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: 2018**

Instructions

1. This paper consists of section A, and B with total of seven 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 Mbeya (sheet 244/4) provided and then answer the following questions.

(a) Calculate the area covered by Mbeya Forest Reserve.

i. Identify the boundaries of Mbeya Forest Reserve on the map, which is shaded in green.
ii. Count the number of full grid squares occupied by the forest reserve. Each full square represents 1 square kilometer.
iii. Estimate the partially occupied grid squares and convert them into full squares.
iv. Summing up these values, the area covered by Mbeya Forest Reserve is approximately 7 square kilometers.

(b) What factors are likely to have influenced the location of Mbeya town?

i. Availability of water sources has contributed to the establishment of Mbeya town. The presence of rivers and streams provides water for domestic, industrial, and agricultural use.
ii. Fertile land has attracted settlement and farming activities. The volcanic soils in the region support the cultivation of crops, making it a favorable location for agricultural development.
iii. Presence of transport networks, including roads and railways, has enhanced communication and trade, making Mbeya an important economic and administrative center.
iv. Relief features such as valleys and gentle slopes provide suitable land for urban expansion, reducing construction challenges compared to steep mountainous areas.
v. Climatic conditions, characterized by moderate temperatures and reliable rainfall, have made Mbeya a comfortable living environment for people.
vi. Historical and economic significance as a trade hub has led to the growth of Mbeya town, attracting people for business, employment, and settlement.

(c) Identify the types and distribution of vegetation cover.

i. Forests are mainly found in the Mbeya Forest Reserve, which is concentrated in the central and southern parts of the map. These areas are marked in green.
ii. Woodlands are scattered across various parts of the region, particularly in less populated areas where natural vegetation remains undisturbed.
iii. Scrub vegetation is found in drier areas, particularly in regions with limited human activities or along slopes.
iv. Plantations of crops such as coffee and tea are seen in some areas, indicating commercial agricultural activities.

(d) In not less than two points for each, comment on:

(i) Land use

i. Agricultural land is widely used for farming activities, including cash crop and subsistence farming. The presence of plantations and cultivated fields confirms this.

ii. Urban development is evident in Mbeya town and surrounding settlements, where residential, commercial, and industrial activities take place.

(ii) Settlement pattern

i. Nucleated settlements are observed in urban areas such as Mbeya town, where people live close to infrastructure and services.
ii. Dispersed settlements are found in rural areas, where houses and farms are spread over large areas due to the availability of land for agriculture.

(iii) Relief

i. The map shows a combination of highlands and lowlands. The presence of contour lines indicates that some areas have steep slopes, while others are relatively flat.
ii. The highland areas are found towards the western and northern parts of the map, while the central and southern areas have gentler slopes suitable for farming and settlement.

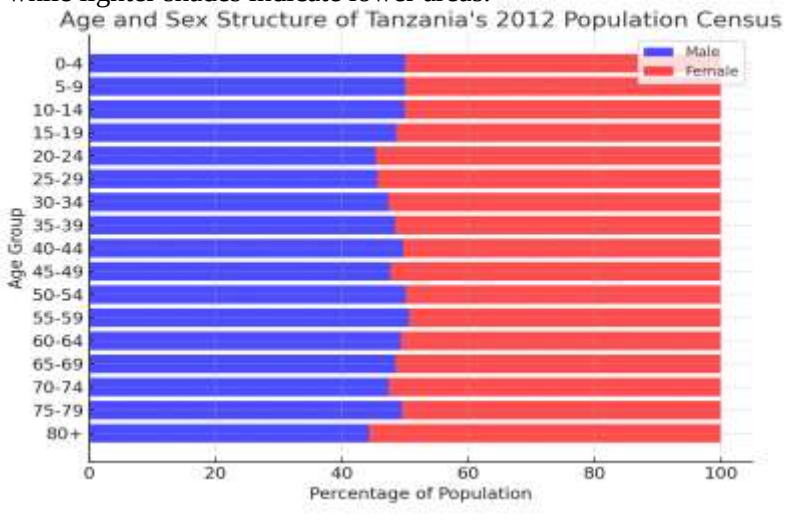
(iv) Rock types

i. Volcanic rocks are dominant in some parts of the region, contributing to the presence of fertile soils that support agriculture.
ii. Sedimentary rocks are likely present in lowland areas where erosion and deposition have occurred over time. These rocks may be associated with river valleys and plains.

