Section A

Answer **both** questions.

Cluster 1: Development, Economy and Environment

1 Resource 1 features a comic showing one perspective of the relationship between population and resources. Resource 2 shows the global distribution of proven oil reserves in 2020. Resource 3 is an information sheet on oil and gas exploration in the Arctic Circle. Resource 4 is an article on the impacts of oil exploration in the Arctic Circle.

(a) Describe the perspective of the relationship between population and resources seen in Resource 1. [4]

Answer Guide:

- *[Observation]* The perspective of the relationship between population and resources seen in Resource 1 is where population numbers will eventually outstrip supply / population increase is too rapid for the growth in resources to match with.

- *[Evidence of population growth]* From Resource 1, it can be seen that population is growing at an exponential rate from 1600 onwards till the present day.

- *[Evidence and interpretation of resource growth]* The train in the comic depicting world food delivery systems, which signifies the amount of food resources available in the world. This train is seen to be having difficulty moving up the population line given the steepness of the track, and is about to crash back down soon as seen from the line "I think I can…"

(b) Explain the limitations of the view of the relationship between population and resources seen in Resource 1. [6]

Answer Guide:

- **This view neglects the contribution of technological advancements in increasing resource supply:**
  - The view from Resource 1 implies that humans would never be able to figure out a way to overcome the limitations of existing agricultural productivity.
  - However, the increase in scientific knowledge and agricultural inventions over the last few decades has undermined the law of diminishing returns as an economic principle underpinning the idea that food supply increases in arithmetical progression.
  - Consequently, the food supply has increased much faster and is able to keep up population growth.
  - *Additional mark – Any appropriate example that is explained*

- **This view is too simplistic does not reflect the reality that the relationship between population and resources differs according to spatial context:**
  - Different types of non-renewable resources in particular are frequently localized in specific geographic regions. Hence, different societies have varying access to different types of resources, and hence food resources may be able to keep up with population growth depending on spatial context.

- Differences in wealth in a population may affect access to food resources. For example, the wealthier may only number a few in society but can access more food resources. However, the poorer may see that the supply of affordable food resources that they can access is not able to meet the demands of the growing population.
- *Additional mark – Any appropriate example that is explained*

**Note: Max of 4 marks if only one limitation is explained. Max of 4 marks per limitation discussed as well.*

(c) Distinguish between proven reserves and hypothetical reserves. [4]

Answer Guide:

Proven reserve	Basis of Comparison	Hypothetical reserve
Yes.	**Discovery of resource**	No.
Generally, full exploration has occurred.	**Extent of exploration of the area for the resource**	Partially surveyed and explored.
Yes.	**Ability to extract given current economic conditions**	Uncertain.

(d) Describe the distribution of proven oil reserves in the world in 2020 as seen in Resource 2. [4]

Answer Guide:

- Generally, proven oil reserves can be found across most continents. [1]
- Most of the world's proven oil reserves can be found in Northern and Central Asia (from 3 billion tonnes to 30 billion tonnes), Middle East (from 300 million tonnes to 100 billion tonnes), North America and South America (from 100 million tonnes to 100 billion tonnes). [2]
- A lower concentration of proven oil reserves can be found in Australia (300 million tonnes – 1 billion tonnes) and in Northern Africa and some countries along the west coast of Africa (100 million tonnes to 3 billion tonnes). [2]

(e) Citing information from Resource 3, explain how oil exploration in the Arctic Circle demonstrates characteristics of an extractive industry. [6]

Answer Guide:

Evidence	How the evidence demonstrates characteristics of an extractive industry
From the map of the Arctic Circle, it can be seen that there are clear boundaries and specific regions within Russia, Denmark, Norway, Canada and the US which have a high probability of gas and oil reserves. [1]	This shows the location-specific nature o oil as a resource to be explored, which is characteristic of extractive industries. [1]

"The land and territorial waters in the Arctic belong to one of five countries: Canada, the United States, Russia, Norway and Denmark. These countries grant licenses to companies such as Shell to explore for oil and gas." [1]	Oil exploration in the Arctic is done through private firms which are state-sanctioned [1], showing both private and public intervention in oil exploration which is characteristic of extractive industries [1].
(Any of the evidence below – [1]) • Potential for oil is explored through installing a wellbore and a system of tubes and valves to monitor and regulate oil flow and pressure • Ice roads and an ice airstrip have to be constructed after installing an oil well, as temperatures can reach minus 50 degrees Celsius in winter	The need to install a wellbore, system of tubes and valves, and the ice roads and ice airstrips all show that oil exploration is highly dependent on specialised technologies to discover and then extract the resource, which is characteristic of extractive industries. [1] In addition, these technologies are likely to be highly capital intensive [1], another characteristic of extractive industries. The fact that oil exploration has to be done in near minus 50 degrees Celsius in winter shows reflects the long, risky and costly exploration phase needed to search for oil in the Arctic Circle, and the huge cost purely for exploration is highly characteristic of extractive industries. [1]

(f) With reference to Resources 3 and 4, explain the possible impacts of drilling for oil in the Arctic Circle. [6]

Answer Guide:

[From Resource 3]

