

## 2019 USGO Nationals Written Examination - Key and Marking Scheme

### Section 1 – Soil Degradation [15 marks]

1. Briefly describe three functions of soil.
2. Identify the type of soil degradation shown in image A. Explain how human action would cause this type of soil degradation. Explain at least one method by which farmers could prevent this type of soil degradation.
3. Identify the time period of American history in which the photograph in image B was taken. Briefly explain one human cause and one natural cause of the condition shown here. Explain one measure that could prevent the type of soil degradation shown in image B.
4. Identify and explain two reasons for soil acidification caused by human actions.

**Grading notes:** This question is adapted from the 2017 iGeo Written Examination. Questions are point marked unless otherwise indicated.

#### **Expected answers:**

1. [3 marks – 1 mark per answer] Fungi and bacteria in soil recycle dead plants and animals into nutrients; medium for plant growth, providing plants with support, essential nutrients, water and air; acts as a reservoir for water, influencing the quantity of water in our rivers, lakes and aquifers; filtering and transforming role for materials added to the soil - able to protect the quality of our water and air; habitat for organisms; provides raw materials such as clays, gravels, sands and minerals; provides a physical base for the foundations of buildings and roads.
2. type [1 mark] – salinization [accept word forms]; cause [2 marks – level marking] - Occurs due to increased rates of water moving past the root zone and recharging the groundwater, causing water table to rise. Rising water tables bring mineral salts into the plant root zone. The salt remains behind in the soil when water is taken up by plants or lost to evaporation. Inefficient or outdated irrigation and drainage systems increase the amount of water moving down past the root zone. Poor water distribution in the irrigated area results in some areas being under-irrigated, causing salts to accumulate because the salts are not flushed out. Other areas can be over-irrigated and waterlogged. [accept reasonable equivalents and abridgements due to space constraints]; prevention [2 marks – level marking] - Removal of salt from soil and introduction of modern irrigation methods such as subsurface or drip irrigation; Prevention of high rate of evaporation; Apply leaching fraction: additional water to be used periodically to flush down salts from the surface away from the root zone; Avoid building dams near areas where the water table is high, so as to reduce the situations of having concentrated salty water near the surface.
3. time period [1 mark] – ‘Dust Bowl’ or ‘Great Depression’; human cause [1 mark] – failure to apply dryland farming techniques to the Great Plains; removal of native grasses and deep plowing of fields using mechanized farm equipment [other reasonable answers accepted]; natural cause [1 mark] – extensive drought starting in 1930 resulting in abandonment of farmland and loss of topsoil; prevention [2 marks – level marking] – actions range from activities such as habitat protection, assisted natural regeneration, and tree-planting to policy improvements, the provision of financial incentives, capacity development, and continuous monitoring; Conservation farming and land management, regulating the areas and frequency in which land is cultivated and grazed on, including fallow periods, fertilizer to replace nutrients, and preservation of vegetation cover [other reasonable answers accepted]
4. [2 marks – 1 mark per answer] acid rain, failure to remove dead plant material, excessive use of fertilizers and manures on cropland, excessive nitrogen pollution, commercial livestock production (CAFO) [other reasonable answers accepted]

## Section 2 - Historical Geography [6 marks]

1. Briefly identify and explain the ways in which the development of transportation networks affected each of the following in the United States in the period from 1800 to 1860 – a) industrialization, b) agriculture, c) westward migration.

**Grading notes:** This type of question is designed to test written expression of concepts in human geography. All three sections of the question were level marked, and marks were awarded for effects and well-reasoned explanations.

### Expected answers:

1.a. [3 marks] Development of steamboats, railroad networks and canals facilitated movement of raw materials to developing industrial areas in the northeast and movement of manufactured goods to markets in the interior of the country or in the south; transportation networks allowed agricultural goods to be shipped from the west and south to the north, facilitating a shift away from agriculture in industrial areas; significant link of cotton supplies in the south to textile factories in the north via transportation networks [other reasonable answers accepted]

1.b. [3 marks] Similar to 1.a., movement of goods allowed profitable agriculture in the fertile areas of the Ohio Valley and areas to the south and west by opening markets in the east via fast, reliable and cheap transportation; in the south, cash-crop farming gained an even stronger hold with links via the Mississippi River, Gulf of Mexico, Atlantic Ocean and railroads to markets in the north and Europe [other reasonable answers accepted]

