

Geography 12

June 2003 Provincial Examination

ANSWER KEY / SCORING GUIDE

- Topics:** 1. The Nature of Geography
 2. Systems of the Earth
 3. Resources of the Earth

Part A: Multiple Choice

Q	K	C	S	T	PLO	Q	K	C	S	T	PLO
1.	C	K	1	3	3A4c	21.	B	U	1	2	2C1a
2.	C	U	1	3	3C1	22.	D	U	1	2	2C1d
3.	A	K	1	3	3B1, 3B2	23.	B	U	1	2	2C1a
4.	A	U	1	1	1A1	24.	B	U	1	2	2C1c
5.	B	U	1	1	1B2	25.	D	U	1	2	2C1b
6.	D	U	1	2	2B5	26.	A	U	1	2	2C1b
7.	A	U	1	2	2A4	27.	A	U	1	2	2D2
8.	C	U	1	2	2A2	28.	C	K	1	2	2D3a
9.	C	U	1	2	2B2	29.	C	U	1	2	2D3b
10.	B	U	1	2	2A2	30.	C	U	1	2	2D3b
11.	A	U	1	2	2B1	31.	D	U	1	2	2D3c
12.	D	U	1	2	2A3	32.	A	U	1	2	2D3c
13.	B	U	1	2	2A3	33.	C	U	1	2	2D3d
14.	D	U	1	2	1C2, 2A3	34.	B	U	1	2	2D3d
15.	A	U	1	2	2B3	35.	B	U	1	1	1C1
16.	B	U	1	2	2B3	36.	C	U	1	1	1C1
17.	C	U	1	2	2B3	37.	C	U	1	1	1C1
18.	B	U	1	2	2B2	38.	B	U	1	1	1C1
19.	D	U	1	1	1B2	39.	C	U	1	1	1C2
20.	D	K	1	2	2C1a	40.	D	U	1	1	1B3

Multiple Choice = 40 marks

Part B: Written Response

Q	B	C	S	T	PLO
1.	1	H	6	1	1B3
2.	2	U	4	2	2D1
3.	3	H	3	1	1C3
4.	4	H	6	3	3A2
5.	5	H	4	2	2B5
6.	6	U	3	2	2B3
7.	7	U	5	3	3C1
8.	8	H	6	3	3A3, 3B2
9.	9	U	3	1	1B4, 3C3
10.	10	H	10	3	1B4, 1C3, 2B5, 2C3, 3C1

Written Response = 50 marks

Multiple Choice = 40 (40 questions)

Written Response = 50 (10 questions)

EXAMINATION TOTAL = 90 marks

LEGEND:

Q = Question Number

C = Cognitive Level

T = Topic

K = Keyed Response

S = Score

PLO = Prescribed Learning Outcome

B = Score Box Number

PART B: WRITTEN RESPONSE

Value: 50 marks

Suggested Time: 80 minutes

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

**REFERENCE
DATA BOOKLET**

Use Photograph 6 and the Topographic Map to answer question 1.

1. The Iron Ore Company of Canada’s operation in the Labrador City region accounts for 95% of Canada’s iron ore production. **Outline** the economic, social and environmental impacts of extracting and processing iron ore in this region. Answer in **paragraph** form.

(6 marks)

Response:

<p>Economic, Social and Environmental Impacts</p>	<ul style="list-style-type: none">• reliance on air transport• threats to aboriginal culture• reliance on imported goods• temporary housing complexes• frontier attitude of the people• social problems associated with boom-and-bust conditions: transient population, ghost town when ore runs out (e.g. drugs, alcohol)• consumption of contaminated wild foods results in ill health• infrastructure costs to build rail and road to remote locations• spin-off businesses to support extraction• creation of employment: short term, high wages• recreational opportunities• profits for the mine operators• development of the town centre• shopping malls, arenas, sportsplexes• tax revenue for the province of Newfoundland and Labrador• services for the residents, such as health and education
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Social, Economic and Environmental Impacts (continued)

- iron ore is an important domestic commodity and international trade item
- long-term economic viability is in question when resource is exhausted
- demand for the resource is dependent on international markets
- open-pit mine: significant alteration of the landscape, subsidence
- rehabilitation costs after extraction
- habitat loss and changes to migratory animals
- tailings are being dumped into the lakes
- acid rock drainage from the tailings contaminates the lakes
- acid rock drainage can cause heavy metals, such as arsenic, lead and zinc, to wash into the water, killing fish and contaminating drinking water
- acid rain from melting process
- sewage dumped into the lakes
- dust pollution from the tailings waste sites
- stack emissions from the mills spread dust over the surrounding area
- biomagnification in the wildlife population
- eutrophication
- loss of aesthetic values
- health issues
- deforestation
- trade relationships
- energy demands
- cultural diversity in work force
- company support for social and cultural activities
- pride/status amongst people
- educational tours
- burning fossil fuels for transportation
- noise pollution
- positive or negative impacts on tourism
- environmental ethics for land use

Note to Markers:

This question is to be marked holistically.

