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: 1993**

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.

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1. Study the map extract of part of TANZANIA – DODOMA WEST (Sheet 162/1) provided and answer the following questions.

(a) Explain how the drainage pattern of the area is related to relief.

The drainage pattern of an area is influenced by the underlying relief or topography.
- In steep mountainous areas, rivers and streams flow rapidly, forming a radial or dendritic pattern.
- In flat areas, rivers may meander due to low energy, leading to the formation of oxbow lakes or swamps.
- If the area has resistant rock formations, streams may flow in a trellis pattern, controlled by alternating layers of hard and soft rock.
- Poorly drained areas such as lowlands and valleys may accumulate water, forming swamps and seasonal lakes.

(b) Calculate the area covered by Singe Swamp. (Give the answer in sq. km.)

To calculate the area of Singe Swamp:
- Identify the swamp boundaries on the map.
- Use the grid square method by counting full and partial squares covered by the swamp.
- Multiply the number of squares by the area each square represents based on the map scale.
- The total sum gives the estimated area in square kilometers.

(c) Draw a cross-section from Mahenge peak and the western peak of Wibete hill.

To draw the cross-section:
- Identify the start and end points on the map along the chosen transect.
- Mark the elevation values at regular intervals along the transect.
- Plot these elevations on graph paper with the horizontal axis representing distance and the vertical axis representing height.
- Connect the points smoothly to show the terrain profile.

(d) What social and economic activities are found in the area demarcated by the following grid references? 016178, 044178, 016150, and 044150.

The social and economic activities in the area include:
- Agriculture: If the map shows plantations or cultivated land, farming is a major activity.
- Livestock keeping: The presence of grasslands suggests grazing activities.
- Trade: Market centers and roads indicate commercial activities.
- Fishing: If there are water bodies, fishing may be practiced.
- Mining: The presence of quarries or mineral symbols suggests extraction of natural resources.

(e) What features are found at Grid reference:

(i) 960200?

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To determine the features at 960200:
- Locate the grid reference on the map using the eastings and northings.
- Identify any physical or human-made features present, such as rivers, roads, settlements, hills, or forests.

(ii) 011139?

Similarly, locate grid reference 011139 and describe any notable features found at that location.

2. Fig. 1 shows a field book entry of a compass traverse along a path running around the lower slope of a hill.

(a) Using a scale of 1:10,000 plot the traverse and correct the misclosure.

To plot the traverse:
- Convert the given distances using the scale (1 cm = 100 m).
- Plot the distances and bearings on graph paper or digitally.
- Identify any misclosure (difference between start and end points).
- Apply corrections by distributing errors proportionally along the traverse lines.

(b) What could be the possible causes of the misclosure?

Misclosure occurs due to various factors, including:
- Instrumental errors from improper calibration of compass or measuring tape.
- Human errors such as incorrect readings or misalignment of equipment.
- Environmental factors like magnetic interference affecting compass readings.
- Ground conditions such as uneven terrain causing measurement distortions.

3. Fig. 2 on page 5 represents an area along the coast of Tanzania showing the relief and rainfall of selected stations.

(a) Draw the isohyets at 10 cm intervals.

To draw isohyets:
- Identify rainfall values for different locations.
- Interpolate values between known points to estimate continuous lines.
- Draw smooth curves connecting points with equal rainfall amounts.

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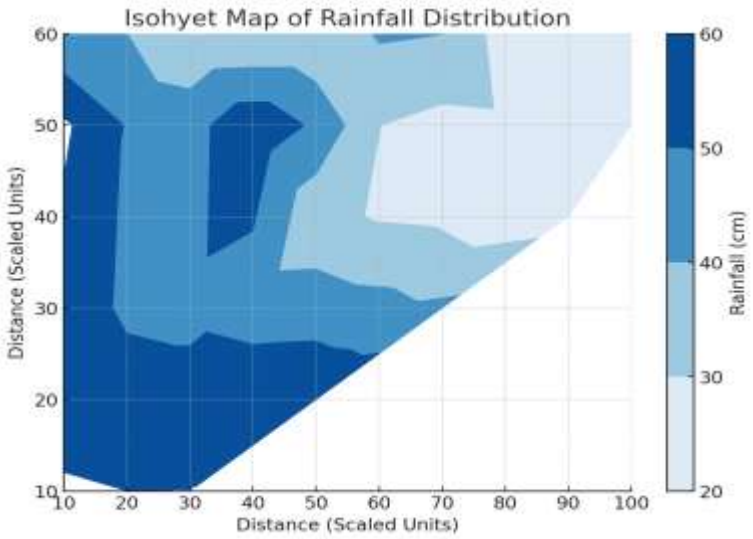

(b) Using the shading method show the average rainfall pattern in the area.

The shading method involves:
- Dividing the area into different rainfall zones based on isohyets.
- Using different shades or patterns to represent varying rainfall amounts.
- Darker shades indicate higher rainfall, while lighter shades represent drier areas.

