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: 2013**

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. (a) By using RF scale given, calculate the distance of the loose surface road in kilometers from grid reference 564854 to 464760.

The RF scale provided on the map is used to determine the actual distance by measuring the map distance and applying the scale conversion.

To calculate:
- Measure the distance between the given grid references on the map using a ruler.
- Convert the measured distance to real-world kilometers using the Representative Fraction (RF) scale provided on the map.

Assume the measured distance on the map is 10 cm and the RF scale is 1:50,000, then:
Real-world distance = (10 cm x 50,000) / 100,000
= 5 km

The estimated distance along the loose surface road is approximately 5 km.

(b) From the map, show the merits and demerits of using cartographic symbols and signs.

Merits:
i. Symbols and signs make maps easier to read and interpret by simplifying complex features into universally recognized icons.
ii. They save space on the map, allowing for the representation of many features without cluttering the layout.
iii. They provide a clear distinction between different land uses, infrastructure, and natural features, improving map accuracy.
iv. They enhance the aesthetic appeal of the map by making it more visually engaging and comprehensible.
v. Symbols allow for quick decision-making in navigation and planning as they present information concisely.

Demerits:
i. Misinterpretation can occur if the user is unfamiliar with certain symbols, leading to incorrect map reading.
ii. Some symbols may not be universally recognized, causing confusion when maps are used in different regions.
iii. Overuse of symbols may make the map crowded, reducing its readability and effectiveness.
iv. Certain symbols may be too simplistic, omitting important details about the represented features.
v. The need for a legend means extra effort is required to understand all symbols, which may slow down interpretation.

(c) With vivid evidence from the map, elaborate the geological patterns found in the area.

i. The presence of contour lines and highland features indicates regions formed through tectonic uplift and faulting.

ii. The presence of seasonal swamps suggests sedimentary deposits in lowland areas, which may be linked to past marine or fluvial deposition.
iii. The mapped area has regions covered by different rock types, as indicated by surface texture and vegetation distribution.
iv. The river drainage patterns visible on the map indicate erosion and deposition processes shaping the geological formations.

(d) Describe the geomorphic processes which might have moulded the landforms in the area.

i. Erosion by water has shaped valleys and river channels, forming distinct drainage features.
ii. Deposition in floodplains and swamps has led to sediment accumulation, modifying the landscape over time.
iii. Weathering of rocks has influenced soil formation and rock breakdown, contributing to surface morphology.
iv. Tectonic activity, such as faulting, may have played a role in uplifting certain highland areas visible on the map.
v. Mass wasting, including landslides and soil creep, may have reshaped the slopes and elevated regions.

(e) With concrete evidence from the map, suggest the climate of the area.

i. The presence of seasonal swamps indicates periodic rainfall, suggesting a wet and dry climatic pattern.
ii. The distribution of vegetation types, including woodlands and scattered trees, suggests a semi-arid to sub-humid climate.
iii. The presence of rivers and surface water features indicates moderate to high precipitation levels.
iv. The location of the area within a certain latitude may correlate with climatic zones, supporting temperature and rainfall observations.

2. Explain five advantages of simple chain survey over plane table survey.

i. Ease of use – Chain survey requires minimal equipment, mainly a chain, tape, and ranging rods, making it simpler to conduct compared to plane table survey, which involves a drawing board, alidade, and tripod.
ii. Higher accuracy for linear measurements – Chain survey provides more precise distance measurements than plane table survey, which depends on graphical plotting, increasing chances of drawing errors.
iii. Suitability for small areas – It is ideal for small, open areas with fewer details, whereas plane table survey is more suited for larger areas requiring detailed plotting.
iv. Less dependency on visibility – Chain survey can be conducted in areas with obstructions by breaking measurements into smaller segments, while plane table survey requires clear lines of sight for accurate plotting.
v. Lower cost – Chain surveying is more cost-effective as it requires fewer instruments and less skilled labor compared to plane table surveying, which demands additional tools and experience in drawing.

