Geography 12

June 2000 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	T	PLO	Q	K	C	T	PLO
1.	D	K	2	2C1	21.	D	K	2	2D3
2.	B	K	2	2C1	22.	A	K	1	1B1
3.	B	K	3	3A1	23.	C	U	1	1B2
4.	A	U	2	2C1	24.	A	K	1	1A1
5.	D	U	2	2C1	25.	A	U	2	2A2
6.	A	K	1	1B4, 2C3	26.	**D**	**E**	**L**	**E** **T** **E** **D**
7.	D	U	2	2C2	27.	D	U	2	2B1
8.	B	U	2	2A3	28.	C	U	2	2A3
9.	A	U	2	2B3	29.	D	U	2	2A3
10.	D	U	2	2D2, 2D4	30.	B	U	2	2B3
11.	C	U	2	2D1	31.	C	U	3	3B2
12.	C	K	2	2D3	32.	D	U	2	2B3
13.	D	U	2	2D3, 2D4	33.	A	K	3	3A1
14.	A	U	2	2D3	34.	C	U	3	3A4
15.	C	U	2	2D3	35.	C	U	3	3A3
16.	A	U	2	2D3	36.	B	U	1	1C1
17.	D	U	2	1B4, 2D3	37.	D	U	1	1C1
18.	C	K	2	2D3	38.	A	U	1	1C2
19.	A	U	2	2D3	39.	D	U	2	2D3
20.	C	K	2	2D3	40.	D	U	1	1C2

Multiple Choice = 39 marks

Part B: Written Response

Q	B	C	S	T	PLO
1.	1	H	6	3	3C1
2.	2	U	5	3	3B2, 3
3.	3	H	6	1	1B2
4.	4	U	4	2	2A5
5.	5	H	4	2	2D3
6.	6	H	6	1	1B3
7.	7	H	4	3	3C3
8.	8	U	5	2	2B5
9.	9	H	10	3	1C2, 2B4, 3C4

Written Response = 50 marks

Multiple Choice = 39 (39 questions)
Written Response = 50 (9 questions)
EXAMINATION TOTAL = 89 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 7 and the topographic map to answer question 1.**

1. The Miramichi River has provided many benefits for the people of the region, but is now stressed by the pressures placed on it by increased population and human activities.

   a) Outline **three** benefits provided to humans by the Miramichi River. **(3 marks)**

   Response:

Benefits provided to humans by the Miramichi River	• recreation • alluvial soils • fish hatcheries • tourism (motels) • aesthetics / view • it is a food source • parks and refuges • economic benefits • created Beaubear Island • it acts as a waste stream • flat flood plain for urbanization • real estate — waterfront property • gravel and sand for building purposes • possible upstream dam to provide hydro-electricity • it is a transportation route (including log transport) • educational activities related to river (hatchery, Strawberry Marsh) • water for drinking, cleaning, irrigation, fire fighting, and cooling (industrial processes such as saw mills and pulp and paper)

b) Assess **three** effects that human activity may have on the Miramichi River. **(3 marks)**

Response:

Effects of human activity on the Miramichi River	• build up of wastes • reclamation of land • run-off from fertilizers • sewage effluent is dumped into the river • leachates from the dump at Chatham Head threaten contamination of the river • thermal pollution of the river by industries such as pulp and paper • pulp and paper mills flushing effluents into the river, usually laced with dioxins • run-off from the sawmill and stock piles found along the river's edge contaminating the river • run-off from the urban centre and the road system is most often left untreated and might contaminate the river • siltation of spawning streams caused by the logging of the hillsides in the region • persistent chemicals, such as dioxins and furans, and the heavy metals such as cadmium, posing a long-term threat to organisms • oil from boat traffic threatens phytoplankton and river ecosystems, swash from boats erodes river banks • dredging to maintain boat transport • overuse of water disrupting water level • environmental groups working to clean up river and sustain ecosystems • bridges, dikes, urbanization along river interfering with natural flow of water • spills from derailment of trains on railbridge • dam construction flooding upstream areas and changing downstream flow and / or interfering with fish spawning • increased fish population due to fish hatchery, but may change ecosystem and could introduce foreign species and disease to the river ecosystem • pollution from industries leading to acid rain and changing pH levels of the river • overfishing destroying river ecosystem • destruction / urbanization of wetlands reduces the rivers ability to flood and purify itself

