Diploma Programme
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Markscheme

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Geography

Higher level and standard level

Paper 2

9 pages

Section A

1. Changing population

(a) Outline the distribution of the Venezuelan states with population densities of above 100 persons per km^2. **[2]**

*Award **[1]** for each valid statement, up to a maximum of **[2]**.*

Possibilities include:
- coastal
- in the north of the country *(accept NW and W)*
- linked to concentration of urban areas/close to capital
- linear/arc-like pattern
- located and named anomaly – San Cristobal/Barquisimeto are inland / La Asuncion an island
- clustered.

(b) Explain **two** physical reasons why some areas have a low population density. **[2+2]**

*Identification of a valid physical reason **[1]** and **[1]** for further development of how it has led to a low population density.*

For example: Mountainous areas frequently have low population densities [1] as the terrain is rugged and steep and agriculture is difficult to practice (and accessibility is poor) [1].

Possibilities include:
- Extreme climate – where the climate is too cold (*eg* Antarctica) or too hot (*eg* Sahara Desert) – leads to problems of agricultural production/human survival.
- Vegetation – areas of dense vegetation (*eg* the Amazon Rainforest) – often have difficult accessibility.
- Water supply – where the water supply is low/unpredictable – difficulty with agriculture/limited water to drink.
- Poor soils – if the soil is thin and unproductive – cannot produce crops or raise livestock.
- Resources – areas with few resources *eg* minerals – lack of opportunity for economic development.
- Frequent natural hazards – high risk of death/injury.
- Disease – areas with high incidence of vector borne diseases *eg* malaria – avoided to cut down risk of illness.
- Remote/landlocked areas – difficulties in access/industrial development/ability to export goods.

(c) Explain **one** cultural reason **and one** economic reason why fertility rates are decreasing. **[2+2]**

*In each case, award **[1]** for a valid reason with **[1]** for further development linked to decreasing fertility rates.*

For example: There has been a decreasing influence of religion **[1]** – religious influence on birth control is no longer strong in western societies **[1]**.

Cultural reasons may include:
- female empowerment/gender equality – females have careers/females have greater role in decisions that impact their lives
- loosening of extended family ties – the influence of family pressure to have larger numbers of children decreased

- shifting attitude towards life – younger population feel their sense of self can be complete without children
- mass media – soap operas and reality TV influence the attitudes of society *eg* 16 and Pregnant in USA
- Westernization of culture in LICs/MICs – impact of western charities who give out contraceptives
- access to reproductive health services – contraception decreases the number of pregnancies
- age of marriage increasing – decreases the number that can be conceived
- changing perceptions of parenting – parenting seen to be time consuming with high expectations
- concern for the environment – fewer children puts less pressure on the environment.

Economic reasons may include:
- employment opportunities – the prospect of a career, women may have less children and marry later
- the cost of having children – time spent in education and the cost of childcare makes it more expensive to have a large number of children.
- recession – people put off decision to have children, women must work so that household income is sufficient
- development of a country's economy – allows investment in education
- lack of affordable housing – difficulty in finding accommodation for larger families
- provision of pensions – need to have support in old age lessened
- high cost of living – extra child becomes very expensive, women cannot afford to take time off work.

2. Global climate – vulnerability and resilience

(a) Outline what is meant by terrestrial albedo. **[2]**

A measurement of the amount of sunlight reflected **[1].**

Development could include: reference to earth/land/sea surfaces **[1]** / the amount of energy reflected back as a % of incoming solar radiation (measured from 0-1) **[1]**.

(b) Suggest how climate change may cause spatial changes in:

(i) biomes; **[2]**

*Award **[1]** for a valid **spatial** change and **[1]** for additional causal detail.*

For example: deserts and semi deserts expand **[1]** as climate change reduces rainfall totals and reliability **[1]**.

