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: 2014**

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. Study carefully the map extract of MPANDA Sheet 153/3 provided then answer the following questions.

(a) Measure the length of the railway line in kilometers from grid reference 845977 to 989022.

i. Identify the railway line on the map and trace its path between the given grid references.
ii. Use a ruler or a piece of string to measure the distance along the railway while accounting for curves.
iii. Convert the measured distance into actual ground distance using the map scale, assuming a scale of 1:50,000.
iv. The estimated length of the railway line is approximately 23 kilometers.

(b) Describe the nature of settlement pattern found in the area.

i. The settlement pattern is nucleated in urban areas, as indicated by densely clustered buildings in Mpanda town.
ii. There are linear settlements along major roads and railway lines, suggesting transport accessibility influences settlement distribution.
iii. Dispersed settlements are seen in rural areas, where houses are scattered due to agricultural activities and land availability.

(c) Briefly explain the three economic activities taking place in the area.

i. Agriculture is a primary economic activity, as evidenced by large areas of cultivated land surrounding settlements.
ii. Mining activities occur in the region, with mineral extraction likely contributing to local employment and economy.
iii. Trade and commerce take place in urban centers like Mpanda town, where markets and transport infrastructure support economic transactions.

(d) Analyze the nature and distribution of vegetation in the area.

i. Woodland vegetation is present, consisting of scattered trees and shrubs, indicating a semi-arid or savanna climate.
ii. Dense vegetation is found in hilly and forest reserve areas, where human activity is minimal.
iii. Grasslands dominate open spaces, providing pasture for livestock and supporting grazing activities.

(e) With two evidences from the map, identify the type of climate found in the area.

i. The presence of seasonal swamps and rivers suggests a region with distinct wet and dry seasons, typical of a tropical or semi-arid climate.
ii. Vegetation patterns such as woodland and scattered trees indicate moderate rainfall, supporting a mix of farming and livestock keeping.

(f) Identify the method which has been applied to show relief of the area and give three advantages for using such a method.

i. The method used to show relief on the map is contour lines, which represent elevation and terrain features.

advantages

i. Contour lines provide detailed information on slope gradients and elevation differences, helping in land use planning.
ii. They allow for easy identification of landforms such as hills, valleys, and plateaus, essential for geographical and geological studies.
iii. Contour maps offer a three-dimensional view of the terrain on a two-dimensional surface, making them useful for navigation and engineering projects.
2. (a) Differentiate the following statistical concepts:

(i) Inferential statistics and Descriptive statistics.

i. Descriptive statistics summarize and present data in an organized manner using measures such as mean, median, mode, and standard deviation. It describes characteristics of a dataset without making predictions or generalizations.
ii. Inferential statistics analyze data from a sample and draw conclusions about a larger population. It involves hypothesis testing, confidence intervals, and regression analysis to make predictions and generalizations.

(ii) Dependent and Independent variable.

i. A dependent variable is the outcome or response that is influenced by changes in other variables. It is measured to determine the effect of an independent variable.
ii. An independent variable is the factor that is manipulated or changed in an experiment to observe its effect on the dependent variable. It is considered the cause of variation in research studies.

(b) The form five students' scores in Geography subject at Nganza S.S were as follows:

Scores	Frequency
20-29	2
30-39	8
40-49	10
50-59	16
60-69	6
70-79	1

(i) Calculate the standard deviation.

i. Compute the midpoints of each class interval.
ii. Multiply the midpoints by their corresponding frequencies.
iii. Find the mean by dividing the total sum of midpoint-frequency products by the total frequency.
iv. Calculate the squared deviations from the mean for each class interval.
v. Multiply the squared deviations by their respective frequencies.
vi. Compute the variance by dividing the total sum of squared deviations by the total frequency.
vii. Take the square root of the variance to obtain the standard deviation.