1.c. [3 marks] Early road networks such as the Cumberland Road aided in transport of settlers and goods to western settlements and aided migration; development of canals and steamboats allowed the exploitation of river systems and the Great Lakes for transport of settlers, livestock and equipment; overland trails developed in the nineteenth century and wagon trains brought hundreds of thousands of settlers to the trans-Mississippi west; railroads would also carry large numbers of settlers west as they began to penetrate the area in the 1840s and 1850s [other reasonable answers accepted]

## Section 3 - Geology [16 marks]

1. Briefly define the principle of superposition.

2. Briefly define the principle of cross-cutting relationships.

3. Identify by letter from oldest to youngest the layers and features in image 1. Given that layer C is sedimentary rock, what type of formation or feature are represented by D and E?

4. Identify by letter from oldest to youngest the layers in image 2. Briefly explain your answer.

**Grading notes:** This question set is based on a replacement question from the 2018 iGeo MMT. All questions are point marked.

### Expected answers:

1. [2 marks] superposition is the principle that in undeformed stratigraphic sequences, the oldest strata will be at the bottom of the sequence [accept reasonable equivalents]

2. [2 marks] the principle of cross-cutting relationships states that the geologic feature which cuts another is the younger of the two features [accept reasonable equivalents]

### Section 3 – Geology [continued]

#### Expected answers:

3. [5 marks] C, B, A, D, E; D [1 mark] igneous intrusion; E [1 mark] fault

4. [3 marks] B, A, C; [2 marks] by cross-cutting relationships and the location of these features, A intruded on the original formation (B) and C intruded on B, making C the youngest [accept reasonable equivalents]

### Section 4 - Glaciers [15 marks]

1. Define the term continental glacier. Identify two specific locations on earth where continental glaciers are located.

2. Identify the type of glacier in the image in section 4. Identify two characteristics of this type of glacier. What landform results when ice from these glaciers retreats and seawater fills the empty space?

3. To the nearest tenth of a mile, how thick on average is the Greenland ice sheet currently? To the nearest foot, what would be the resulting global sea level rise if the entire Greenland ice sheet were to melt?

4. Define each of the following terms and explain its role in the melting of the Greenland ice sheet – North Atlantic Oscillation; ice-albedo feedback.

**Grading notes:** This question is adapted from the 2018 iGeo Written Test. All questions are point marked except the explanations in part 4, which are level marked.

#### Expected answers:

1. [1 mark] a continental glacier, also known as an ice sheet, mass of glacial ice that covers surrounding terrain and is greater than 50,000 square km (19,000 sq mi) [accept reasonable equivalents]; locations [2 marks] – Antarctica, Greenland

2. [1 mark] valley glacier; characteristics [2 marks] outlet glaciers that provide drainage for icefields, icecaps or ice sheets; confined by the walls of the valley they are found in; restricted by formations such as terminal moraines or till; exposed bedrock and slopes often surround valley glaciers [accept reasonable equivalents, 1 mark per correct answer]; landform [1 mark] – fjord

3. thickness [1 mark] 1.2 miles (accept .8 miles to 1.6 miles); sea level rise [1 mark] 24 feet (accept 22-26 feet)

4. North Atlantic Oscillation [1 mark definition, 2 marks explanation] – irregular fluctuations in the difference of atmospheric pressure between the Icelandic Low and the Azores High; brings warm, sunny summer weather to western side of Greenland when in its negative phase, since 2000 has resulted in very high levels of ice melt; ice-albedo feedback [1 mark definition, 2 marks explanation] - a positive feedback climate process where a change in the area of ice caps, glaciers, and sea ice alters the albedo (reflection or absorption of solar radiation); in Greenland, rapid melt of sea ice (which has higher albedo and reflects more solar radiation) leaves more open water (lower albedo and absorbs more radiation) which raises temperatures and melts more ice, causing the positive feedback [accept reasonable equivalents]

## Section 5 – Tourism [10 marks]

1. Define the term ecotourism. Identify three positive impacts or goals of ecotourism.
2. Identify three criticisms or risks of ecotourism. Identify and explain one way in which the government of a developing country with existing ecotourism might address one of these criticisms or risks.

