THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

113/1 **GEOGRAPHY 1**

(For Both School and Private Candidates)

Time: 3 Hours **ANSWERS** **Year: 2006**

Instructions

1. This paper consists of section A, and B with total of 13 questions.
2. Answer a total of five questions; two in section A, and three in questions in section B. Question number 1 is compulsory.

1. Carefully study the map extract of Mpanda sheet 153/3 and answer the following questions.

(a) Give an account on the population distribution of the area.

The population distribution in the mapped area is influenced by factors such as relief, water availability, and economic activities.

- Higher population densities are observed in and around Mpanda town, where infrastructure, trade, and administrative functions are concentrated.
- Moderate population densities are found in areas with agricultural potential, such as settlements near rivers and water sources.
- Low population densities exist in rugged terrain and forested regions, where accessibility is limited.
- The refugee settlement area shows a clustered distribution of people due to the establishment of designated living zones.

Overall, population distribution varies based on accessibility, economic opportunities, and environmental conditions.

(b) Explain factors that have influenced the distribution of vegetation of the mapped area.

Several factors influence the vegetation distribution in the area:

- Climate. Rainfall and temperature determine the type of vegetation, with denser forests in areas receiving more rainfall and sparse vegetation in drier regions.
- Soil type. Fertile soils support agricultural activities and natural vegetation, while rocky or sandy soils limit vegetation growth.
- Relief. High-altitude areas with steep slopes have less vegetation due to soil erosion and harsh conditions, while lowland areas support forests and grasslands.
- Human activities. Deforestation, agriculture, and settlement expansion have altered natural vegetation, leading to scattered patches of trees and cleared land.
- Drainage. Areas near rivers and wetlands have more vegetation due to water availability, supporting papyrus swamps and riparian forests.

(c) Find the actual distance of railway line from grid reference 860975 to 930939 in kilometres.

The distance of the railway line is determined by:
- Measuring the railway segment on the map between the two grid references.
- Using the scale of the map to convert the measured distance into real-world kilometers.

If the map scale is 1:50,000, where 1 cm represents 0.5 km, the measured length of the railway line can be converted accordingly. The exact distance requires precise measurement from the map.

(d) Describe the environmental and social impacts that are likely to hit the mapped area being the asylum area.

As an asylum area, the region is likely to experience both environmental and social impacts.

Environmental impacts:
- Deforestation due to increased demand for firewood, shelter construction, and land clearance.
- Soil erosion caused by overuse of land and destruction of vegetation cover.
- Water scarcity as a result of higher demand for domestic and agricultural use.
- Waste disposal challenges, leading to pollution and health hazards.

Social impacts:
- Population pressure leading to competition for limited resources such as land and water.
- Increased demand for social services such as healthcare, education, and security.
- Potential conflicts between refugees and host communities over resource use.
- Economic opportunities arising from labor supply and trade activities in the refugee settlement.

(e) With reference to the relief and the settlement pattern of the area, account for the type, layouts and quality of overland transportation.

The type and quality of transportation infrastructure in the area are influenced by relief and settlement patterns.

- The presence of a railway line indicates an organized transport network that facilitates movement of goods and people.
- Road networks vary, with all-weather roads connecting major settlements and smaller dirt tracks serving remote areas.
- The relief affects road quality, as hilly or rugged areas may have fewer roads due to steep gradients and difficulty in construction.
- Settlements along roads and railway lines suggest a linear settlement pattern, where transportation accessibility plays a key role in population distribution.
- Remote areas with rough terrain and sparse population have fewer transport links, making movement difficult.

Overall, the transportation system reflects a mix of well-established routes in urban areas and limited access in rugged or forested regions.