(e) Identify three ways that have been used to show relief.

i. Contour lines are used to indicate variations in elevation. Closely spaced contour lines represent steep slopes, while widely spaced lines indicate gentle slopes.
ii. Spot heights are marked at specific locations to show the exact altitude of a place above sea level. These provide accurate elevation data.
iii. Shading and color variations help differentiate highland and lowland areas. Darker colors often represent higher elevations, while lighter shades indicate lower areas.

3. (a)



(b) Briefly comment on the nature of the shape of the age and sex structure drawn in (a).

i. The population pyramid shows a broad base, indicating a high birth rate and a large proportion of young people in the population. This suggests that Tanzania has a youthful population with a high dependency ratio.
ii. The middle-aged population gradually decreases, reflecting lower numbers of people in working-age groups. This trend suggests that some people may migrate for employment opportunities elsewhere, or there could be mortality factors affecting this group.
iii. The population in older age groups is significantly lower compared to the younger age groups, indicating lower life expectancy. Fewer people reach advanced ages due to factors such as health conditions and living standards.
iv. The slight dominance of females over males in the older age groups suggests that women tend to have higher life expectancy than men, which is a common global trend.
v. The overall shape of the population structure suggests a growing population with a need for increased investment in healthcare, education, and employment opportunities to support the large youth population.

3. Differentiate the following pairs of field research technical terms.

(a) Field work and field research.

i. Field work refers to the practical aspect of collecting data from a natural setting, involving direct observation, measurement, and sampling. It focuses on the process of gathering information from the environment.
ii. Field research is a broader concept that includes both the collection and analysis of data. It involves planning, conducting field work, interpreting results, and drawing conclusions based on observations.

(b) Research method and research methodology.

i. Research method refers to specific techniques and tools used for data collection, such as interviews, surveys, and experiments. It focuses on practical ways of gathering information.
ii. Research methodology is the overall framework and principles guiding a research process. It includes the philosophy, design, and strategies used to ensure systematic data collection and analysis.

(c) Null hypothesis and alternative hypothesis.

i. Null hypothesis is a statement that assumes no relationship or effect exists between variables. It is tested to determine if it should be rejected or accepted based on research findings.
ii. Alternative hypothesis is a statement that suggests a relationship or effect exists between variables. It represents what the researcher aims to prove through experimentation or observation.

(d) Objectivity in field research and objectives of field research.

i. Objectivity in field research means collecting and analyzing data without personal bias or influence. It ensures that findings are based on facts rather than opinions or expectations.
ii. Objectives of field research refer to the goals or purposes of conducting a study, such as understanding human behavior, assessing environmental changes, or evaluating economic activities.

(e) Quantitative research and qualitative research.

i. Quantitative research involves collecting numerical data that can be measured and analyzed statistically. It focuses on objective facts, such as population size, temperature variations, and rainfall amounts.
ii. Qualitative research involves collecting non-numerical data, such as descriptions, interviews, and case studies. It focuses on understanding experiences, opinions, and meanings behind social or environmental phenomena.

4. Carefully study the photograph below and then answer the questions that follow.

(a) What type of photograph is this?

The photograph is a ground-level or terrestrial photograph. It is taken from the surface of the earth at an angle that shows details of the landscape, including vegetation, water bodies, and human activities. This type of photograph provides a clear view of natural and artificial features in the foreground and background.