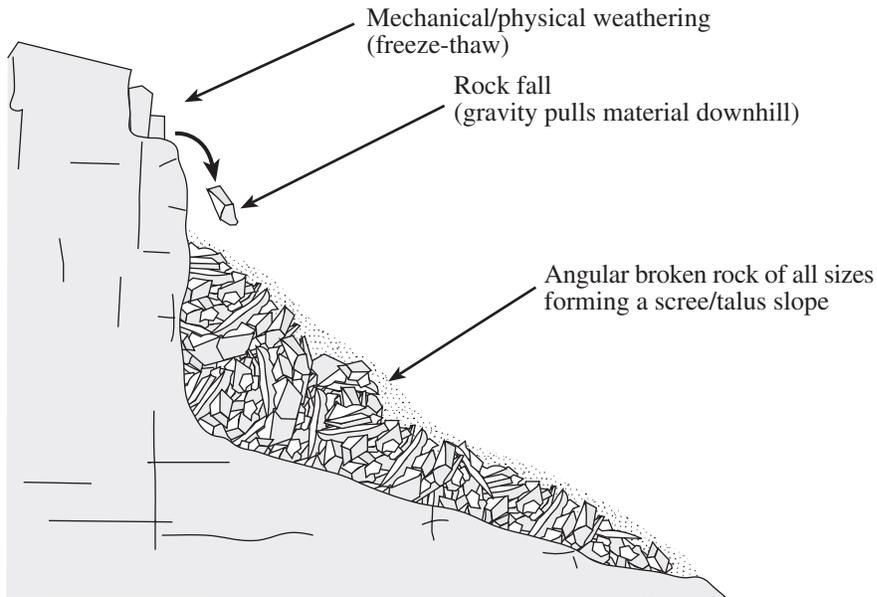
Select one of the following features to answer question 2.
Indicate your selection with a ✓.

Scree/Talus Slope

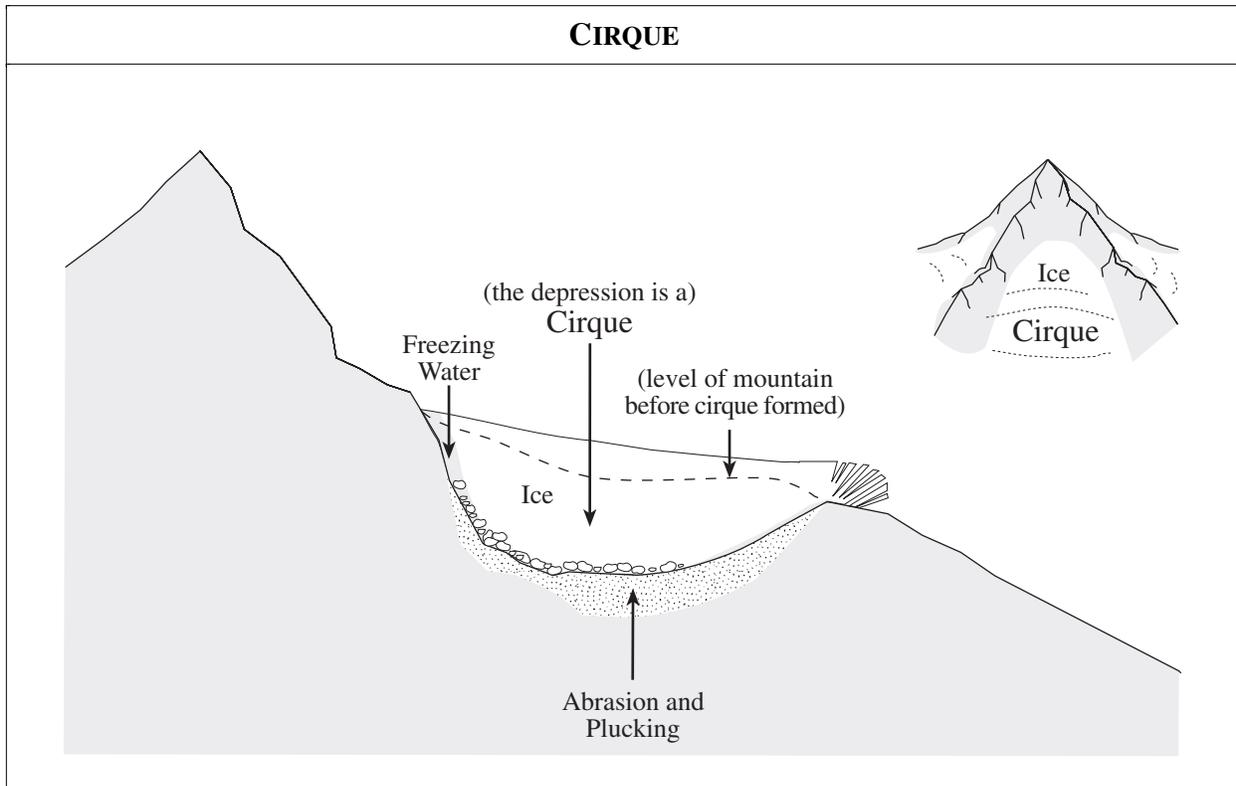
Cirque

2. With the aid of a clearly labelled diagram(s), **explain** either the formation of a scree/talus slope **OR** a cirque. (4 marks)

