

**Geography 12**  
**August 2006 — Form A**  
**Provincial Examination — Answer Key**

Topics	Weightings	Cognitive Processes	Question Types
1. The Nature of Geography	18%	<b>K</b> = Knowledge	<b>53</b> = Multiple Choice (MC)
2. Systems of the Earth	50%	<b>U</b> = Understanding	<b>5</b> = Written Response (WR)
3. Resources of the Earth	32%	<b>H</b> = Higher Mental Processes	

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
1.	D	K	1	3	3A1	MC
2.	C	K	1	3	3A1	MC
3.	A	K	1	3	3A1	MC
4.	C	K	1	3	3A2	MC
5.	A	K	1	1	1B2	MC
6.	C	U	1	1	1B4	MC
7.	D	U	1	1	1A2	MC
8.	A	K	1	2	2A1	MC
9.	D	U	1	2	2A2	MC
10.	B	U	1	2	2A2	MC
11.	B	U	1	2	2A3, 1C3	MC
12.	C	U	1	2	1C2, 2A3	MC
13.	B	U	1	2	1C2, 2A3	MC
14.	B	H	1	2	1C2, 2A3	MC
15.	A	U	1	2	2A4	MC
16.	D	U	1	2	2A3	MC
17.	C	U	1	2	2A3, 2B2	MC
18.	D	U	1	2	2B3	MC
19.	C	U	1	2	2B3	MC
20.	A	U	1	2	2B3	MC
21.	A	U	1	2	2B3	MC
22.	C	U	1	3	3B2	MC
23.	B	U	1	2	2B3	MC
24.	C	K	1	3	3C1, 1B4	MC

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
25.	D	U	1	2	2C1	MC
26.	B	U	1	1	1B1	MC
27.	B	U	1	2	2C1a	MC
28.	A	U	1	2	2C1c	MC
29.	D	U	1	2	2C1b	MC
30.	A	U	1	2	2C1b	MC
31.	D	U	1	2	2C1b	MC
32.	A	U	1	2	2C1d	MC
33.	D	U	1	2	2C1d	MC
34.	A	U	1	2	2C1e	MC
35.	D	U	1	2	2D2	MC
36.	B	U	1	2	2D1	MC
37.	D	U	1	2	2D3b	MC
38.	C	U	1	2	2D3b	MC
39.	D	U	1	2	2D3b	MC
40.	A	U	1	2	2D3d	MC
41.	A	U	1	2	2D3d	MC
42.	D	K	1	2	2D3e	MC
43.	C	U	1	2	2D3c	MC
44.	B	U	1	2	2D3c	MC

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
45.	A	U	1	1	1C1	MC
46.	C	U	1	1	1C1	MC
47.	C	U	1	1	1C1	MC
48.	C	H	1	1	1C1	MC
49.	B	U	1	1	2D3b	MC
50.	A	U	1	2	1B4	MC
51.	C	U	1	2	2D3c	MC
52.	A	U	1	1	2B3	MC
53.	D	U	1	2	1B4	MC
1.	—	H	4	1	1B3	WR
2.	—	H	6	1	3B2, 1B3, 3C1	WR
3.	—	U	6	3	3C2	WR
4.	—	H	6	2	1B2	WR
5.	—	H	18	3	3C4, 3B1, 3B2, 3C3	WR

## PART B: WRITTEN RESPONSE

Value: 40 marks

Suggested Time: 65 minutes

**INSTRUCTIONS:** Answer each question in the **Response Booklet**. You may not need all of the space provided. Answers should be written in **ink**. **Comprehensive answers are required for full marks.**

### REFER TO DATA PAGES

Use the Topographic Map and Photograph 1 to answer questions 1 and 2.

1. Based on evidence from the map and the air photograph, **explain** two physical processes that are responsible for shaping the landscape of the Corner Brook Region and **explain** two ways humans have modified this landscape. **(4 marks)**