REFERENCE DATA BOOKLET	**Use Photograph 8 to answer question 2.**

2. a) Explain **three** ways that the vegetation in the photograph has adapted to climatic conditions. **(3 marks)**

Response:

Adaptations	• the climate fosters grass growth, but limits tree growth • deep roots to tap into groundwater • roots lie dormant during the dry season • extensive and shallow root systems, to absorb surface water • thorns protect leaves from browsers • thick bark to protect trees from fires • thick bark to protect trees from predators and evapotranspiration • waxy leaves • shed leaves to protect plant from fire • small leaves to reduce evapotranspiration • store water in their tree trunks during dry season • leaves shade the base of the plant to reduce evaporation from roots • deciduous leaves fall during dry season to reduce evapotranspiration • taller grasses in wetter areas • albedo of grasses • seeds adapted to lie until wet season • some plants develop whitened leaves (transpiration of salts to reflect light)

b) Explain **two** ways that the physical conditions within this biome influence human activity.
(2 marks)

Response:

Explanation	• potential employment in tourism • gully erosion reduces arable land • intermittent water supply is unreliable • reliance on borehole wells • water diversion schemes (wells, channels) • unreliable rainfall and drought lead to crop loss • nomadic herding following seasonal rains • flash floods during the rainy season wash away villages and villagers • building construction: housing styles (verandahs) • human and animal migration — compaction of soils • style of clothing (cotton for hot summers, broad-brimmed hats) • meagre economic opportunity gives rise to incidents of poaching • agricultural activity (rotation, plant in the spring, rain in summer, harvest in fall) • vegetation permits cattle raising • hunting • limited variety of crops can be cultivated • urban development restricted by lack of water supply • use grasses for roofing / building • stunted trees restrict type of construction • animals (elephants) destroy people's crops • wildlife dangerous • restricted diet • daytime activity restricted by heat • drought may lead to starvation • water-borne diseases • ecotourism (safaris) • research • potential medicines from native cultures • environment often determines culture • the nature of the biome forces people to cultivate the land, being aware of processes of desertification

Use Photograph 9 to answer question 3.

3. With reference to the ecosystem in the photograph, write a **paragraph** that describes the relationships between the lithosphere, atmosphere, biosphere and hydrosphere. **(6 marks)**

Response:

Lithosphere	• The lithosphere has been eroded by several forces: glaciation as evidenced by the moraine lake and the U-shaped trough. Mass wasting including scree slopes. Thin mountain soils and some podzols. There is evidence of water erosion (frost shatter, alluvial fans).
Atmosphere	• Cold temperatures and precipitation have contributed to alpine glaciation. Changes in temperature contribute to physical weathering (frost action). Moderate temperatures and precipitation result in the growth of coniferous forests.
Biosphere	• The area is dotted with northern coniferous trees which are well adapted to the thin mountain soils and cold winter conditions. Above the tree line, alpine vegetation dominates due to the harsh conditions and limited growing season. Human activities may have impact (e.g., acid rain, trail construction, hiking debris) on the natural vegetation and fauna of the region. • Roots of plants / trees cause physical weathering. • Burrowing and climbing of animals causes erosion.
Hydrosphere	• Given its location and elevation, snow builds up during the winter months and slowly melts throughout the rest of the year, resulting in run-off via the streams into the main river. Fluvial action has resulted in substantial erosion of the valley; flooding likely occurs in the spring. Possibility of avalanches in the winter.
Note to Markers: **This question is to be marked holistically.**	

Select one of the following to answer question 4.
Indicate your selection with a ✓.