Response:

SCREE/TALUS SLOPE	
	
<ul style="list-style-type: none">• The process occurs where a depositional feature is found at the base of a steep slope. Mechanical weathering of exposed rock surfaces under the force of gravity causes blocks of rock to be pulled rapidly downslope. Large temperature ranges, frost shatter and root systems cause rock to fall, bounce and roll to the base of the slope and rest in an angular, unsorted, linear pile of debris.• Mass wastage/rock slide.• Frost shattering (frost wedging).• Biological weathering (tree roots).	
<p>Note to Markers:</p> <p>This question is to be marked holistically. The explanation may be shown in the diagram. An annotated diagram can achieve full marks. There are no half-marks.</p>	

Response:



- A cirque is formed when a semi-circular, steep-sided basin is cut into the side of a mountain or at the head of a valley by a glacier. The accumulation of snow in a hollow eventually forms ice, névé, firn or a glacier. The glacier moves and pulls away from the sides of the hollow. Water which has infiltrated fissures and frozen in place allows the moving glacier to pluck out the rock. Freeze-thaw activity is taking place. This causes the sides to steepen and the back wall to retreat (headward erosion). The depression is over-deepened and widened to take the shape of an armchair (amphitheater, hole, depression).

Note to Markers:

This question is to be marked holistically. The explanation may be shown in the diagram. An annotated diagram can achieve full marks. There are no half-marks.

3. **Explain** the advantages of using computer-related technologies (such as Satellite Imagery, Geographic Information Systems, GPS, Remote Sensing and Doppler Radar) to the following: **(3 marks)**

Response:

<p>Weather</p>	<ul style="list-style-type: none"> • Weather satellite technologies allow us to track and monitor weather systems. Computer projections can then allow us to project the severity of these systems (giving us an advanced early warning for frost, floods, tropical systems). • TRIM data (angle of the sun hitting the slope for forestry practices). • Doppler Radar to track and monitor the development and advancement of weather systems: flood warnings. • Remote sensing: no direct contact with earth’s surface, includes aerial photography and satellite imagery. • It is easier and more accurate to predict weather (enabling planning for trips, clothing, activities).
<p>Natural Hazards/Disasters</p>	<ul style="list-style-type: none"> • Weather satellite technologies allow us to track and monitor weather systems. Computer projections can then allow us to project the severity of these systems (giving us an advanced early warning for frost, floods, tropical systems). • Doppler Radar allows us to track tornadoes. • Landsat satellites record accurate details on a daily basis, monitoring such events as forest fires, oil spills, volcanic eruptions. • Natural events such as snow melt, El Niño and desertification can be monitored with computer-related technologies. • GPS to monitor seismic activity, plate movement and volcanic activity. • Tracking the spread of natural pests (pine beetle). • Tracking tsunamis, issuing warnings. • Warn of coming weather systems (hurricanes); prepare for natural disasters; assess the extent of damage and avoid affected areas; develop rescue plans or find a way out (GPS).

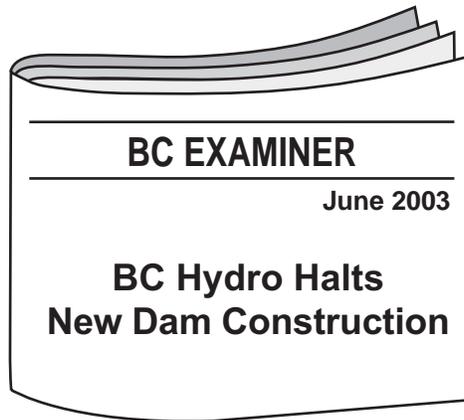
Resource Management

- Computer technologies can accurately project models to determine rates of consumption; plan for use of resources and sustainability; monitor water and wind resources; view resources.
- Computer technologies provide an accurate and rapid overview of huge areas, often revealing structures and patterns that cannot be seen in another way (oil deposits; extent of forest fires; pest damage).
- Infrared technologies are particularly useful for agricultural and forestry surveys. Healthy broad-leaved plants, for example, appear red; while conifers are brown to purple, but diseased plants show up as dark red to blue.
- Landsat satellites circle the earth 14 times each day and pass over every part of the Earth's surface once every 18 days — recording details of mineral and water resources, land use, and pollution.
- Sonar technologies allow oceanographers to map the ocean floor and determine the thickness and nature of seabed deposits.
- Computer technologies can be used for tracking fish and monitoring migration patterns.
- Analysis of Geographic Information Systems (GIS) data can be used to plan and manage resources such as forests.
- Computer technologies can be used for planning crop harvesting schedules.
- Migration routes.