#### Response:

<b>Physical Processes</b>	<ul style="list-style-type: none"><li>• erosional and depositional processes have shaped and continue to shape the region</li><li>• coastal: tidal and wave action (abrasion, hydraulic action, corrasion, attrition) alters coastlines (headlands, stacks) and deposition (beaches, spits) is the result of longshore drift</li><li>• fluvial: the action of running water removes (undercutting), transports (suspension, traction, saltation) and deposits (meanders, deltas) along the river; flash flooding causes mass wasting</li><li>• glacial: past continental ice sheets have carved (plucking, quarrying, abrasion) fjords and created kettle lakes on an outwash plain</li><li>• weathering: physical (frost shattering, freeze-thaw, exfoliation) and chemical (solution) weathering have aided the formation of rockfalls, landslides and scree cones/talus slopes</li><li>• aeolian (wind): the force of wind has helped to shape the region</li></ul>
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<b>Human Modification of the Environment</b>	<p>Development</p> <ul style="list-style-type: none"><li>• roads (blasting, cuttings, embankments, bridges)</li><li>• infrastructure (powerlines, gaslines, waterlines)</li><li>• housing, commercial, industrial, agricultural and parkland (clearing vegetation, leveling, draining wetlands)</li><li>• building on steep terrain</li><li>• creation of groynes, piers, marinas, alters coastlines and beaches (trucking in sand for beaches)</li></ul> <p>Resource Extraction</p> <ul style="list-style-type: none"><li>• deforestation for pulp and paper mills</li><li>• gravel deposits</li></ul> <p>Dredging of the channel to allow ship movement</p> <p>Pollution</p> <ul style="list-style-type: none"><li>• dumps, sewage, septic tanks, mills, burners</li></ul>
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2. **Discuss** the socio-economic and environmental impacts associated with Corner Brook's pulp and paper industry. Answer in **paragraph** form. **(6 marks)**

**Response:**

<p><b>Socio-economic Impacts of the Pulp and Paper Industry</b></p>	<ul style="list-style-type: none"> <li>• People of this isolated part of Newfoundland have built their lives around the pulp and paper industry as an alternative to fishing and seal hunting.</li> <li>• There is substantial residential development in Corner Brook: the pink area shows neighbourhoods and subdivisions.</li> <li>• Recreational facilities have been built to serve the population: parks, trails, campgrounds, an arena, a golf course and a ski hill.</li> <li>• Service centre facilities have been built to meet the needs of the local population: schools, hospitals, churches and a police station.</li> <li>• There are water towers and reservoirs to serve the needs of the population, implying that water must be conserved for a dry season.</li> <li>• Development is long-term, provided that the nearby forests are carefully managed.</li> <li>• The main focus is the pulp and paper mill, located in the heart of the town.</li> <li>• It provides employment for the people of Corner Brook, directly and indirectly.</li> <li>• It provides profits for the company and its shareholders.</li> <li>• It provides tax revenues for the governments: municipal, provincial and federal.</li> <li>• Many other industries have been established to support the local economy.</li> <li>• The sawmill is located on the river, providing employment and wood for the construction industry.</li> <li>• Two industrial parks are located nearby, probably to serve the needs of the main economic activities.</li> <li>• Shopping centres serve the needs of the local population.</li> <li>• Harvesting of the nearby boreal forest provides raw material for the mills and employs hundreds of people.</li> <li>• Power generation was developed to supply the town and the mill's needs.</li> <li>• There is a transportation network for the export of paper and the supply of wood: Humber Arm is a fiord with a well-protected harbour from which ships can transport paper to market. The main roads leading into Corner Brook are likely designed to carry wood to the mills.</li> </ul>
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**Environmental Impacts of the Pulp and Paper Industry**

- Corner Brook has been built on the steep hillsides of the Humber Arm, which may create concerns over run-off and mass wasting.
- The pulp and paper mill has the potential to contaminate the environment:
  - Organochlorides, biochemical oxygen demands (BODs) and total suspended solids have been discharged from the pulp mills.
  - Effluent from mills can poison shellfish and benthic populations.
  - Effluent from the mill may threaten fish stocks by reducing their ability to reproduce.
  - Dioxins and furans from the mill are toxic. Though reductions have been made they are persistent in the environment.
  - Chemicals bioaccumulate in ecosystems.
  - There is air pollution from the mill: carbon dioxide, nitrous oxides, sulphur dioxides and particulates.
  - Energy consumption is high for pulp and paper: the map shows power lines coming into the area.
  - Huge volumes of water are needed for the making of paper; therefore, the nearby lakes have been dammed and the water diverted to the mill.
  - Solid waste is a by-product of the industry and is often disposed of in the ocean or on the land. A large dump is located in the Wild Cove region presumably for the disposal of these wastes; therefore, the threat of groundwater and soil contamination from residuals is very real.
  - Deforestation is another very real threat to the environment: pulp and paper requires vast quantities of wood. Western Newfoundland is densely forested and largely uninhabited; therefore, logging and road building in the past have not been opposed.
  - Spills from transportation accidents leach into the environment.

