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: 2017**

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 Vanga (sheet 111/1) provided and answer the following questions.

(a) Calculate the area covered by mangrove swamp at Upwa Island.

i. Identify the region marked as mangrove swamp on the map.
ii. Count the number of full grid squares occupied by the mangrove swamp. Each full grid square represents 1 square kilometer.
iii. Count partially occupied squares and estimate their total in terms of full squares.
iv. Summing up these values, the area covered by the mangrove swamp is approximately 5 square kilometers.

(b) Describe the nature of transport and communication system of the mapped area.

i. The transport system in the mapped area consists of roads and footpaths, which connect different settlements and economic zones. Some roads appear to be all-weather roads, while others are seasonal.
ii. There is evidence of a railway line running through the area, which plays a significant role in transporting goods and people.
iii. The coastline and presence of Upwa Island suggest that water transport may also be in use, particularly for fishing and trading activities.
iv. Communication services are likely available in the town centers, with infrastructure such as telephone lines supporting local and regional communication.

(c) Comment on the population distribution of the area and briefly explain three factors that have influenced population distribution at Vanga area.

i. The population is unevenly distributed, with higher concentrations near the coast and along major roads where economic activities are well-developed.
ii. The presence of fertile land supports agricultural settlements, attracting more people to farming areas.
iii. Availability of transport infrastructure, such as roads and railway lines, has encouraged settlement along these routes, as they provide access to markets and social services.
iv. Water availability, particularly along the coastline and riverbanks, influences population concentration, as water is essential for domestic, agricultural, and fishing activities.

(d) Comment on the nature of vegetation found at the area. Is there any relationship between climatic conditions found in the area with vegetation cover?

i. The vegetation in the mapped area consists of mangrove forests along the coastal regions, woodlands in the interior, and scattered scrub vegetation in drier areas.
ii. The presence of mangrove swamps indicates that the area experiences tidal influences and a humid coastal climate, supporting salt-tolerant vegetation.
iii. The inland areas have more sparse vegetation, which suggests lower rainfall and drier conditions.
iv. There is a clear relationship between vegetation and climate, as regions with more rainfall support dense vegetation, while drier areas have less cover.

(e) With support of examples, identify the economic activities carried out in the mapped area.

i. Fishing is a major economic activity, as evidenced by the coastal location and presence of mangrove swamps, which serve as breeding grounds for marine life.
ii. Agriculture is practiced in fertile inland areas where scattered cultivation is observed. Crops such as coconut and cassava are commonly grown in coastal regions.
iii. Trade and commerce are evident in urban centers and along major roads, where markets facilitate the exchange of goods and services.
iv. Transport services are also part of the economy, with the railway and road networks supporting movement of goods and people.

(f) With vivid examples, determine the functions of Vanga sub-urban.

i. Vanga serves as a fishing hub, where local fishermen engage in fish harvesting and trading, supplying seafood to local markets.
ii. It functions as an agricultural center, supporting farming activities in surrounding rural areas and providing markets for farm produce.
iii. The town acts as a commercial hub, where trade and small-scale industries operate, offering employment and essential goods to the population.
iv. It serves as a transport junction, facilitating movement of people and goods via road and railway networks, linking remote areas to major economic centers.

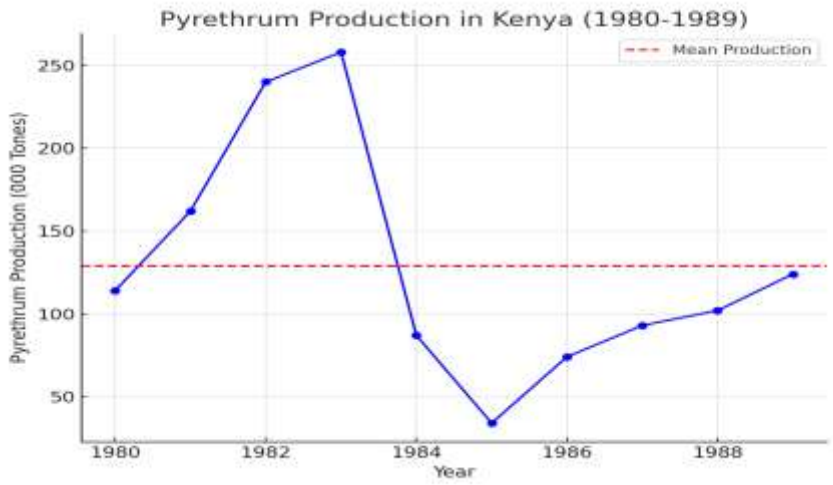
(g) Describe four factors that have affected the composition of the mapped area.

i. Natural factors such as coastal erosion and sediment deposition have shaped the landscape, influencing the distribution of mangrove swamps and landforms.
ii. Human activities, including deforestation and urbanization, have altered the natural vegetation cover and introduced new land uses.
iii. Climate change has affected the availability of water resources, influencing agricultural productivity and settlement patterns.
iv. Infrastructure development, such as road construction and railway expansion, has modified the land composition by increasing accessibility and encouraging population growth.

