land.

- Overgrazing can also be prevented by paddocking which ensures there is always pasture for animals and no area is overgrazed.

- The pasture is subdivided into portions by fencing.
- Animals are left to graze in one paddock at a time.
- Then they are transferred to the next after a few days.

h) Constructing Gabions

- Construction of wire mesh boxes which are filled with soil.

- Allow water to pass through but trap the soil then vegetation gradually grows on the trapped soil.

i) Planting Cover Crops

- Planting crops which cover the soil properly and holds the soil in place e.g. sweet potato vines.

ji) Mulching

- Covering the soil with crop residues.

- Reduces the impact of rain drops on the soil.

- Decays enriching soil with nutrients.

- Reduce the rate of moisture evaporation from the soil.

16. (a) Mention any five characteristics of Desert Vegetation. **(5 marks)**

Characteristics

- Grasses and woody plants.
- Woody plants which are Xerophytic and halophytic.
- Shrubs have shallow roots due to permafrost.
- Plants flower and produce fruits within short wet season.

- There is scarce vegetation in Tundra.
- Plants present in arctic deserts are such as lichens, mosses and flowering plants such as anemones and marsh marigold.

(b) Examine the importance of Forest to Rwanda. **(10 marks)**

Importance of Forests to Rwanda.

- Forests are water catchment areas which supports agriculture and H.E.P. generation.
- Forests provide us with wood fuel e.g. firewood, charcoal and saw dust.
- Forests prevent soil erosion by their roots binding the soil together, reducing run off thereby reducing incidents of flooding and dam siltation.
- Forests are habitats of wild animals which are a tourist attraction which brings foreign exchange used to import goods and services and fund development projects.
- Forests are a disposal system for carbon dioxide which they use in photosynthesis and release oxygen thereby purifying air and reducing global warming.
- Forests increase soil fertility when leaves fall and rot forming humus.
- Forests regulate the climate of an area by creating a micro climate causing heavy and frequent rain by evapotranspiration and lowering temperatures.
- Forests are a source of timber for construction and furniture making.
- Forests beautify the environment by flora (plants) and fauna (animals).
- Some forest's trees are a source of medicine.
- Presence of forests has led to the development of infrastructure as roads have been constructed to make forests accessible.
- Forests provide employment to people e.g. forest guards, forest officers, carpenters and timber merchants.

17. (a) Draw a sketch of a river profile and show the following parts: Meander, Confluence, and mouth. **(5 marks)**

drawing

(b) Evaluate the relationship between water bodies and human activities. **(10 marks)**

The relationship between water bodies and human activities are the following:

- Settlements, Water bodies that contain fresh water attract human settlements.
- Agriculture, Fresh water bodies encourage agriculture by providing water which is used for irrigation.
- Transport, Lakes, seas, oceans and navigable rivers provide a cheap means of transport for people and goods.
- Fishing, Water bodies such as oceans, lakes, rivers are good habitats for fish and other aquatic life.
- Mining, some water bodies contain minerals in their beds.
- Tourism, Water bodies form beautiful sceneries e.g., waterfalls and sandy beaches which attract tourists.
- Recreation, some water bodies offer recreational activities. Water sports such as surfing, yatching and sport fishing are some recreational activities that people engage in.
- Industries, Water bodies such as rivers and lakes provide water which is used for industrial purposes.
- Ports, some rivers have suitable sites for the construction of ports and harbours.
- Building materials, Lakes and rivers contain sand, gravel and pebbles in their beds.
- Flooding, Water bodies such as rivers may flood causing the displacement of people, destruction of property.

- Water-borne diseases, Water bodies can be breeding grounds for disease-carrying organisms. Mosquitoes and snails transmit malaria and bilharzia respectively, which are water-borne diseases.

18. (a) Evaluate the effects of the ozone layer depletion. **(5 marks)**

The effects of ozone layer depletion include the following:

- Increase in temperatures resulting in many of the glaciers melting.
- Rise in the sea level due to the incoming melt water.
- Diseases like skin cancer.
- Extinction of some plant and animal species due to the harsh climatic conditions.
- Prolonged droughts and global warming in general that results to environmental degradation.

(b) Explain factors that affect temperature. **(10 marks)**

These are factors that influencing temperature. The factors are: 1. Latitude 2. Altitude 3. Continentality 4. Ocean Currents and Winds 5. Slope, Shelter and Aspect 6. Natural Vegetation and Soil.

1. Latitude:

Due to the earth's inclination, the mid-day sun is almost overhead within the tropics but the sun's rays reach the earth at an angle outside the tropics. Temperature thus diminishes from equatorial regions to the poles.

2. Altitude:

Since the atmosphere is mainly heated by conduction from the earth, it can be expected that places nearer to the earth's surface are warmer than those higher up. Thus temperature decreases with increasing height above sea level.

3. Continentality:

Land surfaces are heated more quickly than water surfaces, because of the higher specific heat of water. In other words, it requires only one-third as much

energy to raise the temperature of a given volume of land by 1°F. as it does for an equal volume of water.

4. Ocean Currents and Winds:

Both ocean currents and winds affect temperature by transporting their heat or coldness into adjacent regions.

5. Slope, Shelter and Aspect:

A steep slope experiences a more rapid change in temperature than a gentle one. Mountain ranges that have an east- west alignment like the Alps show a higher temperature on the south-facing 'sunny slope' than the north- facing 'sheltered slope'.

6. Natural Vegetation and Soil:

There is a definite difference in temperature between forested regions and open ground. The thick foliage of the Amazon jungle cuts off much of the in-coming insolation and in many places sunlight never reaches the ground.