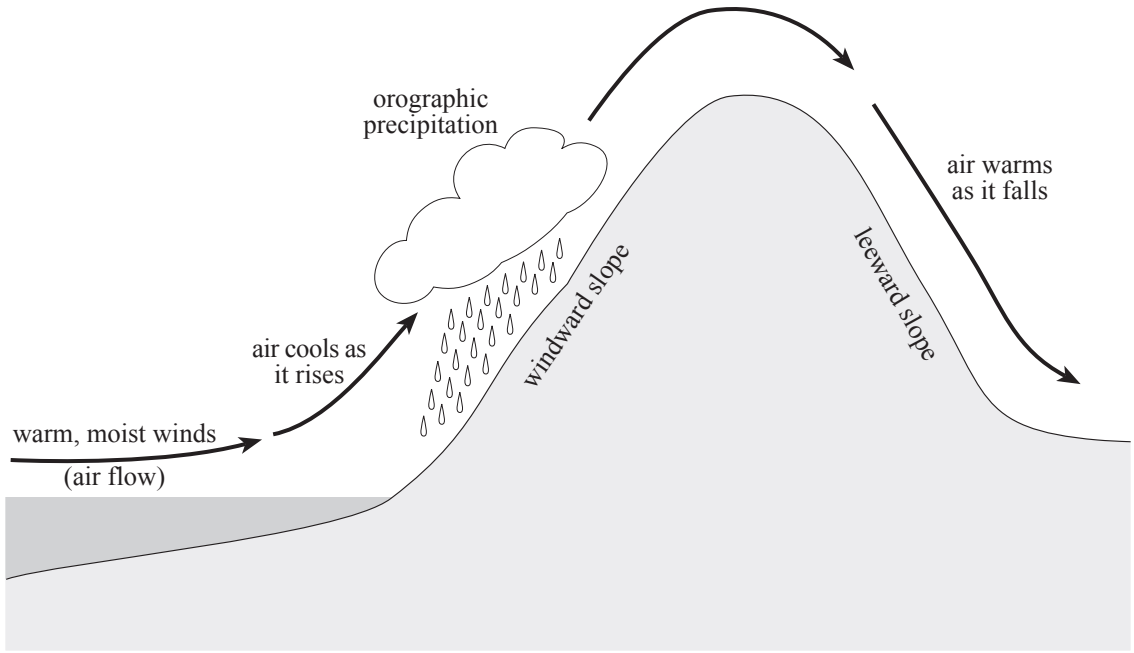
☐ Relief / Orographic Precipitation

☐ Influence of Large Bodies of Water on Temperature

4. a) With the aid of a clearly labelled diagram, explain how relief / orographic precipitation occurs **or** how large bodies of water influence temperature. **(3 marks)**

Response:

RELIEF / OROGRAPHIC PRECIPITATION



On the windward slope warm, moist air from the ocean is forced to rise over the mountain barrier. As the air rises it cools, the relative humidity reaches 100% and the water vapour condenses, resulting in orographic precipitation.