3. **Outline** three advantages and three disadvantages of hydro-electric power generation. (6 marks)

**Response:**

<b>Advantages of Hydro-electric Power Generation</b>	<ul style="list-style-type: none"><li>• Water is a renewable energy source.</li><li>• Hydro-electricity is reliable, providing consistent electrical generation.</li><li>• Once a dam is constructed the energy (water) is free.</li><li>• Water can be stored in a reservoir to cope with peaks in electricity demands.</li><li>• Transportation of electricity is becoming more efficient.</li><li>• Reservoirs can be used for flood control, irrigation, and recreation.</li><li>• It allows the ability to increase power production quickly, unlike other power stations.</li><li>• Hydro-electric power is proven technology (dams have been used to generate electricity for over 100 years).</li><li>• Hydro-electric power plants are long lasting.</li><li>• Hydro-electric dams, either micro or mega, can be constructed to generate energy.</li><li>• Hydro-electric dams are adaptable, cost less to maintain and operate than other generating plants (they can be operated with automatic controls and by remote control from isolated locations).</li><li>• Hydro-electricity does not produce atmospheric pollution.</li><li>• Hydro-electricity does not produce any waste product.</li></ul>
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**Disadvantages of Hydro-electric Power Generation**

- It is location dependent. There are a limited number of sites that have reliable, year-round flow of water.
- Suitable streams are often in remote, previously undisturbed areas.
- Initial construction costs are high.
- Power generation creates thermal pollution (increases water temperature).
- The weight of the dam and reservoir can trigger seismic activity (isostatic adjustment).
- Reservoir creation requires upstream valley to be flooded.
  - relocation of people
  - loss of historical and cultural grounds
  - destruction of spawning grounds
  - loss of resources (agricultural land, forests and minerals)
  - decaying vegetation can increase mercury levels in the water
  - transmission of water-borne diseases especially in the tropics
  - loss of habitat and migration corridor
- Construction alters the downstream environment.
  - fish migration is altered, ladders need to be constructed
  - wetlands dry up
  - floods are reduced, preventing the natural flushing of wetlands
  - loss of farmland since siltation behind the dams means alluvium is unable to replenish soil during floods
  - increased erosion and loss of deltas
- Reservoirs alter the water cycle (increase evaporation rates and change infiltration rates).
- Reservoirs can create microclimates by altering temperature and precipitation patterns.



**Use the following information to answer question 4.**

In April 2000, Mt. Usu in Japan erupted after a series of earthquakes, sending columns of smoke, gas and debris into the air; 15 000 people were evacuated, but no deaths were reported.

4. **Explain** the interactions between the spheres when Mt. Usu erupted.  
Answer in **paragraph** form.

**(6 marks)**

**Response:**

<b>Atmosphere</b>	<ul style="list-style-type: none"> <li>• Smoke and sulphurous gas were released into the atmosphere, polluting the air, but also falling as acid rain, potentially harming animals and people who breathed the air. Often lightning is associated with volcanic eruptions. Ash entering the atmosphere can destroy crops and kill life forms.             <ul style="list-style-type: none"> <li>– cinder, ash, sulphurous gas were released (nuee ardente)</li> <li>– acid rainfall</li> <li>– alters climate (increased rainfall)</li> <li>– lightning storms</li> <li>– alters flight paths</li> </ul> </li> </ul>
<b>Biosphere</b>	<ul style="list-style-type: none"> <li>• People were forced to evacuate the area. Plants and animals would have been destroyed and harmed by the heat from the volcanic ash and debris.             <ul style="list-style-type: none"> <li>– loss of life</li> <li>– destruction of vegetation (plants, trees and crops)</li> <li>– evacuation of people</li> <li>– loss of animals and their habitat</li> <li>– loss of aquatic life</li> <li>– respiratory problems</li> </ul> </li> </ul>
<b>Hydrosphere</b>	<ul style="list-style-type: none"> <li>– mud flows (lahars)</li> <li>– thermal pollution of river</li> <li>– siltation of water bodies</li> <li>– acidification of water bodies</li> <li>– potential to trigger a tsunami</li> <li>– lava and ash alters drainage patterns</li> <li>– alters water cycle</li> </ul>