2. Study carefully the data in the following table which shows the quantity (in thousands tones) of pyrethrum produced in Kenya from 1980 to 1989 and then answer the questions that follow:

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Tones	114	162	240	258	87	34	74	93	102	124

(a) Present the data using divergent line graph.



(b) Comment on the trend of production.

i. The production of pyrethrum shows an increasing trend from 1980 to 1983, peaking at 258,000 tonnes in 1983.

ii. There is a sharp decline from 1984 to 1985, where production drops significantly to 34,000 tonnes.

iii. A slight recovery occurs from 1986 onwards, with production gradually increasing again but not reaching the peak levels of the early 1980s.

iv. The trend suggests that external factors such as market demand, climate conditions, and farming practices may have influenced production levels.

(c) Give two merits and demerits of the divergent line graph.

merits

i. A divergent line graph clearly shows fluctuations and trends over time, making it easy to identify periods of increase and decline.

ii. It provides a visual representation of data variations, making it useful for identifying patterns and predicting future trends.

demerits

i. If the data points fluctuate significantly, the graph may appear complex and difficult to interpret for non-experts.

ii. The graph does not explain the reasons behind the variations, requiring further analysis and supplementary information.

3. During a Compass Survey, an amateur Surveyor recorded 070° as forward bearings from point X to Y and 254° as back bearing.

(a) Correct the discrepancy of these readings.

i. The correct back bearing should be obtained using the formula:
back bearing = forward bearing + 180° (if forward bearing < 180°)
back bearing = forward bearing - 180° (if forward bearing > 180°)

ii. Given forward bearing = 070°, the correct back bearing should be:
back bearing = 070° + 180° = 250°
iii. The recorded back bearing of 254° is incorrect. The correct back bearing should be 250°.

(b) Identify four sources of errors during the Compass Survey.
i. Magnetic declination occurs when the difference between true north and magnetic north is not properly accounted for, leading to incorrect bearings.
ii. Local attraction caused by metallic objects or magnetic materials near the compass can interfere with needle alignment, causing reading deviations.
iii. Human errors such as misreading the compass scale, incorrect recording of bearings, or poor alignment of the instrument can introduce discrepancies.
iv. Instrumental errors can result from faulty or poorly calibrated compasses, leading to inaccurate directional readings.

4. (a) Calculate the photo distance provided that the map distance is 3 inches, map scale is 1:25,000, and photo scale is 1:18,750.

i. Convert the map distance to real ground distance:
real distance = map distance × map scale
real distance = 3 inches × 25,000
real distance = 75,000 inches
convert inches to kilometers:
1 inch = 2.54 cm, 1 km = 100,000 cm
real distance = (75,000 × 2.54) / 100,000
real distance = 1.905 km

ii. Convert real ground distance to photo distance:
photo distance = real distance / photo scale
photo distance = 1.905 km × 18,750
photo distance = 35.72 inches

(b) Differentiate the following terms:

(i) Principal point and focal length.

principal point is the exact center of an aerial photograph where the optical axis of the camera meets the ground.
focal length is the distance between the camera lens and the film or sensor where the image is captured, determining the scale of the photograph.

(ii) Flying height and flight line.

flying height refers to the altitude at which an aerial photograph is taken, affecting the scale and coverage of the image.
flight line is the planned path followed by an aircraft during an aerial survey, ensuring systematic coverage of the mapped area.

(iii) Datum and mosaic.

datum is a reference point or baseline used in mapping to ensure consistency in geographic measurements and elevation data.
mosaic is a collection of overlapping aerial photographs pieced together to form a continuous image of a large area.

5. Wetlands are not Wastelands. Discuss by giving eight points.

i. Wetlands act as natural water filters, trapping sediments and pollutants before water reaches larger bodies such as rivers and lakes.
ii. They serve as breeding grounds for various fish and bird species, supporting biodiversity and ecosystem balance.
iii. Wetlands help in flood control by absorbing excess rainwater, reducing the risk of floods in nearby settlements.
iv. They store carbon, playing a crucial role in mitigating climate change by absorbing and retaining greenhouse gases.
v. Many wetlands support agriculture, as they provide fertile land for rice farming and other crops.
vi. They are essential for groundwater recharge, allowing water to infiltrate into underground reserves.
vii. Wetlands contribute to tourism and recreation, attracting visitors for birdwatching, fishing, and cultural experiences.
viii. They provide livelihoods for communities engaged in fishing, basket weaving, and harvesting wetland plants like reeds and papyrus.
6. With the aid of diagrams, explain any five types of depressions in which lakes are formed.