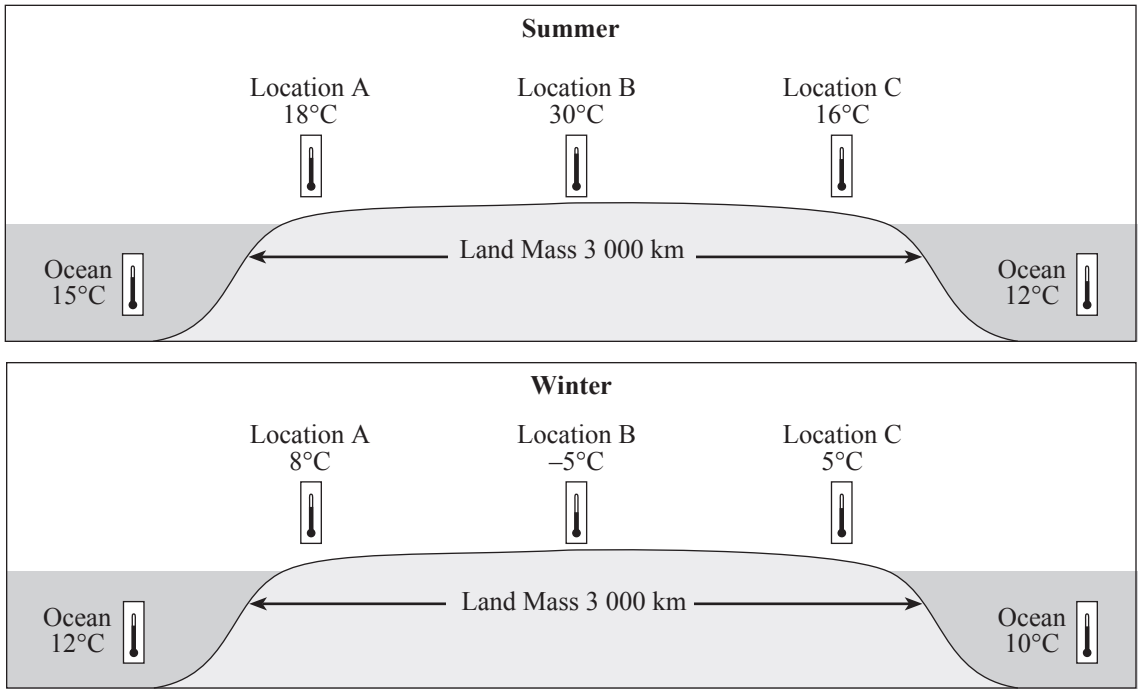
The leeward slope experiences the dry rainshadow effect because as the air mass descends, the leeward slope is warmed. The relative humidity decreases making condensation and precipitation unlikely.

Note to Markers:

This question to be marked holistically. The explanation may be shown in the diagram.

Response:

INFLUENCE OF LARGE BODIES OF WATER ON TEMPERATURE



Because land has a higher specific capacity than water, land heats up and cools down more quickly than does water. Therefore, during the summer, large bodies of water warm up slowly. These water bodies cool the onshore winds and moderate the summer temperatures of coastal locations. During the winter, large bodies of water cool slowly and onshore winds warm, raising the winter temperatures of coastal locations. Inland, the moderating effects are not in force, owing to their greater distance from the sea. In winter, temperatures plunge and in summer they rise. The annual temperature range is large.

Note to Markers:

This question to be marked holistically. The explanation may be shown in the diagram.

b) How might the process you have selected affect economic activity? **(1 mark)**

Response:

Relief / Orographic Precipitation	• agricultural patterns (vertical zones of vegetation) • trees on windward side (extensive commercial logging), but the leeward side is less vegetated • recharge freshwater supplies • windward — road maintenance • recreational activities — ski slopes • leeward — ranching, irrigation issues
Influence of Large Bodies of Water on Temperature	• extended growing season at coastal locations, more limited growing season inland • agricultural pattern (early frosts would affect fruit trees) • recreation / tourism • heating / cooling costs (homes) • vegetation — forestry or cereal grains and ranching

5. Identify and assess **two** methods of controlling flooding by rivers. **(4 marks)**

Response:

Methods to control flooding by rivers	• contour ploughing — reduces overland flow (and erosion) and permits increased infiltration of water • dredging — ongoing, expedient, relatively inexpensive • bypass channels — diverts water from urban areas • sandbagging of banks — temporary, frequent, assists bank integrity • dams to regulate stream flow — costly, but effective • reforestation near river banks will contribute to soil stabilization • flood barriers (e.g., the Thames River) — protects upstream urbanized areas • rip rap — slows down the erosive power of the river, reduces erosion, but needs periodic replacement • levees or dikes — contain floodwaters within the channel, but can be breached • floodways or spillways — redistribute / channel the flow of floodwaters, effective but costly, has definite capacity, which could be exceeded, protects only built up areas • dams (flood upstream areas and interfere with fish habitat) • hay bales (do not hurt the environment) • terracing, trenches, braiding, ditches • protect wetlands (provides an opportunity for natural flooding to alleviate stress, maintains aesthetic value)

Use Photograph 10 to answer question 6.