- Drilling in the Arctic Circle could have positive economic implications the countries in the Arctic Circle where oil is found, as shown in Resource 3 – e.g. Norway, US, Denmark, Canada, Russia [1]. Should oil be discovered and be able to be extracted, these countries would be able to sell the discovered oil and generate revenue from oil as a result. [1]
- (Bonus point) This is particularly significant since oil is a non-renewable resource that is highly used by the world population and current stocks are believed to run out one day. [1]

[From Resource 4]

- Drilling for oil in the Arctic Circle can positively impact the social wellbeing of some Arctic Circle communities that previously did not have such such social service provision [1]. As seen from Resource 4, oil derived revenues have "helped to pay for basic services and infrastructure in villages in the region, such as Barrow near the Chukchi Sea". [1]

- However, drilling for oil can result in negative environmental impacts on the Arctic Circle. [1]

  - Oil drilling in the Arctic Circle could exacerbate the impacts of climate change, as it would severely increase the amount of carbon dioxide into the atmosphere, and CO2 is a greenhouse gas that absorbs and reemits longwave radiation, resulting in warmer temperatures. [1] This is shown in Resource 4 where “oil drilling in the Arctic Circle could result in the emission of roughly 150 billion tonnes of carbon dioxide into the atmosphere.”
  - Oil drilling also results in injury and death to marine animals in the Arctic Circle as their habitats is modified due to drilling [1], as seen in Resource 4 where “whales and other marine mammals are exposed to harmful underwater noise that prevents them from navigating, finding mates, and foraging in the dark Arctic waters” [1].
- The negative environmental impacts of oil drilling in the Arctic Circle has negative social implications on Arctic communities as well, as their food supply would be at risk. [1] This is seen in Resource 4 – “This can threaten the fish and marine mammals that Arctic Indigenous peoples depend on for secure access to food.” [1]

**Note: Max of 4 marks if only one Resource is referenced.*

Cluster 1: Development, Economy and Environment

2 Resource 5 shows the changes in value-add by sector for countries at different income levels. Resource 6 shows the global production network (GPN) of JIN-I Technology Co., Ltd., a TNC with headquarters in Taiwan, in 2014. JIN-I Technology specialises in LED lighting. Resource 7 shows the global market for LED lighting in 2015, predicted in November 2014. Resource 8 is an extract from an economic overview of Latin America and the Caribbean (LAC) by the World Bank. Resource 9 shows the percentage change in Gini coefficient for Latin America and the Caribbean countries from 2019 to 2020.

(a) With reference to Resource 5, compare the changes in value-add by sector for countries at different income levels. [6]

Things to note:

- *Observations are to be phrased as similarities or differences.*
- *Each similarity and difference is awarded 1m; supporting evidence from both low income and high-income will be awarded 1m.*
- *All 3 sectors must be compared to be awarded full marks of 6m.*

Answer Guide:

Low income countries	Basis of comparison	High income countries
Decreased about 4% from 1980 to 2010	**Similarity: Decrease in value-add by agriculture**	Decreased about 3.4% from 1980 to 2010
Increased by about 5.8% from 1980 to 2010	**Similarity: Increase in value-add by services**	Increased by about 14.3% from 1980 to 2010
Increased by about 4.2% from 1980 to 2010	**Difference: Change in value-add by industry**	Decreased by about 7.9% from 1980 to 2010

(b) Account for the changes in value-add by agriculture for low income countries and value-add by services for high income countries as observed in Resource 5. [6]

Things to note:

- *Award 1 mark for each suggestion of how changes come about*
- *Award a maximum of 1 additional mark for further development of each suggestion.*

Answer Guide:

- **Decline in value-add by agriculture in low income countries:**
  - **Reason 1: Comparatively lower costs of importing agricultural products from other countries.**
    - As a country develops and industrialises, it may become more economically efficient (i.e. less costly) to import agricultural products from other countries or regions instead.
    - This causes a country to become less invested in sustaining its own agricultural sector, leading to reduction in the number of people employed in the agricultural sector.

- **Reason 2: Increasingly negative attitudes towards jobs in the agricultural sector.**
  - Such jobs may be seen as less appealing, dirty, physically demanding, and/or offering fewer career prospects.
  - In contrast, jobs in the manufacturing and tertiary sectors tend to regarded as better paid and less physically demanding (more regular hours/located in urban areas). This often leads to a greater demand for jobs the secondary and tertiary sectors instead, causing a sectoral shift in industry and employment.

- **Increase in value-add by services for high-income countries**:
  - **Reason 1: Increasing demand from producer/ business services:**
    - With expanding economy, higher demand for producer services from manufacturing firms to support operations
  - **Reason 2: Increasing affluence**
    - Higher disposable income means higher demand for personal services
  - **Reason 3: Increasing literacy (or improved educational qualification)**
    - Well-educated people seek high paying jobs, found mainly in white-collar
  - **Reason 4: Changes in technology/ technological advancements**
    - Enables new services and hence creates new service jobs

(c) With reference to Resource 6, explain how JIN-I's GPN shows the interconnectedness of the world. [6]

Things to note:

- *Award 1 mark for each explanation of how JIN-I's GPN shows the interconnectedness of the world.*
- *Award a maximum of 1 additional mark for further development of each explanation.*

Answer Guide:

- In general, it can be observed that JIN-I's GPN extends across 3 major regions – North America, Europe and Asia, thus facilitating interconnectedness through the flow of information and products between these places [1m].