<b>Lithosphere</b>	<ul style="list-style-type: none"><li>• Mt. Usu is a composite cone and was created by the subduction/convergence of an ocean plate. (Japan is located where three plates—Pacific, Eurasian and Philippine—collide).</li><li>• As an ocean plate subducts under another plate (continental or oceanic) it melts, sending magma plumes/bubbles towards the surface.</li><li>• After a series of eruptions a cone of cinder, ash and lava will form.</li><li>• Over time, as the ocean plate continues to slowly subduct, magma will continue to accumulate below the surface and when enough pressure builds up an eruption will result.</li><li>• Earthquakes occurred because tectonic movement of crustal plates (asthenosphere) created pressure, which was released by the volcanic eruption and lava flows.<ul style="list-style-type: none"><li>– lava flows</li><li>– landslides</li><li>– mud flows</li><li>– earthquakes and aftershocks</li><li>– creates new rocks and minerals</li></ul></li></ul>
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5. Using your understanding of geography and the data provided:

- **Describe** how physical factors have contributed to desertification of the Western Sahel.
- **Explain** how human factors have compounded the problem of desertification in the Western Sahel.
- **Provide** some strategies to reduce the effects of desertification in this region.

Answer in **essay** form.

**(18 marks)**

**Response:**

<p><b>Physical Factors</b></p>	<ul style="list-style-type: none"> <li>• Under the influence of a high pressure region (30°N) with its dry, outflow wind.</li> <li>• Under the influence of NE trade winds which have a drying effect as they blow off shore.</li> <li>• High daily and annual temperatures increase evaporation rates.</li> <li>• Unreliable seasonal and annual precipitation rates do not recharge water supplies.             <ul style="list-style-type: none"> <li>– climate variations within the region create precipitation levels, ranging from 200 mm to 600 mm</li> </ul> </li> <li>• Limited surface water supplies in the region.</li> <li>• A cold ocean current off shore produces little rainfall.</li> <li>• The region experiences drought due to natural rainfall cycles.</li> <li>• The vast size of the region means inland locations are drier due to continental influences.</li> <li>• Region has been plagued by droughts that have lasted for years.</li> <li>• Fragile transitional biome making it vulnerable to any changes to precipitation totals.             <ul style="list-style-type: none"> <li>– vegetation is xerophytic, reducing transpiration and available atmospheric moisture; if climate change increases the frequency and/or intensity of droughts, it will aggravate desertification</li> <li>– warmer/drier conditions may increase the threat of pests (grasshopper and locust) to vegetation</li> </ul> </li> <li>• If climate change increases the frequency and/or intensity of droughts, it will aggravate desertification; grasshopper and locust population may increase with warmer conditions, increasing the threat to vegetation cover.</li> </ul>
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<p><b>Human Factors</b></p>	<p>Rapid population growth</p> <ul style="list-style-type: none"> <li>– puts pressure on the land for food and fuel.</li> <li>– population boom is due to both high birthrates and increased immigration due to civil wars and drought</li> </ul> <p>Poor Farming Practices</p> <ul style="list-style-type: none"> <li>• Traditional nomadic farming prevented overgrazing, current political boundaries limit movement (increases pressure on marginal grazing lands). <ul style="list-style-type: none"> <li>– reliance on traditional ways of farming and resistance to modern solutions</li> <li>– nomadic lifestyle decreases the sense of ownership and therefore willingness to deal with problems that are generated</li> </ul> </li> <li>• Over irrigation: when water is available poor irrigation practices can cause salinization of soil.</li> <li>• Overgrazing removes vegetation cover leaving soil exposed to wind and water. <ul style="list-style-type: none"> <li>– causes a decline in annual production of pasture vegetation and palatable grass species</li> <li>– replaces perennials with annual species that are short-lived and do not hold soil against erosion</li> <li>– compacts soil under trampling hoofs at water holes and in wet season pastures (gully erosion)</li> <li>– destabilizes dunes when crest vegetation is eaten.</li> <li>– causes a decline in livestock health and consequent fall in milk and meat production</li> </ul> </li> <li>• Overcultivation reduces soil fertility and leaves soil vulnerable to wind and water erosion.</li> <li>• Clearing land (slash-burn) to make room for cash crops reduces soil fertility and exposes the soil to erosion.</li> <li>• Removal of vegetation increases albedo; reduces convection; reduces rainfall; reduces plant growth; accelerates desertification.</li> <li>• Social pressure to attain and maintain status through ownership of cattle/livestock.</li> </ul> <p>Deforestation</p> <ul style="list-style-type: none"> <li>– low economic standing means people rely on the already limited vegetation cover as a fuel source.</li> <li>– removal of trees means less transpiration which increases the risk of lower rainfall</li> <li>– loss of natural vegetation cover increases the risk of wind erosion</li> </ul>
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<p><b>Human Factors (continued)</b></p>	<p>Economic Development</p> <ul style="list-style-type: none"> <li>• Poverty, overpopulation and land degradation create a self-reinforcing downward spiral leading to ever-greater misery and land degradation.</li> <li>• Foreign aid has had some problems especially in the area of well creation, once nomadic farmers have decided to stay close to new wells. The act of boring water holes into the ground to allow for better watering of livestock, a program often undertaken by governments to increase the productive livestock yield of an area, increases the water supply and encourages livestock herders to remain in one area, rather than wander around the desert in search of oases, and results in the overgrazing of a circular area of about 100 km radius.</li> </ul>
<p><b>Strategies to Reduce Effects of Desertification</b></p>	<ul style="list-style-type: none"> <li>• Land Use Plan: <ul style="list-style-type: none"> <li>– improved land use</li> <li>– agricultural and livestock improvements</li> <li>– reforestation programs</li> <li>– water utilization and resource development</li> <li>– village organization</li> </ul> </li> <li>• Include local communities and the public in general in executing grass roots development type efforts and decisions.</li> <li>• Liberalization of economic and political systems, to encourage the development of a diverse civil society and freedom of economic burden.</li> <li>• Encourage financial and educational aid, as well as a support system from non-governmental organizations and various governmental organizations.</li> <li>• Use satellites and global monitoring to collect data and make informed decisions — better use of science and technology to research and fight desertification.</li> </ul>