6. a) Using the photograph, describe two **environmental** problems associated with this method of resource extraction. **(2 marks)**

Response:

Environment	• toxic dust • acid rock drainage • tailing and effluent ponds • destruction of wildlife habitat • interruption of migration patterns • altering of surface drainage patterns • contamination of groundwater supplies • contamination of streams and fish habitat • blasting may be destructive, noise disturbs fauna • slope failure from all forms of mass wastage (avalanches) • chemical leaks from processing or transporting (road / rail) • exploratory activity may cause soil erosion and siltation of streams • removal of vegetation at test drill sites can cause soil erosion and sedimentation of streams (fish habitat) • open-pit mining leaves ugly scars on the landscape and is aesthetically unappealing • construction of access roads disturbs the land (interferes with wildlife and local drainage; allows hunters / wilderness tourists into the region)

b) Describe two **economic** concerns associated with the extraction of minerals. **(2 marks)**

Response:

Economic Problems	• fluctuating currency rates • new technologies can affect demand (carbon fibre optics has lowered demand for copper) • reintroducing flora and fauna • changing international demands • building of tailing and effluent ponds • cleaning up and processing of artifacts • stabilizing tailing piles to prevent slumping • putting measures in place to reduce acid mining • providing power needs (develop own or require power lines) • reduces land available for other activities (hunting / trapping) • meeting infrastructure needs (housing / services / sewage treatment) • land reclamation costs (bonds cost $1 million before extraction can begin) • preventing or dealing with chemical leaks from processing or transporting (rail) • covering health costs of miners due to higher risk occupation • devaluation of surrounding land prices • devaluation of mine site if left as is after closing

c) Describe two **social-political** problems associated with the extraction of minerals.

(2 marks)

Response:

Social-Political	• aboriginal rights • boom-bust towns • monopolistic employers • short-term economic infusion • cost of support services (tertiary activities) • affects on aboriginal groups (loss of culture) • problems are created by high-paying, short-term jobs • jurisdiction (federal, provincial, territory, local government) • opens area up to further development by multinational corporations • road access allows increased hunting in the area and disturbs local drainage • land rights (private land / municipal land / provincial land / federal land) • isolation of families of workers (remote location) • protesters concerned over the type of extraction used (Greenpeace, Sierra Club)

Note to Markers:
Parts b) and c) should be marked holistically as there is overlap between categories (the fluctuation of currency rates appears to be economic, but could be the result of political decisions).

7. a) Describe **two** threats to the sustainability of agricultural soils in Canada. **(2 marks)**

Response:

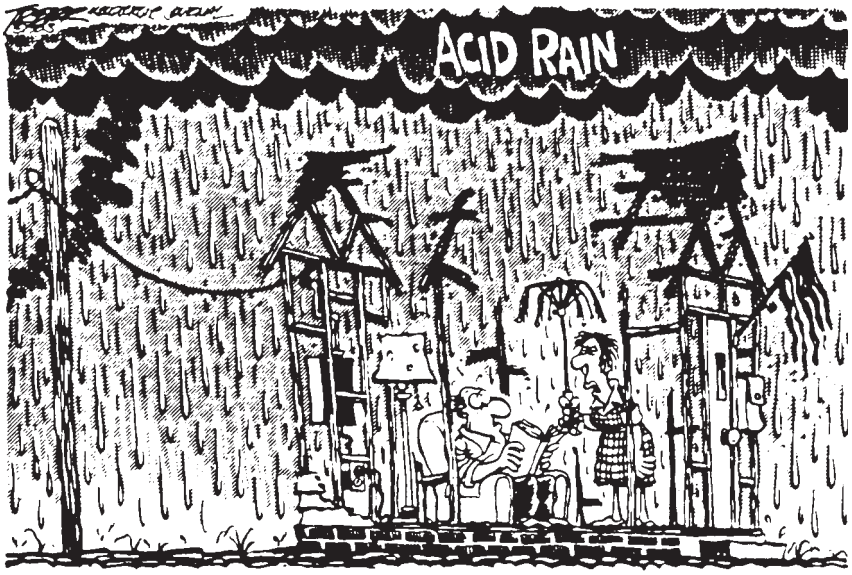
Soil	• flooding • deflation • overgrazing • acidification • soil depletion • monocultures • soil compaction • shortage of water • down slope plowing • wind and water erosion • poor irrigation techniques • extreme winters (lack of snow) • urban sprawl, land use conflicts • sheet erosion during spring floods • lack of shelter belts (wind erosion) • global warming / greenhouse effect • salinization of soil due to over irrigation • soil exhaustion if crops can be grown all year • a loss of genetic diversity due to intensive farming of cash crops • water and soil contamination due to an increased use of agricultural chemicals (biocides) • loss of fertility owing to the use of chemical fertilizers