Note to Markers:

There are no half-marks.

Use the following headline to answer question 4.



4. a) **Identify** and **explain** four disadvantages associated with large-scale dam construction.

(4 marks)

Response:

Disadvantages of Large-scale Dam Construction	<ul style="list-style-type: none">• initial cost of hydro dams is high• eutrophication• loss of habitat and migration corridors upstream• loss of vegetation (trees)• destruction of spawning grounds• loss of downstream wetland habitats and arable lands• alteration of/or obstacles to fish migration routes• transmission of water borne diseases• loss of delta formation• acceleration of coastal erosion as alluvial deposition diminishes• siltation behind dams• increased erosion downstream• isostatic adjustments (earthquakes)• upstream flooding• changes in infiltration rates• increased evaporation rates• increased water temperature• drying up of downstream wetlands• increased mercury levels in the water supply (decaying vegetation)• the alteration of the river flow to meet seasonal power demands; the river flow is naturally low in winter and high in spring; now it can be controlled to meet the demands of people• temperature changes (micro-climatic changes)• alters temperature and precipitation pattern in surrounding areas• political pressures
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<p>Disadvantages of Large-scale Dam Construction (continued)</p>	<ul style="list-style-type: none"> • relocation of people • loss of spiritual, historical and cultural grounds • international issues with respect to the flooding of land • the cost of moving fish to their spawning channels • interferes with recreation • reduction of aesthetic beauty • possible land claims issues • possible conflicts between different interest groups
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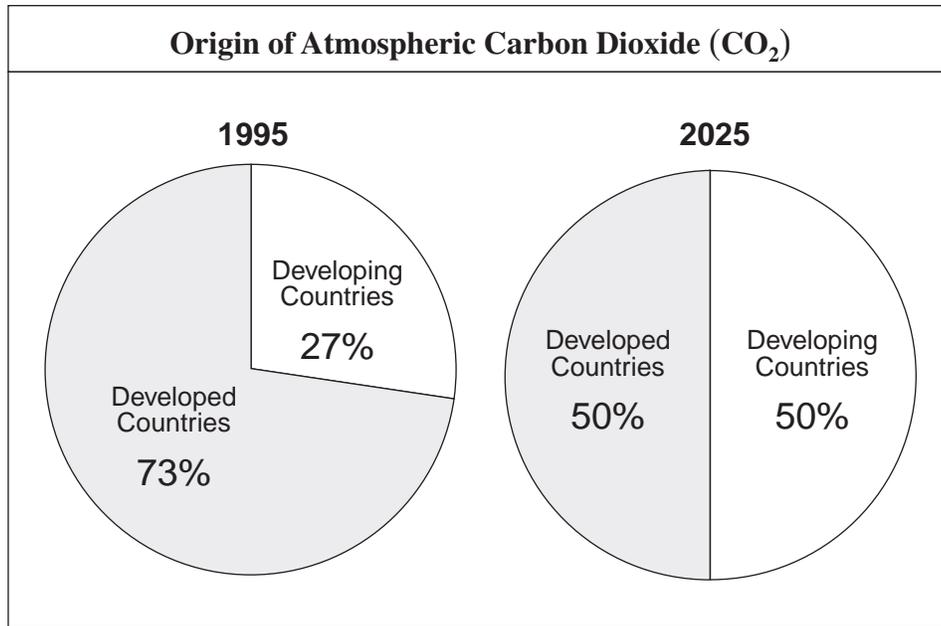
b) **Suggest** two ways to reduce the need for new dam construction.

(2 marks)

Response:

<p>Reducing the Need for New Dam Construction</p>	<ul style="list-style-type: none"> • not overheating homes in winter or overcooling in summer • using better home insulation • reducing the use of home appliances • PowerSmart programs <ul style="list-style-type: none"> – low-energy light bulbs – low-energy appliances • using double (thermopane) windows • electrical conservation • industrial: alternative fuel sources such as wind power • vertical home construction versus horizontal development • regulation of hydro production • solar energy in homes • conserve water • improve dam technology (more efficient turbines) • build microhydro dams (smaller scale dams) • make better initial site selection • use alternative energy sources (all types) • update/modify/better maintain existing dams
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Use the following graphs to answer question 5.