(b) Identify three types of economic activities which are carried out in the area. Give evidence for each activity.

i. Agriculture is a major activity, as evidenced by the presence of well-irrigated green fields, indicating organized crop cultivation.
ii. Livestock keeping is likely practiced, as the availability of green pastures and water sources suggests a suitable environment for grazing animals.
iii. Fishing may occur in the nearby water body, as large water resources often support fishery activities that provide food and employment to the local population.

(c) Give four factors which might have influenced the economic activities mentioned in (b).

i. Availability of water sources supports irrigation, livestock farming, and fishing activities, ensuring sustainability throughout different seasons.
ii. Fertile soil in the region allows for successful crop cultivation, leading to high agricultural productivity.
iii. Favorable climate, including moderate rainfall and temperature, promotes the growth of vegetation and supports various farming practices.
iv. Presence of transport infrastructure such as roads enables farmers and fishers to transport their products to markets, boosting trade and economic growth.

(d) Giving a reason, identify two environmental problems which are likely to face the area.

i. Water pollution is a possible issue due to agricultural runoff containing fertilizers and pesticides, which can contaminate nearby water bodies.
ii. Soil degradation may occur due to excessive irrigation, leading to salinization and loss of soil fertility over time.

(e) At what time was the photograph taken? Give reasons for your answer.

The photograph was likely taken during the wet season. This is supported by the presence of lush green vegetation, indicating recent rainfall or sufficient irrigation. Additionally, the water body appears full, suggesting high water levels due to seasonal rains.

(f) Identify the activity which is taking place in the photograph. Give a reason for your answer.

The activity taking place in the photograph is irrigation farming. The presence of sprinklers distributing water across the fields indicates artificial watering of crops to support agricultural production, especially in areas where rainfall is insufficient.

5. Using relevant examples,

(a) Describe four major characteristics of karst scenery.

i. Presence of limestone rock is the primary feature of karst landscapes. Karst scenery forms in areas where limestone is dominant, as it is highly soluble in water. Examples include the Guilin Karst in China and the limestone formations in the Dinaric Alps.
ii. Underground drainage is a common characteristic, where surface water disappears into sinkholes or caves, flowing through underground channels instead of forming surface rivers. The Puerto Princesa Underground River in the Philippines is an example of such a system.
iii. Formation of caves and caverns occurs due to continuous dissolution of limestone by acidic water. Famous examples include Mammoth Cave in the USA and Jenolan Caves in Australia.
iv. Development of karst towers and limestone pillars results from prolonged erosion and weathering. These isolated rock formations, like the Stone Forest in China, stand as remnants of former extensive limestone landscapes.

(b) Explain six factors influencing the existence of underground water.

i. Nature of the rock determines underground water storage. Porous and permeable rocks like sandstone allow water to infiltrate and accumulate in aquifers, whereas impermeable rocks like granite prevent water storage.
ii. Climate plays a crucial role, as areas with high rainfall promote infiltration and groundwater recharge, while arid regions have limited underground water due to high evaporation.

iii. Vegetation cover enhances infiltration by reducing surface runoff and slowing down the movement of water, allowing it to seep into the ground more effectively.
iv. Topography influences the movement and accumulation of underground water. Flat or gently sloping areas allow water to penetrate the soil, while steep slopes promote runoff, reducing infiltration.
v. Human activities such as excessive groundwater extraction for agriculture and industrial use can lower water tables, affecting the sustainability of underground water sources.
vi. Geological structures such as faults and fractures create pathways for underground water movement and storage. Areas with well-developed fault systems often have significant groundwater reserves.

6. Examine five causes of temperature inversion and give its three effects.

Causes of temperature inversion:

i. Radiation cooling occurs at night when the ground loses heat rapidly, cooling the air near the surface while the upper layers remain warmer.
ii. Subsidence inversion happens when air descends and compresses under high pressure, warming the upper layers while cooler air remains trapped below.
iii. Valley inversion occurs in mountainous areas where cold air descends and accumulates in valleys, leading to lower temperatures at lower altitudes compared to higher elevations.
iv. Oceanic influence can cause temperature inversion when warm ocean currents overlay cold air masses, preventing the mixing of air layers.
v. Presence of smoke and pollution can enhance inversion by trapping heat at higher levels, creating a stable layer of warm air that prevents the dispersion of pollutants.