Other possibilities include:
- Some biomes may shift/move/expand/disappear to different latitudes
- Mediterranean vegetation shrinking – the present areas will become drier
- Tundra in the Northern Russia which is shrinking in lower latitudes – permafrost melts due to rising temperatures.
- Boreal forests/Taiga – trees at the southern boundary are experiencing dieback as temperatures increase
- Increase in wildfires – may shrink the area covered by a particular biome *eg* Mediterranean
- Coral bleaching – coral reef biomes are shrinking as sea temperatures increase/acidification takes place
- Mangrove biome shrinking/disappearing/changing position – temperature increase leads to melting ice which raises sea levels.

(ii) animal migration patterns. **[2]**

*Award **[1]** for a valid spatial change and **[1]** for additional causal detail.*

For example: Climate change is driving some species to migrate to new locations especially if they prefer cold climates **[1]** by moving to higher latitudes or higher altitudes (*eg* Atlantic Mackerel).

Other possibilities include:
- migratory birds – changing routes or patterns/extent of migration
- savanna animals – changing routes or patterns/extent of migration
- loss of sea ice can change migration routes of caribou in Canada – they avoid swimming long distances
- increase in access to green vegetation – decreases need to migrate for caribou
- migration of mosquitoes to areas that are warming – climate change has changed the environment so that it is now suitable
- fish stocks *eg* mackerel migrating poleward in search of cooler waters.

(c) Explain **two** ways in which higher temperatures could increase the incidence of health hazards on people. **[2+2]**

*In each case, award **[1]** for a valid distinct way linked to higher temperatures and **[1]** for additional explanation/exemplification.*

For example: Increased temperature in some regions increase the incidence of vector-borne diseases **[1]** carried by mosquitoes like dengue fever and the Zika virus **[1]**.

Other possibilities include:

- Weather temperature extremes – heat waves causing increased mortality amongst vulnerable populations such as the older generation due to heat stroke/cardiovascular disease. Linked with mental disorders/lower birth weight. Heat waves are also linked to a number of skin conditions such as rashes/blisters.
- Changes in agriculture could impact upon food availability – nutritional deficiencies.
- Increased water temperatures caused by higher air temperature mean that waterborne bacteria and harmful algal toxins will be present in the water at different times of the year, or in places where they were not previously threats.
- Higher air temperatures can increase cases of Salmonella and other bacteria-related food poisoning because bacteria grow more rapidly in warm environments. These diseases can cause gastrointestinal distress and, in severe cases, death.
- Decrease air quality – raise the levels of ozone and other pollutants in the air that exacerbate cardiovascular and respiratory disease.
- Higher temperatures lead to increased incidence of cyclones – resulting health hazards/mortality.
- Higher temperatures lead to melting glaciers which give sea level rise which contaminates water supplies in lowland areas – leads to hypertension/miscarriage/skin diseases *eg* Bangladesh.
- Release of pathogens from melting ice – melting of permafrost release long dormant diseases *eg* anthrax in Siberia
- Dehydration from increased temperature – can lead to hypertension, cramps and mental issues.

3. Global resource consumption and security

(a) Describe the trends shown in the slum populations of Lesotho between 2005 and 2014. **[1+1]**

*Award **[1]** for each of the following trends.*

- overall increase / increase 2005-2009
- 2009-14 decrease.

*Quantification required for allocation of **[2]**.*

(b) Suggest **two** reasons why progress towards access to safe water has been slow in some regions. **[2+2]**

*In each case, award **[1]** for a valid reason for slow progress and **[1]** for further development/exemplification.*

For example: In Madagascar there has been a lack of investment in water provision **[1]** which has meant that the development of infrastructure such as water points is missing **[1]** for a large proportion of the rural population.