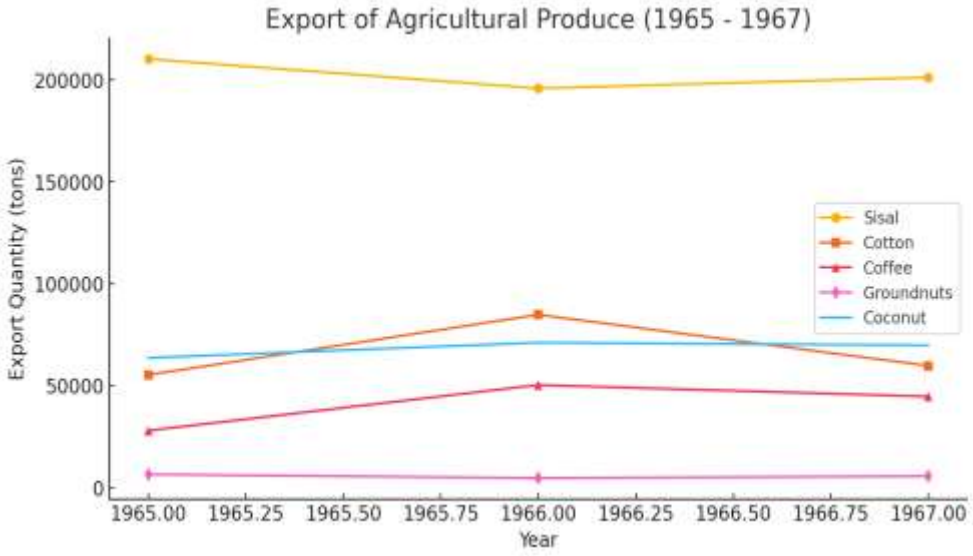
2. Study table 1 carefully and use it to answer the questions that follow.

Table 1: Export of Agricultural Produce (tons) 1965 - 1967

Period	Sisal	Cotton	Coffee	Groundnuts	Coconut
1965	210,235	55,261	27,947	6,445	63,632
1966	195,812	84,786	50,321	4,653	71,099
1967	201,183	59,760	44,637	5,573	69,789

(a) Draw a suitable line graph to represent the data shown in the table.

The line graph has been drawn to show the export quantities of agricultural produce from 1965 to 1967. Each product is represented by a separate line to illustrate changes over the years.



(b) Comment on the limitations of the method used.

Line graphs are useful for showing trends over time, but they have several limitations:

- Difficulty in comparing multiple variables. Since the data includes five different agricultural products, the overlapping lines may cause confusion in interpreting the trends.
- Large numerical differences. The variation in quantity between products like sisal and groundnuts is significant, making it hard to compare all items on the same scale.
- Misleading trends. Small fluctuations in data may appear significant on a graph, potentially exaggerating changes.
- Lack of precise values. While the graph shows trends, it does not provide exact numerical values, requiring reference to the data table for accuracy.

Despite these limitations, line graphs are effective for identifying general patterns and changes over time in export quantities.

3. (a) Briefly give an account of field research.

Field research is a method of data collection that involves direct observation, measurement, and interaction with subjects in their natural environment. It is widely used in geography, anthropology, and social sciences to gather firsthand information. Field research can include surveys, interviews, experiments, and case studies. The main advantage is that it provides accurate and real-time data, but it can be time-consuming and costly.

(b) Outline the strengths and weaknesses of questionnaires and interviews as methods of data collection.

Questionnaires:

Strengths:
- Allow data collection from a large number of respondents in a short time.
- Provide standardized responses, making data analysis easier.
- Can be administered remotely, reducing logistical costs.

Weaknesses:
- Respondents may provide inaccurate or dishonest answers.
- Limited flexibility, as questions are pre-structured.
- Low response rates can affect data reliability.

Interviews:

Strengths:
- Allow for in-depth data collection with detailed explanations.
- Enable researchers to clarify questions and probe for additional information.
- Provide insights into respondents' emotions and attitudes.

Weaknesses:
- Time-consuming and labor-intensive.
- Responses may be influenced by the interviewer's presence.
- Difficult to analyze due to the qualitative nature of responses.

4.(a) What is compass survey?

A compass survey is a method of measuring angles and directions using a magnetic compass. It is commonly used in land surveying, navigation, and mapping to determine bearings and orientations. The surveyor records angles relative to magnetic north and calculates distances using measured field data.