b) Suggest **two** reasons why soil management strategies are difficult to implement. **(2 marks)**

Response:

Management strategies are difficult to implement because	• of economics (too costly). • of changing market trends. • of the lack of government aid. • of changing global climatic conditions. • the viability of agriculture as a business is under threat. • of the promotion of chemical fertilizers by governments. • of government policies (subsidies to grow one type of crop). • commodity prices are so low, farmers are forced to cut corners. • of the demand for increased agricultural production to feed the ever increasing global population and to provide economically viable occupations for farmers. • of a reluctance to let soil rest, recharge. • traditional farming techniques are familiar (people are reluctant to change). • there is no control over the weather. • there is a lack of education in the new techniques. • there is poor cooperation amongst the group. • there is no method of monitoring or regulating change.

Use the following cartoon to answer question 8.



John Trever. *Albuquerque Journal.* Reprinted with permission.

8. a) What is the intent of the cartoonist's message? **(1 mark)**

Response:

The intent of the cartoonist's message is that	• we don't consider the full impact of our actions. • whatever we have tried, we have fouled the earth. • nuclear energy has a waste problem, but coal has another — it is acidic. • the full impact of our choices are only known when it is too late. • all methods of generating electricity have associated environmental problems.

b) Describe **two** effects acid rain may have on the biosphere. **(2 marks)**

Response:

Effects	• Coniferous forests lose their vast diversity of plant and animal life. The source of stress is both wet and dry acidification; these deposits increase the acidity of lakes, rivers, soils and air. • Burning of fossil fuels and smelting of various ores has produced gases (sulphur dioxide, nitric oxide and nitrogen dioxide) that react with other elements in the atmosphere to form dry and wet deposition. These deposits are absorbed into soil and water systems as well as trees and plants. • Acidification affects lakes. Living organisms in these lakes begin to die off. Forests absorb acidic water into their roots. Trees are affected. • Acidified melting snow creates an acid shock in the northern areas. This increase in acidity disrupts the breeding and reproduction cycles of many aquatic species. Acid loving species increase (sphagnum). • Heavy metal levels are increased, posing dangers for humans as well as other living organisms. • Forests become stunted and some die. • Health issue, particularly respiratory problems for humans. • Carbonation of buildings / monuments (chemical weathering). • Some organisms thrive in an acidic environment (sphagnum / moss).

c) Suggest **two** ways to reduce the cause or impact of acid rain. **(2 marks)**

Response:

Solutions	• Alternative fuel sources must be developed or expanded (solar, hydro-electric, fuel cells). • Treat coal with a lime bath to reduce the harmful emissions (fluidized bed combustion). • Buffering, which is the liming of lakes and soils to increase the pH level, is possible but costly and short-term if acidification persists. • Prevention — the industrialized world must drastically cut its emission of sulphur dioxide and nitrogen oxide. Emissions must be reduced (use scrubbers on smoke stacks). • Bilateral and multilateral agreements between regions / provinces / states to reduce emissions (standards can be raised). • Increase education / awareness of the problem. • Expand the use of cleaner burning (bituminous) coal (increase funding). • States funded initiatives to encourage / ensure that the industry improves emission rates (financial assistance to purchase scrubbers).

