Section 1 [25 marks]
Please refer to the map in Section 1 of the Resource Booklet. This map represents the popular vote of a certain presidential election using circles of varying sizes to represent vote margins.

1. Identify a major strength of a map like this over traditional election maps that color entire states red or blue to indicate the winner. [2 marks]

2. What is a notable weakness of a map like this in showing election results at the national level? What is a weakness of this map in showing state-level results in a populous state like Pennsylvania or Ohio? What is a weakness in a less populous state like Alaska or South Dakota? [3 marks]

3. In a well-developed paragraph, explain how the concept of 'clustering' explains the appearance of this map and the results of recent presidential elections? [6 marks]

4. Given the information in this map, what party won each of the following states – Florida, Montana, North Carolina, Tennessee, Indiana [6 marks]

5. In a well-developed paragraph, describe how the Electoral College system and representation in each house of the United States Congress disadvantages states like Texas and California. Be as specific as possible and use demographic data to support your argument. [8 marks]

Grading notes: This question is typical of the political geography questions that might appear on the AP Human Geography examination. All questions level marked.

Expected answers:
1. [2 marks] This map maintains its shape and shows larger vote margins in more populous areas with large circles and smaller vote margins in rural or less populated areas. [accept reasonable equivalents]

2. [1 mark per answer / explanation] It is difficult to tell who won several states because numbers / totals aren't included, same for national-level results; in populous states, especially those with multiple population centers, the circles overlap making results confusing; in rural states due to the small population the circles are difficult to read and results are difficult to determine [other reasonable answers accepted]

3. [6 marks] clustering describes the phenomenon of people of similar political ideologies tending to live in proximity to each other – usually rural areas for Republicans and urban areas for Democrats; there is also a reverse effect – people can be shaped politically by the places they live. The result is that Democrats tend to win by large margins in urban areas and in populous states like New York, Illinois, Massachusetts and California and Republicans tend to win by large margins in rural states, which shapes the current political map and presidential results.

4. [1 mark per correct answer] Florida – D; Montana – R; North Carolina – R; Tennessee – R; Indiana – R; Iowa – D

5. [8 marks] This answer needs to not only acknowledge the rural bias of the EC and Senate, but also the comparative value of a House seat in a state like Montana or Alaska as compared to Texas and California; full marks should only be awarded for specific reference to the demographics – e.g. one electoral vote in TX, CA or FL represents over 700k people, one EV in WY represents just under 200k people.

Section 2 [25 marks]

Please refer to the map in Section 2 of the Resource Booklet.

6. Identify the impact of climate change on the hydrologic cycle and explain how this change will affect agricultural production. Provide at least one concrete example based on the information on the map. [3 marks]

7. Identify the impact of climate change on temperature and explain how this change will affect agricultural production. Provide at least one concrete example based on the information on the map. [3 marks]

8. Identify the impact of climate change on carbon dioxide concentration and explain how this change will affect agricultural production. Provide at least one concrete example based on the information on the map. [3 marks]

9. Identify the impact of climate change on crop biodiversity and explain how this change will affect agricultural production. Provide at least one concrete example based on the information on the map. [3 marks]

10. Identify the impact of climate change on crop prices and explain how this change will affect agricultural production. Provide at least one concrete example based on the information on the map. [3 marks]

11. Given the information in the map, what will be the economic effect of climate change on meat production in the United States? How will these changes likely effect meat consumption in the US? [5 marks]

12. Define the term climate-smart agriculture. What are the three main goals of climate-smart agriculture? [5 marks]

Grading notes: This question set is partly adapted from the 2019 iGeo WRT examination. All questions are level marked.

Expected answers:
6. [3 marks] 80% of the world's crops are rainfed, so disruptions to the hydrologic cycle can be devastating to agriculture; extreme precipitation events, flooding and drought are becoming more common, severe and widespread, and all can decrease yield [accept reasonable equivalents]

7. [3 marks] Over the next 30-50 years, average temperatures will likely increase by at least 1.0 °C; regionally-dependent changes include increased number of heat waves and warm nights, a decreasing number of frost days, and a longer growing season in temperate zones; hotter weather can lead to more evaporation and increased strain on groundwater and depletion of reserves; some fertile agricultural regions, including the Great Plains of the US will no longer be able to produce their traditional crops; each degree of global warming is estimated to decrease production by 5 to 15% [accept reasonable equivalents]

8. [3 marks] Over the next 30-50 years, CO_2 concentrations will increase to about 450 parts per million by volume (ppmv). The CO_2 response is expected to be higher on C3 species (wheat, rice, and soybeans), which account for more than 95% of world's species than on C4 species (corn and sorghum). C3 weeds have responded well to elevated CO_2 levels, symbolizing the potential for increased weed pressure and reduced crop yields; nutrient content of some crops will change, particularly a decrease in protein content; CO_2 levels will have mixed but generally detrimental effects. [accept reasonable equivalents]

9. [3 marks] The distribution of wild crop relatives, an increasingly important genetic resource for the breeding of crops, will be severely affected; this will result in less hardy plants and lower yields [accept reasonable equivalents]

Section 2 (continued)

10. [3 marks] Price will rise for the most important agricultural crops–rice, wheat, maize, and soybeans. This, in turn, leads to higher feed and therefore meat prices. [accept reasonable equivalents]

11. [5 marks] As a result, climate change will reduce the growth in meat consumption slightly and cause a more substantial fall in cereals consumption, leading to greater food insecurity [accept reasonable equivalents]

12. [5 points] Climate-smart agriculture (CSA) is an integrated approach to managing landscapes—cropland, livestock, forests and fisheries—that address the interlinked challenges of food security and accelerating climate change; Increased productivity, Enhanced resilience, Reduced emissions [accept reasonable equivalents]

Section 3 [25 marks]
Please refer to the map in Section 3 of the Resource Booklet.