Scores Midpoint (x)	Frequency (f)	fx	Deviation (x - Mean)	(x - Mean)²	f(x - Mean)²
20.0	2.0	40.0	-24.418604651162788	596.2682531097889	1192.5365062195779
30.0	8.0	240.0	-14.418604651162788	207.89616008653317	1663.1692806922654
40.0	10.0	400.0	-4.418604651162788	19.52406706327742	195.2406706327742
50.0	16.0	800.0	5.581395348837212	31.151974040021663	498.4315846403466
60.0	6.0	360.0	15.581395348837212	242.7798810167659	1456.6792861005954
70.0	1.0	70.0	25.581395348837212	654.4077879935102	654.4077879935102

(ii) What are the disadvantages of grouped data?

i. Loss of individual data details occurs since values are categorized into class intervals, making it impossible to retrieve original observations.
ii. The range within a class interval is assumed to be uniform, leading to approximation errors in statistical computations.
iii. Grouped data analysis requires advanced statistical methods such as interpolation for median and mode, which increases complexity.
iv. Outliers and unique trends may be hidden within the intervals, making it difficult to detect small variations in the dataset.

3. (a) Explain the types of vertical aerial photographs.

i. True vertical aerial photographs are taken with the camera lens positioned exactly perpendicular to the ground, providing an accurate scale for mapping and land surveys.
ii. Tilted vertical aerial photographs have a slight deviation from the perpendicular axis due to camera tilting, causing minor distortions but still useful for interpretation.

(b) Describe why aerial photographs appear difficult in interpretation.

i. Variations in scale occur due to changes in terrain elevation, making it challenging to measure distances accurately.
ii. Shadows and lighting conditions affect visibility, creating distortions and making it harder to distinguish features.
iii. Overlapping images from multiple angles require stereoscopic analysis, which can be complex for inexperienced interpreters.
iv. Seasonal variations in vegetation and water bodies affect image consistency, making land use classification difficult.
v. Lack of labeling and orientation requires additional interpretation techniques to correctly identify objects and features.

4. (a) Distinguish the following research concepts:

(i) Research Proposal and Research Report.

i. A research proposal is a plan that outlines the objectives, methodology, and significance of a study before data collection begins. It serves as a blueprint for research execution.
ii. A research report is the final document that presents findings, analysis, conclusions, and recommendations after data collection and analysis have been completed.

(ii) Qualitative Research and Quantitative Research.

i. Qualitative research explores subjective experiences, opinions, and behaviors using methods such as interviews and observations. It focuses on non-numerical data.
ii. Quantitative research collects numerical data and applies statistical methods to analyze trends, relationships, and predictions. It emphasizes measurable variables.

(iii) Data Collection and Data Analysis.

i. Data collection involves gathering raw information using tools such as surveys, experiments, and field observations. It is the first step in research.
ii. Data analysis involves processing, organizing, and interpreting collected data to identify patterns, trends, and conclusions using statistical tools.

(iv) Population and Sample.

i. A population refers to the entire group of individuals, objects, or elements under study in research. It represents the target from which conclusions are drawn.
ii. A sample is a subset of the population selected for study to represent the characteristics of the larger group while minimizing costs and time.

(b) What are three advantages and disadvantages of sampling techniques?

advantages

i. Sampling reduces research costs and time by analyzing a small representative group instead of the entire population.
ii. It allows for detailed analysis, making it possible to focus on specific variables and obtain accurate findings.
iii. Sampling minimizes data overload, making data management and interpretation easier compared to handling a large population.

disadvantages

i. Sampling errors may occur due to biased selection, leading to inaccurate generalizations about the population.
ii. Small sample sizes may not capture the full diversity of the population, limiting the reliability of conclusions.
iii. Difficulty in selecting a truly representative sample can lead to misleading results, affecting research validity.

5. Describe five causes of plate tectonics movement and prove its existence by providing four pieces of evidence.

i. Mantle convection currents cause plate movements due to the rising and sinking of heated magma within the Earth's mantle. These currents generate forces that push and pull tectonic plates.
ii. Slab pull occurs when a denser oceanic plate sinks into the mantle at subduction zones, dragging the rest of the plate with it. This movement contributes to plate interactions.
iii. Ridge push takes place at mid-ocean ridges where new lithosphere is formed. The force of gravity causes the lithosphere to slide away from the ridge, pushing plates apart.
iv. Gravitational differentiation within the Earth leads to variations in density, creating forces that influence the movement of tectonic plates.
v. Earth's rotation and the forces acting on the crust due to its spin may contribute to plate movement by exerting stress on the lithosphere.

evidence of plate tectonic movement

i. The distribution of earthquakes and volcanoes along plate boundaries confirms plate interactions, as seismic and volcanic activities are concentrated in these regions.
ii. Fossil evidence shows that identical fossils of plants and animals have been found on continents that are currently separated by vast oceans, indicating past continental connection.
iii. The fit of continents such as South America and Africa suggests they were once joined before the process of continental drift caused their separation.
iv. Ocean floor spreading at mid-ocean ridges provides direct evidence as new crust forms at the ridges and older crust moves away, confirming the movement of plates.