REFERENCE DATA BOOKLET	**Use the Case Study of Indonesia in the data booklet to answer question 9.**

9. Using evidence from the case study in the data booklet and your understanding of geography, discuss how physical and human factors have affected the ecosystems of Indonesia. Explain why it is difficult to implement resource management strategies in this region.
Answer in **multi-paragraph** form. **(10 marks)**

Response:

Physical	• Series of volcanic islands. • Soils are volcanic and fertile, though easily eroded. • Very heavy rainfall leaches soil, decreasing its fertility. • There are large gene pools in tropical forests. • The rainforest and jungle developed naturally. • There is very expansive biodiversity (see chart). • The climate is wet-tropical — it is very hot and humid. • Species are protected by the forest and depend on the forest for survival. • There is plenty of food available — the forest regenerates naturally if undisturbed. • Tropical seas develop coral beds around the island — Indonesia is home to several species which depend on coral for food supply and protection. • Plate tectonics (subduction zone which creates volcanic island archipelago). • Up to 40 000 islands in this area. • Burning of the forest puts CO_2 into the atmosphere, enhancing global warming and atmospheric pollution. • Deforestation effects (siltation of rivers, flooding, soil degradation).

Human	• Civil war (East Timor) — ecosystems go unprotected through neglect. • Fire is used to clear forests. • Getting farmers to change traditional farming methods (slash and burn). • There is an economic crisis in Asia. • There is a drop in the value of currency. • Money is in short supply for workers (they cannot afford to buy food). • The population must increasingly look for food in the forests and sea. • Foreigners are attracted to Indonesian wildlife delicacies. • Fishers are using very destructive means to harvest (using dynamite on coral reefs). • Corporations are expanding plantations in order to develop more exports to obtain more cash. • Foreigners bring in much needed currency. (They are able to purchase exotic animals cheaply.) • Tourism (ecotourism). • Government corruption. • Lack of education. • Overpopulation (high birth rate). • Culturally diverse attitudes. • Class differences (disparity). • Desire to attain first world status (westernize).
Difficulty in managing resources	• Very heavy foreign debt. • There is little or no money to enforce resource management policies if they exist. • Foreigners demand exotic species. • Protected areas are being exploited. • Not enough protection of the coral (naval patrols). • Convincing companies to be better global citizens. • Implementation of a reasonable plan to prevent further extinction. • People are poverty stricken. Population numbers are projected to increase rapidly. • Because of numerous islands, communication and protective enforcement create major problems. • Government is distracted by internal strife and, therefore, neglects resource management policies and implementation. • Governments are reluctant to play a larger role in providing programs and incentives to leave species alone.

Difficulty in managing resources (continued)	• The economy has to be stabilized before any significant change can occur — the international community is reluctant to provide aid. • The economic benefits to the multi-national companies in the short-term outweigh awareness of the impact resource exploitation has (short-term gain over long-term effects). • Convincing international companies that harvesting the forests or expanding plantations is not in the best interests of preserving exotic ecosystems. • Establishing a sustainable plan for guaranteeing the survival of the ecosystem which would include all vested interests. • Overpopulation / birth control. • Small land area, limited by islands, population cannot spread. • Indonesia is a very difficult country to govern. With so many islands and cultures, how can there be a coordinated effort to implement resource management? • Isolationism. • Sanitation is poor. • Lack of education. • Diseases (malaria). • Desire for western lifestyle. • International non-cooperation. • Difficulties in communication. • First world demand for products. • Power of multinational corporations. • Natural disasters (earthquakes, flooding). • Enforcement of laws is difficult or ineffective. • Government is unstable (corruption, nepotism). • Poverty makes environmental concerns secondary to survival. • Fragile ecosystem (western reforestation methods not appropriate to the area).
Note to Markers: **This question is to be marked holistically.**	

END OF KEY