(b) Explain the ways that can be used to reduce errors during compass surveying.

To reduce errors in compass surveying:
- Avoid working near metallic objects or electric currents that can affect the magnetic needle.
- Take multiple readings from different positions and calculate an average.
- Use a well-calibrated and properly leveled compass to ensure accuracy.
- Minimize parallax errors by reading the compass at eye level.
- Correct for magnetic declination to obtain true bearings.

5.(a) A camera in an aircraft at an altitude of 1600 metres was used to take a photograph. Determine the focal length of the camera if the scale of the photograph is 1:50000.

The formula for scale in aerial photography is:

Scale = Focal length / Flying height

Rearranging the formula to find focal length:

Focal length = Scale x Flying height

Substituting the given values:

Focal length = (1/50000) x 1600

Focal length = 0.032 metres or 32 millimetres

(b) What are the merits and demerits of ground photographs?

Merits:
- Provide detailed and realistic images of the landscape.
- Can be taken at various angles to capture different perspectives.
- Require less equipment and lower costs compared to aerial photographs.

Demerits:
- Cover a limited area, making large-scale mapping difficult.
- May contain distortions due to camera angles and perspective.
- Weather conditions can affect visibility and image quality.

6. Give an account of the major divisions of the geological time scale.

The geological time scale is divided into eons, eras, periods, and epochs, representing Earth's history from its formation to the present.

- The Precambrian Eon (4.6 billion - 541 million years ago) is the longest eon, covering the formation of the Earth, early life, and the appearance of simple organisms.
- The Paleozoic Era (541 - 252 million years ago) saw the development of marine life, the rise of fish, amphibians, and early reptiles, and ended with the largest mass extinction.
- The Mesozoic Era (252 - 66 million years ago) is known as the "Age of Reptiles," with the dominance of dinosaurs and the emergence of mammals and birds before another mass extinction.
- The Cenozoic Era (66 million years ago - present) is the "Age of Mammals," marked by the rise of modern mammals, birds, and eventually humans.

Each division is defined by major evolutionary and geological events, shaping Earth's history.

7. Describe the favourable conditions for the development of a river capture.

River capture, or stream piracy, occurs when one river erodes into another river's drainage basin, diverting its flow. The favourable conditions for river capture include:

- Differential erosion. A river with a higher erosional capacity carves through soft rocks more effectively, allowing it to extend its valley and capture another river.
- Steep gradient. A river with a steeper slope flows faster and erodes more aggressively, cutting into a neighboring drainage basin.
- Tectonic movements. Uplift or faulting can tilt land surfaces, causing rivers to change direction and leading to capture.
- Headward erosion. The gradual upstream extension of a river channel allows it to intercept another river.
- Rock structure and composition. Softer rocks erode faster, allowing one river to advance more quickly and capture another.

When capture occurs, the diverted river may leave behind a dry valley known as a wind gap.

8. Examine the factors which influence the rate of coastal wave erosion.

The rate of coastal wave erosion depends on several natural and human-induced factors:

- Wave energy. High-energy waves from strong winds and storms erode coastlines faster than low-energy waves.
- Rock type. Hard rocks like granite resist erosion, while soft rocks like sandstone erode quickly.
- Coastal slope. Steep cliffs experience more direct wave impact and erosion compared to gently sloping beaches.
- Tidal range. A high tidal range increases the exposure of rocks to repeated wave action, accelerating erosion.
- Human activities. Coastal developments, deforestation, and sand mining weaken shorelines, making them more vulnerable to erosion.
- Climate change. Rising sea levels and increased storm frequency intensify wave erosion along coastlines.

9. With the aid of diagrams, write short notes on any four of the following:

(a) Atoll

An atoll is a ring-shaped coral reef that encloses a lagoon, typically formed around a sinking volcanic island. As the island subsides, corals grow upward, maintaining the reef structure.