- JIN-I taps on the lower cost labour for the lower skilled jobs in the **manufacturing and sales bases** by setting most of these up in Asia, where several emerging or less developed countries are found. [1m]
  - Resource 6 shows that there are at least 14 manufacturing and sales bases, and 1 manufacturing base in Asia. [1m]

- JIN-I accesses the highly skilled labour for research work by setting up **R&D centres** in developed countries or emerging economies [1m].
  - Resource 6 shows that most of R&D centres are located in North America, Western Europe and Asia (specifically China) [1m].

- JIN-I sells its products/ locates its **sales offices** to different parts of the world where there is a viable market either in terms of affluence or size [1m].

- Resource 6 shows that Asia is the biggest consumer with at least 13 sales offices, while North America has at least 11 units and Europe has at least 8 units [1m].

(d) With reference to Resources 6, 7 and 8, explain why the company should seek new markets in Latin America and the Caribbean (LAC). [6]

Things to note:

- *Award 1 mark for an explanation using data from Resources 6/7/8 on why the company should seek new markets in LAC.*
- *Award a maximum of 1 additional mark for further development of each explanation.*
- *Award maximum of 5 marks for explanation citing data from 2 resources only.*

Answer Guide:

- **Resource 6** – LAC currently only has 2-4 manufacturing bases and no sales bases/ sales offices. [1m]
  - There is potential for the company to expand its sales presence to the region. Since products are manufactured in the region, setting up a sales base/ sales office would be ideal since there is less need for transportation over great distances which could manage costs for JIN-I [1m] → potentially cheaper products for the consumers, which could encourage sales. [1m]

- **Resource 7** – LAC predicted to take up 8% of the global market share for LED lighting in 2015. [1m] **Resource 8** – LAC expected to expand economy by 1.2% in 2017 and 2.1% in 2018. [1m]
  - There is potential for the company to expand its sales presence to the region. While the predicted proportion is not the highest, there is room for this proportion to grow in the future, as suggested by the trend of growth from 2017 to 2018. [1m]
  - In particular, countries within LAC are also showing (varying) trends of growth in spite of economic recession – Argentina, Brazil Mexico, Central America and the Caribbean – which suggests that growth is not just concentrated in some countries, and thus makes LAC viable as a region. [1m]

(e) Using evidence from Resource 9, identify the country with the greatest improvement in economic inequality. [2]

Answer Guide:

- Paraguay [1m] – it has a -5% change in Gini coefficient which is the greatest negative percentage change. [1m]

(f) Explain **two** ways in which social indicators may be used to express variations in levels of development across space [4]

Things to note:

- *Award 1 mark for each identification of a social indicator.*
- *Award a maximum of 1 additional mark for further development of each social indicator.*

Answer Guide:

- Life expectancy at birth [1m]
    - Can be used to show the differences in average number of years that a newborn could expect to live in a particular place, if current death rates do not change. [1m]
    - Helpful in showing differences in mortality conditions and, by proxy, of health conditions in a place. [1m]

- Literacy rate [1m]
    - Can be used to show the differences in percentage of the population of a given age group that can read and write. [1m] The adult literacy rate corresponds to ages 15 and above, the youth literacy rate to ages 15 to 24, and the elderly to ages 65 and above.
    - Helpful in showing differences in educational attainment/ can be used to predict the quality of future labour force. [1m]

Section B

Cluster 1: Development, Economy and Environment

3 "The Global Production Networks (GPNs) of transnational corporations (TNCs) negatively impact host economies."

Evaluate the validity of this statement. [20]

Possible approaches:

Candidates could approach the question by making a judgement on how far the statement is valid using **evaluative criteria:**

- E.g. By comparing the negative impacts in relation to criteria such as:
  - Whether or not negative impacts experienced extend across a large spatial scale
  - Whether or not negative impacts experienced are sustained over a long period of time
  - How far the root cause of negative impacts can be addressed so as to mitigate them
  - How comprehensive the negative impacts experienced
- E.g. By analysing the contextual factors (e.g. governance of the country) that would result in negative impacts being more/ less caused by GPNs of TNCs

Some possible viewpoints on the statement that a response could adopt:

Statement is largely valid, because…	**Statement is largely invalid, because…**
• GPNs can be seen to largely negatively impact host economies as they do meet a large number of criteria that causes the statement to be deemed as largely valid (listed above), though there are some circumstances under which they bring about positive impacts	• GPNs can be seen to largely positively impact host economies instead, as they do NOT meet a large number of criteria that causes the statement to be deemed as largely valid (listed above), though there are some circumstances under which they bring about negative impacts, AND/OR • GPNs can be seen to have a variety of negative impacts, but due to certain contextual factors, these negative impacts can be largely mitigated, resulting in the statement being largely being invalid instead

Levels marked using Generic Level Descriptors for 20m H2 essays