**Grading notes:** Tourism is a common theme on iGeo examinations, including both the WRT and FWE, and this question is adapted from the 2014 iGeo WRT. All parts are point marked except the solution asked for in question 2, which is level marked.

### **Expected answers:**

1. [2 marks] ecotourism is a form of tourism involving visiting fragile, pristine, and relatively undisturbed natural areas, intended as a low-impact and often small-scale alternative to standard commercial mass tourism [accept reasonable equivalents]; impacts / goals [1 mark per correct answer] - builds environmental awareness, provides direct financial benefits for conservation, provides financial benefits and empowerment for local people, minimization of tourism's own environmental impact, affordability and lack of waste in the form of luxury [other reasonable answers accepted]
2. criticisms / risks [1 mark per correct answer] any tourism is by definition harmful to many of these areas causing serious environmental impacts, overtaxing of resources and damage to natural areas, economic benefits often not shared by local communities or local communities experience adverse impacts due to rising rents / prices or other factors, cultural exploitation / deterioration often occur; possible solutions [2 marks] – strict regulations on number of visitors to curb overcrowding; regulations on use of local guides / companies; local ownership of tour businesses, accommodations, restaurants; strict environmental rules to protect natural areas [other reasonable answers accepted]

## Section 6 – Demographics [15 marks]

1. What country does this data represent?
2. Given the available information, what historical, political, economic and demographic factors account for the sharp population decrease demonstrated here? Be as specific as possible in the space provided and account for as much of the data represented as possible.
3. Identify and explain at least three specific public policies that the national government could undertake to reverse the demographic trends shown here.

**Grading notes:** This is typical of the types of demographics questions that appear on the iGeo WRT examination. Question 1 is point marked, and questions 2 and 3 are level marked.

### **Expected answers:**

1. [2 marks] Bulgaria
2. [7 marks] Points will be awarded for reasonable explanations that attempt to tie in the rapid population decline, rapid emigration, declining birth rate and rising death rate in the wake of the fall of communism in the early 1990s. The breakup of collective farms, the end of state-run industries, rapid depopulation of rural areas and massive emigration of young, educated Bulgarians all contributed to the trends shown and should be addressed in the answer. [other reasonable answers and explanations accepted]
3. policies / explanations [2 marks per correct policy and explanation] policies to encourage increased birth rate; assistance buying property or starting businesses; incentives for settling or starting businesses in rural areas; incentives to encourage immigration, especially by young people [other reasonable answers accepted]

## Section 7 – Migration [10 marks]

1. Define the term refugee. According to UNHCR and UNRWA, is the number of refugees in the world closer to 5 million, 25 million, 50 million or 100 million people?
2. Given the information in the chart of refugees resettled by country, which of these countries has resettled the largest number of refugees per capita? Describe the trend in resettlement of refugees in the United States in the years after the time period covered in the chart, and particularly since the beginning of 2017.
3. Given the information in the graph of refugees per capita, why did Lebanon and Jordan have so many refugees within their borders in the period covered by the graph? Explain why a small and relatively remote nation like Nauru made this list.
4. Identify and explain three reasons why refugees would leave their country of origin.

**Grading notes:** This question was adapted from the 2015 AP Human Geography exam. All questions were point marked.

### Expected answers:

1. [2 marks] A refugee is a displaced person who has been forced to cross national boundaries and who cannot return home safely (other reasonable equivalents accepted); 25 million
2. [3 marks] Australia has accepted the most refugees per capita; In the US, roughly the same number of refugees were accepted in 2014, 2015, and 2016. Under the Trump administration, that number has been cut roughly in half (to about 29,000) in 2017 due to more restrictive administration policies. (other reasonable explanations accepted)
3. [2 marks] Lebanon and Jordan have so many refugees within their borders because of their proximity to Syria. Nauru makes this list due to an agreement with Australia to accept and process refugees seeking entry to Australia.
4. [3 marks] Political reasons include conflict / war, political persecution, forcible eviction by government or military; Social reasons include religious persecution, racial or ethnic persecution / genocide; Environmental factors include famine, epidemics, and natural disasters. (other reasonable answers accepted)