3. (a) Briefly explain the following concepts as applied in field research techniques.

i. Research problem – A research problem is the issue or gap in knowledge that a study seeks to address. It provides the foundation for formulating research questions and objectives, guiding the study's direction.

ii. Primary data – This refers to first-hand information collected directly from sources such as interviews, questionnaires, and observations. It is original data gathered for a specific research purpose.

iii. Literature review – This is an evaluation of existing research on a topic. It helps to identify knowledge gaps, support research objectives, and provide context by analyzing past studies related to the research problem.

iv. Research methodology – It outlines the techniques and procedures used to conduct a study. This includes data collection methods, sampling techniques, and analysis approaches to ensure accurate and reliable findings.

v. Sampling techniques – These are methods used to select a portion of a population for study. They include random sampling, stratified sampling, and purposive sampling, ensuring representativeness and reliability of research results.

(b) Explain the components of a research report.

i. Title page – Contains the research title, author's name, institution, and date of submission.
ii. Abstract – A brief summary of the study, including objectives, methods, key findings, and conclusions.
iii. Introduction – Provides background information, research problem, objectives, and significance of the study.
iv. Literature review – Discusses previous studies, identifying knowledge gaps and supporting the research framework.
v. Methodology – Describes the research design, data collection methods, sample size, and analysis procedures.
vi. Findings and discussion – Presents the collected data, analysis, and interpretation of results.
vii. Conclusion and recommendations – Summarizes key findings, draws conclusions, and suggests solutions or further research.
viii. References – Lists sources cited in the research following standard citation formats.
ix. Appendices – Includes additional materials such as raw data, questionnaires, and maps used in the study.

4. (a) Explain four aspects to consider before analyzing the contents of a ground-level photograph.

i. Type of photograph – Determining whether it is a vertical, oblique, or horizontal photograph helps in interpretation.
ii. Scale of the photograph – Understanding the scale allows for accurate measurement and comparison of features.

iii. Time and season of capture – Knowing the time of the year helps in identifying vegetation, land use, and climatic conditions.
iv. Key features and orientation – Identifying landforms, infrastructure, and natural features assists in relating the image to a map.

(b) Find the scale of the photograph when two landmarks shown on the photograph can be located on a 1:25000 scale of a topographical map. The measured distance between the landmarks is 47.2 mm on the map and 94 mm on the photograph.

Scale of the photograph = (Distance on map / Distance on photograph) * Map scale

= (47.2 mm / 94 mm) x 1:25000

= 0.502 x 1:25000

= 1:49800

The scale of the photograph is approximately 1:49800.

(c) Outline four disadvantages of aerial photographs.

i. Distortion and scale variation – Differences in elevation, lens curvature, and camera angles can distort the image, making interpretation difficult.
ii. Lack of ground details – Features such as roads, boundaries, and infrastructure may not be clearly visible compared to topographical maps.
iii. Weather dependency – Cloud cover, shadows, and atmospheric conditions can obscure features, reducing the quality of the image.
iv. High cost – Aerial surveys require specialized equipment and expertise, making them expensive compared to other mapping techniques.

5. 'Glaciated regions are not that bad.' Justify

i. Water supply – Glaciated regions serve as important freshwater reservoirs. Melting glaciers feed rivers and lakes, providing water for agriculture, hydroelectric power, and domestic use.
ii. Hydroelectric power generation – Many glaciated regions have fast-flowing rivers due to meltwater, which is harnessed to generate hydroelectric power, supporting industries and communities.
iii. Tourism and recreation – Glaciated landscapes attract tourists for activities such as skiing, mountaineering, and sightseeing, generating income and employment for local communities.
iv. Fertile valleys – Glacial deposits such as moraines and outwash plains create fertile soils, which support agriculture in regions like the Swiss Alps and Canadian prairies.
v. Unique ecosystems – Glaciated regions support unique biodiversity, including cold-adapted flora and fauna, which contribute to ecological balance and scientific research.

vi. Mineral resources – Some glaciated areas contain valuable minerals like gold, copper, and iron ore, which can be extracted and utilized for economic development.
vii. Scientific research – These regions provide opportunities for climate change studies, geological research, and ice core analysis, which help in understanding past and future environmental changes.
viii. Flood control – Glaciers act as natural water storage systems, releasing water gradually and preventing extreme floods during wet seasons.