5. a) **State** two reasons why carbon dioxide emissions may decrease in **developed** countries by 2025. (2 marks)

Response:

<p>Reasons Carbon Dioxide Emissions May Decrease in Developed Nations</p>	<ul style="list-style-type: none"> • development of <ul style="list-style-type: none"> – fuel efficient vehicles – energy efficient appliances – recycling programs (recycled products reduce energy demands — aluminum and glass) • use of <ul style="list-style-type: none"> – alternative energy (solar, wind, tidal) – energy conservation methods (double-pane windows, better insulation, PowerSmart) – rapid transit, car pooling, high occupancy vehicle lanes • government involvement <ul style="list-style-type: none"> – changes to legislation and levying of fines – tax breaks and incentives for the development and use of alternative energy sources – education and awareness programs • Kyoto agreement • creation of green spaces preserves carbon sinks (reforestation/afforestation) • more people work from home (less pollution from commuting) • fluidized combustion bed • developed countries have moved industries to developing countries • CO₂ injected into oil wells to extract resource; CO₂ stays buried for long periods
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b) **Suggest** two reasons why carbon dioxide emissions are likely to increase in **developing** countries by 2025.

(2 marks)

Response:

<p>Reasons Carbon Dioxide Emissions Will Likely Increase in Developing Nations</p>	<ul style="list-style-type: none">• lack of government regulations (economic growth is a priority)• larger populations demand a greater consumption of goods which leads to increased energy demands• many of these countries are starting to industrialize, which increases their use of fossil fuels• coal is available and relatively inexpensive• they cannot afford energy-efficient technology• lack of education and knowledge of consequences• apathy• international agreements• advertising/marketing of the “good” life• developing countries were able to operate with cheap and non-renewable energy for years• using old technology (often acquired from developed countries)• power and influence of multinational corporations and transnational corporations• desire to emulate Western lifestyle• major deforestation for development of industries and cities• agricultural development/expansion and use of slash and burn methods causes loss of carbon sink
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6. a) **Identify** the natural vegetation associated with the biome shown in the photograph.

(1 mark)

Response:

Vegetation	<ul style="list-style-type: none"> • deciduous forest • temperate deciduous • mixed forest • alder, ash, aspen, beech, birch, elm, maple, oak, poplar • eastern woodlands • hardwoods • broadleaf • parkland
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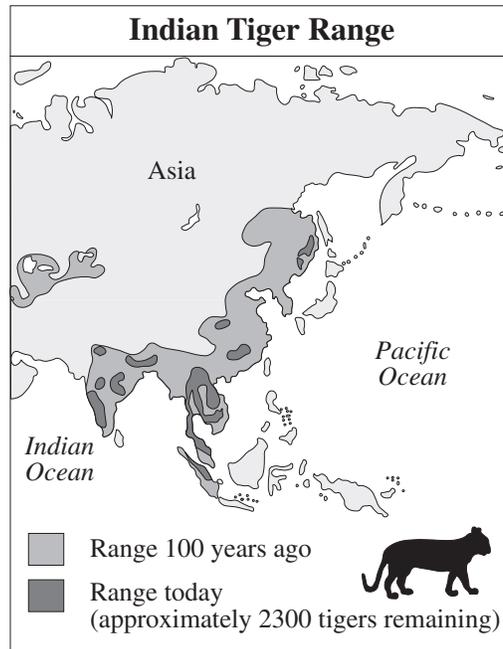
- b) **Identify** and **explain** two ways that this vegetation has adapted to the climate of this region.

(2 marks)

Response:

Adaptations	<ul style="list-style-type: none"> • sap flows to the roots in the winter • thin bark (does not need to protect the sap) • sheds leaves during the fall, to conserve energy and moisture • shallow root systems • upslope branches compete for sunlight • hardwoods • leaf litter for redistribution of nutrients • seed distribution system • roots access nutrients through leaf litter • competition for sunlight means tall, spindly growth • spacing allows the growth of other species • slower growth rate due to short warm season • waxy to reduce moisture loss
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Use the following map to answer question 7.



7. a) **Explain** two reasons why the range of the Indian Tiger has been reduced. **(2 marks)**

Response:

<p>Reasons for the Reduction in the Range of the Indian Tiger</p>	<ul style="list-style-type: none"> • habitat destruction/loss of food source • population growth • urban development/sprawl • industrial activities <ul style="list-style-type: none"> – mining – forestry • agriculture • pollution • climate change: global warming and migration of vegetation zones • wars • technological advancement • ecotourism • poaching • trophy hunting • culling of the population: threats to agriculture and people • traditional medicines • exportation of the species around the world • desertification • slow reproduction rates (lower numbers can not catch up) • tourism, resort development, trekking • cultural and religious practices
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b) **Suggest** two practical solutions to reduce the threat of species extinction. **(2 marks)**

Response:

<p>Solutions to Reduce the Threat of Species Extinction</p>	<ul style="list-style-type: none"> • create strict laws, increase enforcement and levy heavy fines • establish international treaties and laws: CITES • increase the number of conservation officers • encourage education and understanding of how valuable all species are <ul style="list-style-type: none"> – food chain – gene pools – medical cures • create protected areas <ul style="list-style-type: none"> – parks – refuges – reserves • establish breeding programs <ul style="list-style-type: none"> – gene pools – zoos • restrictions on urban development and industrial activities • introduce ecotourism as an economic alternative • first world offering economic incentives such as foreign debt swap • educate locals about sustainable practices in agriculture/ forestry
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c) **Explain** why it may be difficult to implement solutions. **(1 mark)**

Response:

<p>Difficulties in Implementing Solutions</p>	<ul style="list-style-type: none"> • lack of money to establish refuges and to enforce regulations • lack of international agreement and cooperation on conservation • economic benefits associated with hunting, poaching and trading of animals • lack of education and understanding of the importance and value of endangered species • people unwilling to accept the “tiger” as a vital component of the environment • economic pressure to release reserve lands for development • government corruption (bribery) • immediate economic benefits from unsustainable practices hard to ignore • apathy/people don't care
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Select one of the following activities to answer question 8.
Indicate your selection with a ✓.

Fishing

Agriculture

8. a) **Describe** three threats to the activity that you have selected.

(3 marks)

Threats to Fisheries

- Global warming — the warming of coastal waters has a profound impact on the elimination of certain species of fish (salmon) and the introduction of new species (mackerel) which ultimately impacts species above and below on the food chain.
- Lack of sufficient precipitation in the fall impacts fish spawning rivers.
- The spread of disease could eliminate fish stocks (farmed Atlantic salmon could infect wild Pacific salmon stocks).
- Aquaculture/fish farm competition with native species.
- Introduction of foreign species.
- The overpopulation of predatory species (the increase in seal populations has a direct impact on fish stocks).
- Overfishing/overharvesting.
- Improved technology for fishing (factory ships, use of drift nets, use of satellites for tracking schools of fish).
- Oil spills.
- Threat of offshore oil drilling along coastlines and potential spills.
- Fisheries Department overestimates fish stock.
- Change in climate influences fish habitat (global warming, El Niño, UV rays).
- Ozone depletion destroys plankton (food source).
- Logging may increase river sediment which will cover spawning beds.
- Foreign and domestic fishermen disregard conservation methods.
- Destruction of wetlands due to urban and industrial development.
- Competition with international fishers.
- Harvesting techniques.
- Industrial run-off into streams and coastal areas.
- Dam construction — damage to spawning grounds.
- Competition for dwindling stocks.

**Threats to Fisheries
(continued)**

- New net sizes.
- Catch and release programs.
- Predator species introduced (bass in BC lakes, Atlantic salmon).
- New technology permits more fish to be caught (better sonar, GPS).
- Eutrophication.
- Conflicts between user groups (natives vs. commercial vs. sports fisheries).
- Toxic run-off from agriculture.

Threats to Agriculture

- Climate change/global warming — the fluctuation of weather patterns directly impacts growing seasons (warmer, drier summers create drought conditions on the Prairies).
- Soil erosion due to unsustainable practices.
- Insect infestations can destroy crops by decreasing yield and quality.
- Hail storms, floods and other extreme weather phenomena can destroy crops or render them unmarketable.
- The elimination of groundwater sources for irrigation purposes (Ogallala Aquifer).
- Poor agricultural practices: overgrazing, overcultivation, lack of crop rotation.
- Excessive application of chemical fertilizers, pesticides and herbicides (agrocides).
- Excessive irrigation/salinization.
- Urban development such as housing, transportation, recreation (golf courses taking over farmland), industry, urban sprawl.
- Economic tariffs.
- Lack of subsidies granted to Canadian farmers for international competition.
- Overreliance on monocultures and genetically modified seeds.
- Ground level (ozone) pollution reduces crop yields.
- Desertification.
- Overmechanisation leads to destruction of topsoils.
- Removing land from the Agricultural Land Reserve.
- Huge debt loads force North American farmers into unsustainable practices.
- Young people don't want to farm.
- Farmers are quitting and moving to urban areas for employment.
- Flooding.
- Diseases (mad cow).
- Exploitation ethic.
- Diseases in crops.

b) **Suggest** three strategies that could help sustain this activity for future generations.