6. Explain the values of vulcanism for the development of society. Give eight points.

i. Volcanic soils are highly fertile, supporting productive agriculture due to their rich mineral content. Many regions near volcanoes have thriving farming communities.
ii. Volcanic eruptions provide geothermal energy, which is a renewable and sustainable source of electricity used in many countries such as Iceland and Kenya.
iii. The formation of landforms such as volcanic islands, mountains, and plateaus expands habitable land and creates new ecosystems.
iv. Volcanic landscapes attract tourists, boosting the economy through revenue generation in tourism industries. Destinations such as Mount Kilimanjaro and Hawaii's volcanoes attract visitors globally.

v. Minerals such as sulfur, copper, and gold are associated with volcanic activity, supporting mining industries and economic growth.
vi. Hot springs and geysers associated with volcanic activity serve as therapeutic sites, attracting health and wellness tourism.
vii. Volcanic rocks are used in construction and road building, providing durable materials such as basalt and pumice.
viii. The study of volcanoes contributes to scientific research and hazard preparedness, enabling better understanding and mitigation of volcanic risks.

7. To what extent is a river basin development both advantageous and disastrous?

advantages

i. River basins provide water for domestic, agricultural, and industrial uses, ensuring a reliable supply for human activities.
ii. Hydroelectric power generation is facilitated through dam construction within river basins, contributing to sustainable energy production.
iii. Flood control measures such as dams and reservoirs regulate water flow, preventing destructive floods and supporting irrigation.
iv. Navigation is improved as rivers serve as transport routes for goods and people, reducing dependency on road networks.
v. Fishing opportunities in river basins support local economies by providing food sources and employment in fisheries.
vi. Tourism and recreation activities such as boating and wildlife conservation in river basin ecosystems generate revenue and support biodiversity.

disadvantages

i. Flooding in river basins can cause destruction to settlements, crops, and infrastructure, leading to economic losses and displacement.
ii. Pollution from industries and agricultural runoff contaminates water sources, affecting aquatic life and human health.
iii. Deforestation and soil erosion in river catchment areas reduce water quality and contribute to siltation, affecting river flow.
iv. River basin projects such as dams may lead to displacement of communities and loss of ancestral lands.
v. Climate change impacts can alter river flow patterns, leading to reduced water availability and ecosystem disruptions.
vi. Water conflicts may arise due to competing demands from agriculture, industry, and domestic users, leading to disputes over resource allocation.

8. Describe the factors that control global distribution of plant communities.

i. Climate, particularly temperature and rainfall, determines the type of vegetation in different regions. Tropical areas have dense forests, while arid regions support sparse vegetation.
ii. Soil composition and fertility influence plant growth, as nutrient-rich soils support diverse plant life, whereas poor soils limit vegetation types.
iii. Altitude affects plant distribution as higher elevations have cooler temperatures and reduced oxygen levels, limiting plant diversity.
iv. Latitude determines solar radiation levels, affecting plant photosynthesis and the growth cycle of vegetation in different zones.
v. Proximity to water bodies influences moisture availability, with areas near lakes and rivers supporting lush vegetation compared to inland deserts.
vi. Human activities such as deforestation, agriculture, and urbanization alter natural plant distributions by modifying ecosystems.
vii. Fire occurrences shape vegetation patterns by clearing land, promoting regrowth, or destroying plant communities in fire-prone areas.
viii. Wind patterns influence seed dispersal, shaping the natural spread of vegetation across different regions.

9. Analyze six properties to be considered when studying soil profile at the field.

i. Soil color indicates organic matter content, mineral composition, and drainage conditions, with darker soils being rich in humus.
ii. Soil texture defines the proportion of sand, silt, and clay, affecting water retention and aeration properties.
iii. Soil structure describes the arrangement of soil particles into aggregates, influencing root penetration and water movement.
iv. Soil porosity determines the space between particles, affecting air and water availability for plant growth.
v. Soil moisture content influences its ability to support vegetation, with wetter soils found in humid regions and drier soils in arid areas.
vi. Soil depth varies depending on weathering processes and determines the extent of plant root development and nutrient availability.

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