13. What criteria must a tropical cyclone meet to be considered a 'major hurricane' by the National Weather Service and NOAA? According to this map, what are the two most populous metropolitan areas that are at the greatest risk from a major hurricane? [3 marks]

14. Since the data for this map was compiled in 2010, identify whether the hurricane return frequency of major storms has increased or decreased for each of the following areas – southeast Texas, southeastern Louisiana, south Florida, coastal South Carolina [4 marks]

15. Describe the general track of a tropical cyclone that forms between 5 and 30 degrees north latitude. Does this general track change once the tropical cyclone reaches 30 degrees north latitude, and if so how? [4 marks]

16. Given the data on this map and the geography of this region of the United States, identify three specific areas on the Gulf or Atlantic coasts (e.g. the Florida Panhandle, the southern coast of Georgia, etc.) that would be MOST prone to severe flooding as a result of hurricanes, and provide reasons why you chose each area. [6 marks]

17. In a paragraph, describe the current state of the 2020 Atlantic hurricane season. Account for the number, frequency and strength of storms as the season draws to a close, and where major storms, if any, have made landfall. [8 marks]

Grading notes: Questions 13, 14 and 15 are point marked; questions 16 and 17 are level marked.

Expected answers:
13. [1 mark] major hurricane – category 3 or above (111mph / 96kt wind speed); [1 mark each] Houston, TX and Miami, FL (also accept New Orleans, LA)

14. [1 mark per answer] – southeast Texas (increased), southeastern Louisiana (increased), south Florida (increased), coastal South Carolina (decreased)

15. [2 marks] the general track of these storms worldwide is west or northwest; [2 marks] it will change to generally north or northeast

Section 3 (continued)

16. [2 marks per answer] southeastern Louisiana (New Orleans and vicinity) – low-lying, degraded wetlands, previous damage from other hurricanes, degraded levee system, other factors; South Florida (Miami area) – low-lying, high concentrations of both people and buildings on the coast, vulnerable to storm surge; coastal South Carolina – very low-lying and vulnerable to storm surge, particularly on the barrier islands and immediately inland; other areas (Florida panhandle, Texas Gulf Coast, etc.) could be acceptable with proper justification, but reasoning would have to be strong

17. [8 marks] The 2020 Atlantic hurricane season is now the most active Atlantic hurricane season on record, with tropical cyclone formation at a record-breaking rate. A total of 31 (sub)tropical depressions, 30 named storms, 13 hurricanes, and 6 major hurricanes have formed throughout the season. It is the second season to use the Greek letter storm naming system, the first being 2005. Of the 30 named storms, 12 made landfall in the contiguous United States, breaking the record of nine set in 1916. This season saw six U.S. landfalling hurricanes, tying with 1886 and 1985 for the most in one season. The season has had five Category 4 hurricanes – the highest number recorded in a single season in the Atlantic basin and the first such occurrence since 2005. The season was also the fifth consecutive season in which at least one Category 5 hurricane formed. During the season, 27 tropical storms have broken the record for the earliest formation by storm number. This season also featured a record 10 tropical cyclones that have underwent rapid intensification, tying it with 1995. This unprecedented activity has been fueled by an ongoing La Niña. It has been the fifth consecutive above average season, from 2016 onward, and the first extremely active season since 2017. [reasonable equivalents accepted, must contain reliable statistics and accurate claims about frequency and strength of storms and be a well-organized and written paragraph]

Section 4 - [17 marks]

[See examination paper for the question scenario]

Given this information, answer the following questions. Be as realistic and practical in your answers as you are able and base your answers on both the map and the information above.

18. [14 marks] Which of the sites described do you think is best for building the new stadium? Why did you choose the site you did above the other two sites? Be as specific as possible in the space provided and identify both the advantages of your choice and disadvantages of the other options, and compose your answer in thoughtful and well-organized paragraphs.

19. [6 marks] Given the location of this hypothetical city, how might the local climate effect the construction of this stadium? What might be done in construction to mitigate the effects of the local climate and to make the stadium appropriate for year-round use?

20. [12 marks] Identify three new infrastructure or amenity projects that would need to be built, either by the city or by private companies, to make the stadium project viable in the area you chose. Why do you believe these three things are significant to making the stadium useful and enjoyable to the residents in this particular location?

21. [8 marks] What do you think are the biggest problems with constructing the stadium in the area of town you chose and why? Consider at least one short-term and one long-term issue in your response.

Section 4 (continued)

Grading notes: This urban planning section is typical of the Field Work 2 exercise at the iGeo competition and calls for students to make and justify urban planning decisions based on a host of considerations. All answers are level marked and require thoughtful and well-written explanations with attention paid to the guideline of 'realistic and practical' – fantastic or excessively costly solutions to these problems will not be given credit. Given the hypothetical nature of this exercise, expected answers will not be provided. A wide range of answers will be accepted for each question, with the exception of question 19 (which must acknowledge that given the location of this city it is in a cold climate and must have some sort of protection – a dome or covering – on the stadium to allow for year-round use).