(3 marks)

Response:

Strategies to Sustain Fisheries	<ul style="list-style-type: none">• Expand the egg-take and hatchery programs.• Bring together stakeholder groups (the Department of Fisheries and Oceans, Aboriginal Groups, Fishers, Salmonid Conservation Groups) to establish annual quotas and/or closures of areas.• Create fish ladders, utilize fish ferries.• Develop fish hatcheries.• Catch-and-release programs in the sports fishery.• Increase costs for fishing licences.• Restrict forestry along spawning rivers (100 metre buffer zone).• Ban dam construction on spawning rivers.• Convert areas with spawning rivers to parks.• Implement salmon enhancement programs.• Use tertiary sewage treatment (do not dispose of sewage in streams).• Limit the catch for all groups (sport, native and commercial fishers); reduce the annual allowable catch.• Negotiate a conservation treaty with the United States (and other international stakeholders).• Impose large fines and jail terms for foreign fishers in Canadian waters.• Place a moratorium on fishing (prohibit fishing for extended periods of time to allow fish stocks to replenish).• Use aquaculture (could decrease pressure on wild stocks, but could also endanger wild stocks if mismanaged).• Place size restrictions on catches (put smaller, immature fish back).• Increase awareness through education programs.• Reduce air and water pollution.• restrictions on emissions from boat engines.• Only let fish farms raise local stocks (no Atlantic salmon).• Buying back commercial licences.• More pressure from lobby groups (Greenpeace/David Suzuki).• Liming of lakes (buffer).
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Strategies to Sustain Agriculture

- Grow crops that can adapt to the changing climatic conditions within a region (strains of wheat that are drought resistant).
- Examine the introduction of genetically modified crops — ones that increase yield potentials and are pest and disease resistant.
- Expand the use of efficient, water conserving irrigation systems (drip irrigation techniques).
- Expand the use of natural fertilizers and biological agents to fight pests and disease.
- Soil conservation strategies (contour ploughing, terracing, shelterbelts, field rotation, crop rotation, intercropping, organic methods).
- Establishing Agricultural Land Reserve.
- Expansion of educational programs.
- Reducing soil erosion.
- Subsidizing agriculture to ensure sustainable practices (reducing debt loads).
- Small-scale organic agriculture.
- Greenhouses.
- Leaving ground cover/laying hay over fields.

Use the following cartoon to answer question 9.



9. a) What is the meaning of the cartoon?

(1 mark)

Response:

<p>Meaning</p>	<ul style="list-style-type: none">• Changing attitudes towards recycling and our use of natural resources.• This cartoon promotes the idea of recycling, for if humans don't recycle they may destroy the earth.<ul style="list-style-type: none">– global warming (methane emissions from landfills)– ozone depletion (buried plastics and CFCs are slow to breakdown)– loss of resources (metals and trees)– contamination of freshwater (leachates from landfills, dumps, settling ponds)– destruction of ocean ecosystems from intentional dumping of garbage in oceans (New York City)• Reusing (thrift shops, blue boxes).• Biodiversity, sustainability, quality of life, finite nature of the planet, damage to ecosystems, uniqueness of the planet, use of renewable and non-renewable resources, loss of beauty or aesthetic value due to the lack of recycling.
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b) **Explain** two reasons why some people do not recycle.

(2 marks)

Response:

Reasons Why Some People Do Not Recycle	<ul style="list-style-type: none">• landfills are viewed as relatively cheap (municipal garbage pickup is not considered that expensive)• not all recyclable materials are picked up by municipal garbage collection• inconvenience of taking recyclable materials to recycling depots• throw-away society (out of sight, out of mind)• built-in obsolescence of products• convenience and low cost of plastics/tetra packaging• limited market for recycled materials• lack of government support, not all items have a recycle/refund deposit (milk cartons)• composting attracts wildlife• limited understanding by many regarding what can be recycled and the benefits of recycling• few financial incentives• recycling services are unavailable in some areas• culture of abundance — no experience with shortages• lack of legislation (not the law; not forced to)• laziness/apathy• anti-government• don't see the big picture• inferior products• no impact in their lifetime• people of the future have the answer• sanitary reasons• not promoted in the workplace• don't see immediate results, materialistic society• no tangible evidence• more expensive than regular garbage disposal• no incentive• developing or poor countries• cultural reasons or differences• older generations are not on board (old habits)• NIMBY (Not in My Backyard)• short term vs. long term impacts• not cool to recycle
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10. Using your understanding of geography and the data provided:

- **explain** how the physical and natural environment is a threat to the people of Mexico City;
- **assess** how human activities are a threat to the environment of this region;
- **discuss** the difficulty in achieving solutions to the problems facing the people of Mexico City.

Answer in **multi-paragraph** form.

(10 marks)

Response:

<p>Threats to People from the Physical and Natural Environment</p>	<ul style="list-style-type: none"> • moderate rainfall (749 mm) <ul style="list-style-type: none"> – semi-arid vegetation – aquifer recharge is now insufficient • convectional rainfall mainly in the summer <ul style="list-style-type: none"> – short-term rain – possible flash floods • mountain soils <ul style="list-style-type: none"> – limited fertility • thin air <ul style="list-style-type: none"> – breathing difficulties – automobile engines need to work harder, thus produce more pollution • mountains act as a barrier to natural air movement <ul style="list-style-type: none"> – accumulation of photochemical smog – sinking polluted air is trapped – creates temperature inversions/thermal inversions • mountains block moist air from the Pacific Ocean <ul style="list-style-type: none"> – rainshadow – hills devoid of vegetation are prone to landslides • relatively flat land in the basin <ul style="list-style-type: none"> – suitable for development — attracts a large number of people leading to overcrowding • mountains restrict East–West development • mass wasting • malaria and mosquitoes (spread of disease)
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<p>Physical and Natural Environment (continued)</p>	<ul style="list-style-type: none"> • fertile soil originally attracted a large number of people • ground prone to liquefaction (ancient lake bed) <ul style="list-style-type: none"> – structural damage to buildings • freshwater source exploitation may cause land subsidence • potential for high-magnitude earthquakes — close to tectonic boundaries <ul style="list-style-type: none"> – poorly constructed homes and businesses are susceptible to damage and collapse • once-fertile soil has been depleted from overuse • geothermal potential may draw more people to the region due to cheap power • threat of eruption (1995 — Popocatepetl) <ul style="list-style-type: none"> – destruction of property – dust (pollution) – acid rain
<p>Threats from Human Activities</p>	<ul style="list-style-type: none"> • since 1950 the population has increased from 3 million to 24.5 million due to various cultural influences • natural vegetation removed for development and crop production <ul style="list-style-type: none"> – soil erosion – destruction of habitat • need for increased food production <ul style="list-style-type: none"> – agroicides may enter food chain • increased urban development <ul style="list-style-type: none"> – alters infiltration rates which reduces the recharge rate of aquifers (run-off increased, infiltration decreased) – reduces space for agriculture – increases demand for freshwater – increases garbage – increases the number of vehicles on the road • development moving up the basin’s hillsides <ul style="list-style-type: none"> – deforestation and heavy seasonal rainfall increases mass wastage potential • increased demand on limited freshwater sources <ul style="list-style-type: none"> – competition between domestic, industrial and agricultural activities • land subsidence <ul style="list-style-type: none"> – as aquifers are depleted the ground may experience subsidence causing structural damage to buildings • contamination of freshwater (aquifer) sources <ul style="list-style-type: none"> – agricultural activities (agroicides/manure) – domestic sewage – industrial waste – landfills – urban run-off

Threats from Human Activities (continued)

- industrial emissions increase atmospheric levels of carbon dioxide, carbon monoxide, hydrocarbons, nitrogen oxides, and sulphur dioxides
 - 30 000 factories
 - power plants
- gasoline powered vehicle exhaust increases low-level ozone and volatile organic compounds (VOC) in the atmosphere
 - 3 million cars
- methane
 - agricultural activities
 - landfills
- domestic sewage
 - as sewage ponds dry, the dried waste material may become airborne creating health problems
- health issues (asthma, cancer)
- negative impact of tourism
- use of air conditioning in homes
- older model vehicles (using Freon or CFC polluting air conditioners; poor running condition; no catalytic converters)
- local environmental damage caused by H_2SO_4 and H_2SO_3 (acid rain)
- open sewers and untreated sewage facilitate the spread of disease

Difficulties in Achieving Solutions

- basin does not allow winds to blow pollutants out of the region
 - accumulation of pollutants (long-term problem)
- volcanic eruptions and seismic activity are unpredictable and cannot be prevented
- since water is necessary, the exploitation of the area's limited water sources (aquifers) will continue
- local water sources are not readily available for waste treatment
- determining which level of government will bear the responsibility: federal, district-county or city
- the priority of government and industry is economic growth; strict legislation can slow economic development
- politicians are reluctant to be critical of industry (voters need jobs and corporate donations)
- influence of industry (40% of Mexico's industrial production takes place in Mexico City)
- determining where money for the enforcement of legislation would come from (taxes/industry)
- Mexico is a developing nation and, as such, economic growth takes priority over environmental concerns
- money for solutions is not available (Mexico is trying to reduce its foreign debt)
- it is too costly to do seismic upgrades to all buildings and infrastructure
- Mexico City is an old city (long-term damage is difficult to correct)
- Mexico City has experienced a number of costly and destructive earthquakes
- the growth rate is too fast for the current infrastructure to handle
- proactive planning is impossible because problems are too big and complex
- rural migration (people come to the city looking for jobs and a better way of life)
- large-scale, daily migration of people from the rural regions to the city
- agricultural activities, which require large amounts of water, are needed to feed the growing population, but farmland is being replaced by urban development
- because much of Mexico City's population lives in poverty, day-to-day existence is the priority
- cultural values and long-time traditions limit choices for women
- many Mexicans want to improve their standard of living
- break the cycle of poverty
- lack of education programs
- multinational corporations take advantage of lax labour and environmental laws

Difficulties in Achieving Solutions (continued)

- the suspect nature of government (including the possibility of corruption)
- Mexico's religion is predominantly Roman Catholic and therefore birth control for many is not an option
- government spending on health care is supported from the tax revenue generated from the industry
- national pride (not wanting to be told what to do by developed nations)

END OF KEY