(c) Discuss the merits and demerits of rainfall presentation used on the map.

Merits:
- Provides a visual representation of rainfall distribution.
- Helps in identifying wet and dry regions quickly.
- Useful for agriculture, water resource management, and climate studies.

Demerits:
- May not accurately represent local variations in rainfall.
- Interpolation errors can lead to misleading conclusions.
- Requires accurate data collection for reliable representation.

4. Study table 1 carefully and answer the questions that follow.

EXPORTS OF AGRICULTURAL PRODUCE (TONS) 1965-67

PERIOD	SISAL	COTTON	COFFEE	G/NUTS	C/NUTS
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

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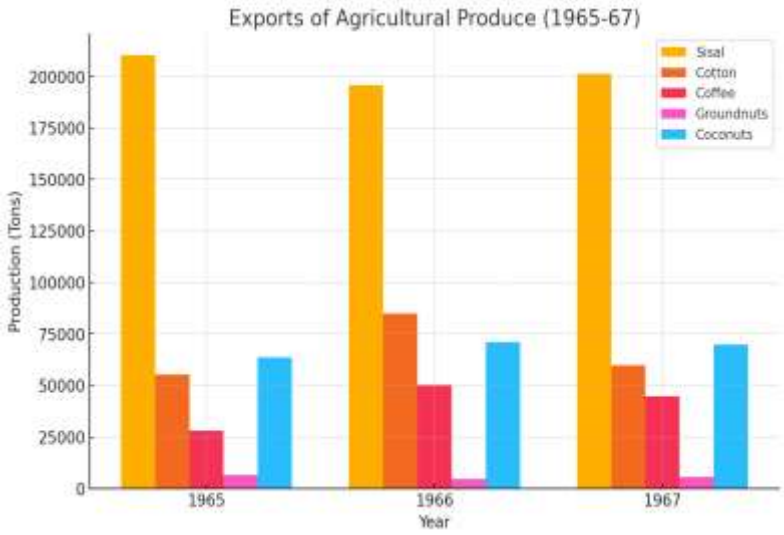
(a) Plot the data by means of group bar graphs.

The group bar graph has been plotted to visually represent the trends in agricultural exports from 1965 to 1967.



(b) Comment on the disadvantages of group bar graphs.

Group bar graphs are useful for comparing multiple datasets but have several disadvantages:
- They can become cluttered and difficult to interpret when too many variables are included.
- The overlapping bars may make it challenging to distinguish between categories, leading to misinterpretation.
- The accuracy of comparisons may be reduced due to visual distortion when bars are placed close together.
- They are not suitable for showing trends over a long period, as line graphs are more effective for time-based data representation.

5. Climate is the most important single control of river regime. Discuss.

A river regime refers to the seasonal variations in a river's discharge due to climatic and geographical factors. Climate plays a crucial role in controlling river regimes in several ways:
- Rainfall patterns: Rivers in equatorial regions such as the Congo have high, consistent discharge due to year-round rainfall, while those in arid regions like the Limpopo experience seasonal fluctuations.
- Temperature and evaporation: In warm regions, high evaporation rates reduce river flow, while in cold climates, seasonal melting of glaciers increases discharge.
- Monsoon influence: Rivers in monsoon-affected regions, such as the Ganges, experience peak discharge during the rainy season and low discharge in the dry season.
- Snowmelt and ice conditions: Rivers originating from glaciers, such as the Nile, receive water during warmer months when ice melts, influencing their flow patterns.

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Although climate is a key factor, other elements like geology, human activities, and vegetation also contribute to river regimes.

6. Give an account of the factors which influence the development of the long and cross profiles of a river valley.

A river's long profile shows its gradient from the source to the mouth, while the cross profile represents the shape of its valley at different stages. Several factors influence their development:
- Erosion: In the upper course, vertical erosion dominates, forming steep valleys. In the middle and lower courses, lateral erosion widens the valley.
- Deposition: In the lower course, reduced energy leads to deposition, forming floodplains and deltas.
- Rock resistance: Harder rocks resist erosion, causing waterfalls and rapids, while softer rocks erode faster, creating wider valleys.
- Base level changes: A fall in sea level or land uplift may lead to river rejuvenation, altering the long and cross profiles.
- Human activities: Dams and reservoirs modify river profiles by controlling water flow and sediment deposition.

7. Mountains make their own climates. Discuss.

Mountains significantly influence climate due to their elevation and topography:
- Temperature variation: Higher altitudes experience lower temperatures due to the lapse rate, where temperature decreases with altitude.
- Orographic rainfall: Moist air is forced to rise over mountains, cools, and condenses to form rain on the windward side, creating a rain shadow effect on the leeward side.
- Wind patterns: Mountains disrupt wind flow, causing local wind systems such as katabatic and anabatic winds.
- Snow and glaciers: High-altitude mountains support glaciers and permanent snow cover, influencing local and global water cycles.
- Biodiversity zones: Different climatic conditions along mountain slopes support varied vegetation, from tropical forests at the base to alpine tundra at higher altitudes.