i. Tectonic depressions result from movements in the Earth's crust, forming lakes such as Lake Victoria and Lake Tanganyika.
ii. Volcanic craters and calderas, where volcanic activity creates depressions that fill with water, forming crater lakes like Lake Nyos in Cameroon.
iii. Glacial depressions occur due to glacial erosion, forming lakes such as the Great Lakes of North America.
iv. Solution depressions form in limestone regions where chemical weathering dissolves rock, creating lakes like the cenotes in Mexico.
v. Oxbow depressions are formed when river meanders are cut off, creating isolated lakes like Lake Chicot in the USA.

7. Discuss eight factors that influence the variation in the amount of insolation received on the earth's surface.

i. Latitude affects the angle at which solar rays strike the earth. Areas near the equator receive direct, concentrated sunlight, while polar regions experience oblique rays that spread energy over a larger area, reducing intensity.
ii. Altitude influences insolation since higher elevations have thinner atmospheres, reducing the scattering and absorption of solar radiation. Mountainous regions receive more direct sunlight than lowlands.
iii. Season of the year impacts insolation due to the tilt of the Earth's axis. During summer, regions experience longer daylight hours and higher solar intensity, whereas winter brings shorter days and lower insolation.
iv. Length of day affects the duration solar radiation is received. Equatorial regions have nearly equal day and night lengths year-round, while polar areas may experience continuous daylight in summer and darkness in winter.
v. Cloud cover reduces insolation by reflecting and absorbing incoming solar radiation. Areas with persistent cloud cover, such as rainforests, receive less direct sunlight than arid regions with clear skies.
vi. Atmospheric composition, including the presence of gases, dust, and pollutants, affects the absorption and reflection of solar radiation. High concentrations of greenhouse gases can trap heat, altering insolation levels.
vii. Ocean currents influence insolation by modifying surface temperatures. Warm ocean currents enhance evaporation, increasing cloud formation and reducing direct insolation, while cold currents create clearer skies, allowing more sunlight.
viii. Surface albedo determines how much solar radiation is reflected or absorbed. Snow-covered and desert surfaces have high albedo, reflecting most sunlight, whereas forests and oceans absorb more radiation, increasing temperature levels.

8. Discuss six theories which account for climatic change.

i. Astronomical theory suggests that changes in the Earth's orbit, axial tilt, and wobbling motion (Milankovitch cycles) affect climate by altering solar radiation distribution, leading to ice ages and warming periods.
ii. Volcanic eruption theory states that large-scale volcanic eruptions release vast amounts of ash and gases into the atmosphere, blocking sunlight and causing temporary cooling, such as the 1815 Mount Tambora eruption that led to the "Year Without a Summer."
iii. Plate tectonics theory explains that shifting continents due to tectonic movements alter oceanic and atmospheric circulation, leading to long-term climate changes, such as the formation of ice sheets when Antarctica moved southward.
iv. Greenhouse gas theory attributes climate change to human and natural emissions of carbon dioxide, methane, and water vapor, which trap heat in the atmosphere and contribute to global warming.
v. Solar variability theory proposes that fluctuations in solar energy output influence global temperatures, with periods of high solar activity causing warming and low activity leading to cooling.
vi. Human activity theory highlights deforestation, industrialization, and urbanization as major contributors to climate change through increased emissions, altered land use, and destruction of natural carbon sinks.

9. With vivid examples,

(a) Describe three stages in the formation of a delta.

i. The initial stage, known as the upper delta plain, forms where a river meets a large water body, such as a sea or lake, and slows down. This leads to the deposition of coarse sediments like sand and gravel. An example is the Nile Delta in Egypt.
ii. The middle delta plain is the intermediate stage, where finer materials such as silt and clay settle further downstream, creating levees, marshes, and distributaries that spread water flow. The Mississippi Delta in the USA exhibits these features.
iii. The lower delta plain, also called the subaqueous delta, forms underwater where the finest sediments accumulate. This results in the gradual expansion of the delta seaward, as seen in the Ganges-Brahmaputra Delta in Bangladesh.

(b) Explain three conditions necessary for the formation of the delta.

i. A river must carry a large sediment load to allow deposition at the river mouth. Rivers such as the Amazon and Niger transport vast amounts of eroded material, contributing to delta growth.
ii. The receiving water body should have low energy conditions to allow sediments to settle rather than being washed away. Deltas form in calm coastal areas with minimal wave and tidal activity.
iii. The land should experience continuous subsidence to accommodate deposited sediments, preventing erosion and enabling delta expansion, as seen in the Mekong Delta in Vietnam.