(b) Mesas and Buttes

Mesas and buttes are flat-topped hills with steep sides, formed by erosion of layered rock. Mesas are larger, while buttes are smaller and more isolated remnants.

(c) Geo

A geo is a narrow coastal inlet formed by wave erosion along lines of weakness in cliffs. Over time, continuous wave action enlarges the inlet, creating a steep-sided coastal feature.

(d) Zone of subduction

A subduction zone is where an oceanic plate sinks beneath a continental or another oceanic plate due to tectonic movement. It forms deep-sea trenches, volcanic arcs, and earthquakes.

(e) Rias

Rias are drowned river valleys formed by rising sea levels that submerge coastal river channels, creating deep, navigable inlets. They are common in regions with a history of glacial melting.

(f) Eskers

Eskers are long, winding ridges of sand and gravel deposited by meltwater streams beneath glaciers. They indicate past glacial movement and drainage patterns.

10. Examine the various causes of climatic changes experienced on the earth over different time scales.

Climate change occurs due to natural and human-induced factors:

- Orbital variations. Changes in Earth's orbit and tilt influence ice ages and interglacial periods over thousands of years.
- Volcanic eruptions. Large eruptions release ash and gases that block sunlight, causing temporary cooling.
- Ocean currents. Changes in currents like El Niño and La Niña affect global temperature and precipitation patterns.
- Solar activity. Variations in solar radiation influence climate cycles, including warming and cooling trends.

- Greenhouse gases. Human activities such as burning fossil fuels and deforestation increase carbon dioxide and methane, leading to global warming.
- Deforestation. Reducing forest cover decreases carbon absorption and increases atmospheric temperatures.

These factors, acting over different time scales, contribute to long-term and short-term climate variations.

11. To what extent can the theory of plate tectonic explain the present landforms in East Africa?

The plate tectonic theory provides a strong explanation for the formation of landforms in East Africa.

- The East African Rift Valley. The region is undergoing continental rifting, where the African plate is splitting into two smaller plates. This has resulted in faulting, earthquakes, and volcanic activity.
- Volcanic mountains. Landforms such as Mount Kilimanjaro and Mount Kenya were formed by volcanic eruptions due to tectonic movement.
- Lakes and basins. Rift valley lakes such as Lake Tanganyika and Lake Malawi formed due to subsidence along fault lines.
- Earthquakes. The active faulting in East Africa causes frequent seismic activity.

While other processes like erosion and sedimentation also shape the landscape, plate tectonics is the primary driver of major landform changes in the region.

12. Briefly explain the following:

(a) Ecosystem

An ecosystem is a community of living organisms interacting with their physical environment. It includes biotic components like plants and animals and abiotic factors like soil, water, and climate.

(b) Habitat

A habitat is the natural environment where a species lives and thrives. It provides food, water, shelter, and conditions necessary for survival.

(c) Micro-climate

A micro-climate is a localized climate condition that differs from the surrounding area, influenced by factors such as vegetation, buildings, and topography. Examples include urban heat islands and forest clearings.

(d) Climax vegetation

Climax vegetation refers to a stable and mature plant community that has reached equilibrium with environmental conditions. It represents the final stage of ecological succession.

13. With examples, analyze the factors which influence soil formation.

Soil formation is influenced by several key factors:

- Parent rock. The mineral composition of the underlying rock determines soil texture and nutrient content. For example, basaltic rock forms fertile volcanic soils.
- Climate. Temperature and rainfall affect weathering rates and organic matter decomposition. Tropical regions have rapid soil formation due to high rainfall.
- Biological activity. Plants, animals, and microorganisms contribute to organic matter buildup and soil fertility. Earthworms, for instance, aerate and enrich soil.
- Topography. Slopes influence drainage and erosion. Steep areas have thin soils, while flat areas accumulate deep, fertile soils.
- Time. Soil formation is a slow process, taking thousands of years to develop mature layers. Young soils are less developed compared to older soils.
- Human activities. Deforestation, agriculture, and urbanization alter natural soil processes, sometimes leading to degradation.

These factors interact to determine soil characteristics in different environments.