Other possibilities include:

- High population growth rates in developing countries means that there is a greater demand for water.
- Lack of hygienic wastewater disposal leads to polluted groundwater supplies.
- Open defecation often pollutes water courses.
- Lack of investment in rural areas means there is an inequality between rural and urban supply of safe water.
- Political decisions can mean money is given to other areas of development – leads to lack of investment in water supply such as wells.
- Conflict between groups may lead to the destruction of infrastructure or a focus of spending on armaments.
- Climate change may lead to prolonged drought which may cause water supplies to dry up.
- Sea level rise in coastal areas – leads to salinization of supply making it undrinkable
- Natural disasters such as earthquakes or floods may destroy infrastructure such as pipelines.
- Agricultural extraction may lead to a lack of water for human consumption / including the exporting of virtual water.
- Lack of funding from HICs – *eg* UK cut funding for clean water
- Dams built on rivers that cross two or more countries – water held upstream
- Remote areas – difficulty/financial problems of construction of infrastructure.

(c) Explain **one** economic advantage **and one** environmental advantage of the circular economy. **[2+2]**

*In each case, award **[1]** for identification of a valid advantage and **[1]** for further development/exemplification.*

For example: The circular economy results in employment growth **[1]** – jobs are created through more labour-intensive activities/logistics/new innovative industries **[1]**.

Economic advantages:
- economic growth – increased revenue from circular activities
- substantial resource savings – no need to extract raw materials
- incentives for innovation – collaboration between, manufacturing, design and recyclers
- more durable products save money in the long term
- improving the security of supply of raw materials
- increases disposable income as encourages buying used items or leasing/renting which is cheaper
- less dependence on imports
- company reputation is enhanced by being part of the circular economy – attracts customers
- reducing healthcare costs – fewer harmful emissions into air and water
- reduces clean-up costs – discarded plastics in rivers and oceans.

Environmental advantages:
- fewer emissions – reduced consumption of fossil fuels
- land productivity and soil health – nutrients returned to soil/reduction in use of artificial fertilizers
- less damage to ecosystems – fewer resources needed so land not used for mining/intensive agriculture, water bodies not impacted by dumping of toxins
- reduces climate change – less energy used for production/supply lines leads to fewer emissions.
- reduces use of non-renewable resources – less environmental damage from oil and mineral extraction
- aims for zero waste – less material goes to landfill.

Section B

4. (a) (i) State the range for e-waste generated (in kg per person) for the countries shown. **[1]**

0.4 to 28.5 (or 28.1)

(ii) Identify which raw material is produced in the largest amount when e-waste is recycled. **[1]**

Iron

(b) Describe the relationship between GNI per person and average growth rate of EEE. **[2]**

*Award **[1]** per valid point. Some quantification needed for full marks.*

Possibilities include:
- negative correlation **[1]**
- recognition of lowest GNI as an anomaly **[1]**.

(c) To what extent does the evidence in the infographic support the view that e-waste is a global problem? **[6]**

*Award **[1]** for each valid point supported by evidence taken from the infographic, up to a maximum of **[5]**.*

*Award a maximum of **[4]** if only one side of the argument is given.*

*Award the final **[1]** for an overall appraisal, which weighs up the infographic as a whole.*

Support:
- Reference to all continents involved in the recycling of waste
- Reference to the amount/scale of e-waste that is produced
- Reference to the rate of growth of e-waste
- Reference to the small amounts that are recycled
- Reference to the contribution of e-waste to hazardous waste in landfills
- Reference to the pollution e-waste produces
- Reference to the movement of e-waste from HICs to MICs/LICs

Against:
- Reference to the money that can be produced by e-waste
- Reference to value of recovered minerals
- Reference to employment given by recycling e-waste
- Reference to global variability of rates of e-waste production/growth/recycling
- Reference to HICs being more problematic as they produce the most

For example: The world map shows that all continents send or receive e-waste **[1]**. The table below the map demonstrates that the production of waste is more of a problem in HICs than LICs **[1]**. Norway produces the most with 28.5 kg/person whilst Niger produces the least with 0.4 kg/person **[1]**. However many valuable minerals can be recovered from e-waste such as gold **[1]**. The photograph shows that recycling also provides jobs for people **[1].** Thus although e-waste is an issue at a global scale it can also have some benefits for the countries that import it **[1]**.