6. Give an account of the factors which influence the salinity of ocean water

i. Evaporation – High evaporation rates in hot regions increase salinity as water is lost while salts remain concentrated.
ii. Precipitation – Heavy rainfall dilutes seawater, reducing its salinity, especially in equatorial regions and coastal areas.
iii. River inflow – Large rivers such as the Amazon and Congo discharge freshwater into oceans, lowering salinity levels near their mouths.
iv. Ocean currents – Warm ocean currents increase evaporation and salinity, while cold currents bring less salty deep water to the surface.
v. Melting and freezing of ice – Melting polar ice caps dilute seawater, reducing salinity, while freezing removes freshwater, increasing salinity.
vi. Human activities – Industrial waste, desalination plants, and pollution can alter salinity levels in localized regions, affecting marine life and water circulation.

7. (a) Explain eight characteristics of the Tropical rainforest

i. High annual rainfall – Receives more than 2000 mm of rainfall annually, supporting dense vegetation.
ii. High humidity – Moisture levels remain high throughout the year due to constant evaporation and transpiration.
iii. Tall trees – Trees grow up to 50 meters high, forming a multi-layered canopy that blocks sunlight from reaching the ground.
iv. Rich biodiversity – Home to the highest number of plant and animal species, including rare and endangered species.
v. Poor soils – Despite lush vegetation, rainforest soils are leached and nutrient-poor, requiring continuous decomposition for fertility.
vi. Warm temperatures – The climate remains hot and stable, with temperatures ranging between 25°C and 30°C year-round.
vii. Fast decomposition – Organic matter decomposes quickly due to heat and moisture, recycling nutrients efficiently.
viii. Epiphytes and climbing plants – Many plants grow on tree trunks and branches to reach sunlight, while vines and lianas cling to trees for support.

(b) Examine the relationship between climatic regions and river regimes

i. Equatorial climate – Rivers in equatorial regions have a uniform flow throughout the year due to consistent rainfall, as seen in the Amazon and Congo rivers.
ii. Tropical climate – Rivers in tropical regions experience seasonal variation, with high flow during rainy seasons and low flow during dry seasons.
iii. Arid and semi-arid climate – Rivers in deserts are intermittent or seasonal, flowing only during rare rainfall events, like wadis in the Sahara.
iv. Temperate climate – Rivers in temperate zones experience moderate flow variation, with higher discharge in spring due to snowmelt and rainfall.
v. Polar climate – Rivers in polar regions freeze in winter and experience high flow in summer due to ice melt, affecting their seasonal regime.

8. Describe six factors that determine the resistance of the rock to denudation

i. Rock hardness – Hard rocks like granite and basalt resist erosion better than soft rocks like limestone and shale.
ii. Mineral composition – Rocks containing resistant minerals such as quartz are more durable compared to those with soluble minerals like calcite.
iii. Rock structure – Jointed and fractured rocks are more vulnerable to weathering and erosion compared to massive, compact rocks.
iv. Climate – Rocks in humid climates experience faster chemical weathering, while those in arid regions are more resistant due to lack of moisture.
v. Vegetation cover – Dense vegetation protects rocks from direct erosion by reducing wind and water impact, whereas barren landscapes promote denudation.
vi. Human activities – Deforestation, mining, and construction accelerate rock weathering and erosion, while conservation efforts can enhance rock resistance.

9. Examine eight methods to use in soil conservation in order to improve agricultural production in Tanzania

i. Contour plowing – Plowing along the natural contours of the land reduces water runoff and soil erosion on slopes.
ii. Terracing – Constructing terraces on steep lands slows down water movement and prevents soil erosion.
iii. Crop rotation – Alternating different crops helps maintain soil fertility and reduces the depletion of specific nutrients.
iv. Agroforestry – Planting trees alongside crops enhances soil stability, prevents erosion, and improves moisture retention.
v. Mulching – Covering the soil with organic materials like straw and leaves reduces evaporation and maintains soil moisture.
vi. Cover cropping – Growing ground-cover crops like legumes protects the soil from erosion and enhances nitrogen fixation.
vii. Conservation tillage – Minimizing plowing preserves soil structure, reduces erosion, and retains organic matter.
viii. Use of organic fertilizers – Applying compost and manure enriches the soil with nutrients, promoting sustainable agriculture.