**Strategies to Reduce  
Effects of Desertification  
(continued)**

- Land and soil conservation methods need to be implemented such as
  - contour plowing
  - stone lines
  - trench and alley planting (provides shade)
  - wind breaks
  - check dams
  - bunds and terraces
  - multiple use of lands,
  - growing crops in rapid rotation,
  - sand interplanting several crops at a time
  - fencing off young trees to avoid overgrazing
  - local farmers to cultivate drought tolerant edible perennial plants, which they can use for food and that stabilize the sand at the same time
  - planting sisal to reduce size of gullies
  - domesticate indigenous species
- Developing sustainable land management through improved land tenure systems and community natural resources management.
- It is essential to empower local people with the means for prevention including education, training and access to birth control.
- Introduction of greenbelt programs especially in conjunction with shelter belts — Natural vegetation barriers are often better solutions to desertification than high technology engineering projects.
- Reduce number of grazing animals to prevent overgrazing.
- Find other viable options to reduce consumption of biomass.

## SCORING GUIDE FOR THE CASE STUDY

An essay may or may not conform to each and every descriptor within a particular scale point. The marker should classify the response into a category based on general impression rather than by checking off each descriptor. **This is a first draft response and should be assessed holistically.**

### 6

- Thesis is clearly developed and provides a focus for discussion throughout.
- Superior interpretation and synthesis of the data demonstrates an extensive understanding of geographic concepts.
- Insightful supporting detail and analysis provided; meaningful conclusions are drawn.
- Expression is clear and fluent; the response need not be error free.

### 5

- Thesis is relevant, providing direction for discussion throughout.
- Excellent interpretation and analysis of the data presents a proficient and broad understanding of geographic concepts.
- Relevant use of supporting detail and analysis; effective conclusions are drawn.
- Expression is clear and fluent; the response need not be error free.

### 4

- Thesis is relevant providing for an appropriate discussion.
- Competent interpretation of the data showing a satisfactory understanding of geographic concepts.
- Appropriate use of supporting detail with some analysis; adequate conclusions may be drawn or attempted.
- Expression is generally clear and fluent; errors may be present but are seldom distracting.

### 3

- Thesis is attempted, but may be unclear or ambiguous.
- Simplistic interpretation and repetition of the data demonstrates limited understanding of geographic concepts.
- Minimal use of supporting data with little or no analysis; conclusions may be weak or non-existent.
- Expression is simplistic; errors impede meaning.

### 2

- Thesis is unfocussed and off topic.
- Inadequate interpretation of the data demonstrates a flawed understanding of geography.
- Irrelevant use of supporting detail; analysis is not evident.
- Expression is awkward; errors impede meaning.

### 1

- No attempt at thesis.
- Limited or no interpretation of the data demonstrates no understanding of geography.
- Absence of supporting detail with no analysis.
- Expression is unclear and makes understanding difficult.

### 0\*

- While writing is evident, no discernible attempt has been made to address the topic given or the writing is illegible.
- \* Any zero paper must be cleared by the table head.

### NR

- A blank paper with no response given.

**END OF KEY**