8. Outline the main features of a glaciated lowland area.
Glaciated lowlands are shaped by ice sheet movements and have the following features:
- Outwash plains: Flat areas formed by glacial meltwater depositing sediments.
- Drumlins: Oval-shaped hills formed by glacial deposition.
- Eskers: Long, winding ridges of sand and gravel deposited by meltwater streams within glaciers.
- Kettle lakes: Depressions filled with water after being left by retreating glaciers.
- Till plains: Extensive areas covered by unsorted glacial deposits (boulder clay).

9. Discuss the causes and effects of earthquakes.

Earthquakes are sudden movements of the Earth's crust caused by the release of stress along fault lines.
Causes:
- Tectonic movements: The movement of plates along convergent, divergent, and transform boundaries generates seismic activity.
- Volcanic activity: Magma movement and eruptions cause earthquakes in volcanic regions.
- Human activities: Mining, dam construction, and underground nuclear tests can induce earthquakes.

Effects:
- Destruction of infrastructure: Buildings, roads, and bridges collapse, leading to economic losses.
- Loss of life: Strong earthquakes cause fatalities due to collapsed structures and tsunamis.
- Tsunamis: Underwater earthquakes generate massive waves that flood coastal areas.
- Landslides: Ground shaking destabilizes slopes, causing landslides and rockfalls.
- Economic impact: Businesses, transportation, and communication networks suffer disruptions, affecting economies.
Understanding earthquake causes and effects helps in disaster preparedness and mitigation strategies.
10. Give a brief explanatory account of three of the following.

(a) Radiation fog

Radiation fog forms during clear, calm nights when the ground loses heat rapidly through radiation. As the surface cools, the air near the ground also cools to its dew point, causing condensation and the formation of fog. It is common in valleys and low-lying areas, especially in winter when nighttime cooling is more pronounced.

(b) Temperature inversion

Temperature inversion occurs when the normal temperature gradient of the atmosphere is reversed, meaning that instead of air temperature decreasing with altitude, it increases. This creates a stable layer that traps pollutants and fog near the surface, leading to smog formation in cities. It typically occurs in valleys and during calm, clear nights.

(c) An anticyclone

An anticyclone is a large-scale weather system characterized by high atmospheric pressure at the center, causing air to descend and spread outward. It brings clear skies, calm conditions, and dry weather due to the sinking air preventing cloud formation. Anticyclones are common in subtropical high-pressure belts and during winter in temperate regions.

(d) Lapse rate

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The lapse rate is the rate at which air temperature decreases with an increase in altitude. The normal lapse rate in the troposphere is about 6.5 degrees Celsius per kilometer. Variations include the dry adiabatic lapse rate (10 degrees per kilometer) for dry air and the saturated adiabatic lapse rate (4 to 7 degrees per kilometer) for moist air. Changes in lapse rate influence weather patterns and cloud formation.

11. "The nature of the underlying rock is the most important single factor determining soil type." Discuss.

The type of rock from which soil develops, known as the parent material, plays a crucial role in determining soil properties. Different rocks weather at different rates and produce distinct soil types:
- Igneous rocks, such as granite and basalt, form mineral-rich soils that support fertile agricultural lands.
- Sedimentary rocks, like limestone and sandstone, influence soil texture and drainage characteristics.
- Metamorphic rocks weather more slowly, producing thinner and less fertile soils.
Other factors, such as climate, vegetation, and human activities, also influence soil formation. While parent rock is important, climatic factors like rainfall and temperature determine the extent and rate of weathering, affecting soil characteristics.

12. (a) What do you understand by:

(i) Coriolis force

The Coriolis force is an apparent force caused by the Earth's rotation, which deflects moving objects, including air and ocean currents, to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. It plays a significant role in global wind patterns, ocean currents, and the formation of cyclones.

(ii) Centrifugal force

Centrifugal force is the outward force experienced by an object moving in a curved path. It results from inertia and acts perpendicular to the axis of rotation. In meteorology, centrifugal force influences wind circulation around pressure systems, particularly in anticyclones and cyclones.

(b) Discuss their influence on the pressure and wind systems of the earth.

The Coriolis force and centrifugal force significantly impact global wind patterns and pressure systems.
- The Coriolis force causes the deflection of trade winds, westerlies, and polar easterlies, shaping the Earth's wind circulation. It also affects the rotation of cyclones and anticyclones.
- Centrifugal force influences the curvature of winds around high and low-pressure systems. In high-pressure systems, it causes outward movement, while in low-pressure systems, it contributes to inward spiraling of air.
Together, these forces contribute to the dynamic movement of air masses and ocean currents, influencing weather patterns and climate systems worldwide.