Effects of temperature inversion:

i. Increased air pollution occurs as pollutants and smog become trapped near the surface, leading to poor air quality and respiratory issues.
ii. Frost formation can damage crops when cold air is trapped near the ground, leading to freezing conditions harmful to vegetation.
iii. Disruption of normal weather patterns can result in prolonged dry conditions or fog formation, affecting transportation and visibility.

7. Account for three theories explaining the occurrence of coral reef and atoll.

i. Darwin's subsidence theory suggests that coral reefs initially form around volcanic islands. As the island gradually sinks, corals continue to grow upward, eventually forming fringing reefs, barrier reefs, and atolls.
ii. Daly's glacial control theory proposes that coral reefs developed due to changes in sea level during glacial and interglacial periods. When sea levels rose after ice ages, corals grew on submerged landforms, creating reefs and atolls.
iii. Murray's standstill theory argues that coral reefs grow in shallow waters where conditions remain stable. He suggested that reefs develop where underwater platforms provide suitable surfaces for coral attachment without significant subsidence.

8. Examine four layers of the atmosphere and in each give three characteristics.

i. Troposphere
- It is the lowest atmospheric layer, extending up to about 12 km from the Earth's surface.
- Weather and climatic processes, such as cloud formation, precipitation, and storms, occur in this layer.
- Temperature decreases with altitude at an average rate of 6.5°C per km.

ii. Stratosphere
- It extends from about 12 km to 50 km above the Earth's surface.
- The ozone layer is located in this layer, absorbing harmful ultraviolet radiation from the sun.
- Temperature increases with altitude due to the absorption of solar radiation by ozone molecules.

iii. Mesosphere
- It lies between 50 km and 85 km above the Earth's surface.
- It is the coldest layer of the atmosphere, with temperatures dropping as low as -90°C.
- Meteors burn up in this layer due to friction with air molecules.

iv. Thermosphere
- It extends from about 85 km to 600 km above the Earth.
- The temperature increases significantly due to the absorption of solar radiation, reaching up to 2,500°C.
- The auroras (northern and southern lights) occur in this layer due to the interaction of charged particles with the Earth's magnetic field.

9. Describe the nature, spatial distribution, and significance of Fold Mountains.

Nature of Fold Mountains:
i. Fold Mountains are formed due to the compression of tectonic plates, causing layers of the Earth's crust to buckle and fold over millions of years.
ii. They consist of anticlines (upfolds) and synclines (downfolds), creating rugged and elevated terrain.
iii. These mountains often contain extensive rock layers that have been uplifted, leading to high peaks, steep slopes, and deep valleys.

Spatial distribution of Fold Mountains:
i. Fold Mountains are mainly found along convergent plate boundaries where tectonic plates collide.
ii. Major Fold Mountain ranges include the Himalayas in Asia, the Andes in South America, the Rockies in North America, and the Alps in Europe.
iii. They are commonly located near continental margins, where oceanic and continental plates interact, leading to intense folding and uplift.

Significance of Fold Mountains:
i. They provide sources of major rivers, as many of the world's largest river systems originate in Fold Mountain regions, supplying water for agriculture, industry, and domestic use.

ii. They are rich in mineral resources, including coal, iron, and precious metals, making them economically significant for mining activities.
iii. They support tourism and recreation due to their scenic beauty, attracting visitors for activities such as hiking, skiing, and mountaineering.
iv. They act as climate barriers, influencing weather patterns by blocking winds and causing orographic rainfall on windward slopes while creating dry conditions on leeward sides.
v. They provide habitat for diverse plant and animal species, contributing to ecological balance and biodiversity conservation.