
NATIONAL EXAMS MAY 2010

04-Env-B1, Environmental Assessment and Management Systems

3 hours duration

NOTES

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is a CLOSED BOOK EXAM with a 2-sided ($8\frac{1}{2}'' \times 11''$) AID SHEET prepared by the candidate allowed.
3. The candidate may use one of two calculators, the Casio or Sharp approved models. Note that you must indicate the type of calculator being used. Write the name and model designation of the calculator on the first inside left hand sheet of the exam work book.
4. Any five(5) questions constitute a complete paper. Only the first five(5) answers as they appear in your work book(s), will be marked.
5. Each question is equally weighted at twenty (20) points for a total of a possible one-hundred (100) points for a complete paper.

Problem 1

Provide answers to the following questions related to *analysis of environmental impacts using technical and non-technical parameters* and *applicable federal, territorial or provincial environmental legislation*:

- (5) (i) Identify and briefly discuss two pre-impact phases and one post-impact phase of an environmental impact assessment that can identify key stress areas for appropriate action. You may use an example to clarify your discussion.
- (5) (ii) Describe two *impact indicators* from an environmental impact analysis and show how they may be used to determine the impacts on the atmosphere due to transportation intensification in a growing urban community.
- (10) (iii) Describe two technical and two non-technical features of an existing federal or provincial or territorial environmental legislation that prevents or minimizes negative environmental impacts in the atmosphere or hydrosphere. In your description briefly compare the relative effectiveness of technical versus non-technical approaches by taking into account the cost and benefit of each approach.

Problem 2

Provide answers to the following questions related to following areas: *environmental impact assessment applied to solid waste management, effluent control and air pollution control*:

- (7) (i) Consider a landfill site for solid waste from a growing rural community planning for a doubling of its current capacity that will serve an expected population of 50,000 people and associated light industries, commercial establishments and institutions. Describe three key issues that an environmental impact assessment will help municipal planners and engineers deal with the location and design of the facility.
- (7) (ii) Combined sewer overflows (CSOs) are a major environmental concern in a municipality with a combined sewer system which results in high discharges of sewage and stormwater during large storm events to the local river. Briefly explain an on-site and 'end of pipe' possible solutions to reduce the quantity of CSOs.
- (6) (iii) Provide an example of a technical and non-technical solution to the discharge of particulates ($PM_{2.5}$ or PM_{10}) from paint spray booth operation that is located in an industrial area, but close to a residential apartment complex.

Problem 3

Answer the following questions related to *environmental audits*, *geographical information systems (GIS)* and *environmental management systems (EMS)*:

- (7) (i) Explain three key steps in conducting an environmental process audit and the benefits you can provide to your client through your services as an environmental auditor. For your explanation, choose your own example or consider the potential use of treated wastewater effluent or changing the feed stock in a chemical batch process that is expected to reduce the amount of residual solid waste.
- (6) (ii) Explain how the GIS may be used during a natural environmental disaster to assist with the emergency management. In your explanation, highlight three aspects of GIS systems that make it particularly useful for this purpose.
- (7) (iii) Transport Canada (TC) has made a commitment to sustainable development in the areas of transportation safety and program delivery. Provide three specific ways in which the integration of an EMS in the operation of TC may assist to fulfill their commitments.

Problem 4

Provide answers to the following questions related to *principles of sustainable development*, *design of controlled environments* and *protection of natural resources for sustainable development*:

- (6) (i) Briefly explain three key principles of sustainable development as applied to the forest industry, fish farming (aquaculture) or an example of your choosing. Select only *one* example.
- (7) (ii) Compare and contrast the design of controlled environments versus natural environments. Use an example to show three main differences.
- (7) (iii) A national freight company wants to lead the industry in providing environmentally conscious freight transportation services. Provide three ways that the freight company may integrate the concepts of sustainable development in their operation to achieve their goal over the next five years.

Problem 5

Provide answers to the following questions related to *resource problems and design* with consideration of *ecological, economic, demographic and social dimensions*:

- (10) (i) It has been advocated that the lease or use principle makes more sense in a rapidly changing technological world than does the buy or own principle. Use an example and provide three ways in which this approach may reduce our ecological or economic dependence on natural resources.
- (10) (ii) The sprawling city concept (i.e., suburbs expansion from the core city complex) has been compared to central high-rise intensification. Briefly explain two advantages and two disadvantages for each approach of city planning and design. In your explanation, consider the ecological, economic, demographic and social dimensions. A table may be useful in answering this question.

Problem 6

Provide answers to the following questions related to *techniques to integrate knowledge and define policy* and *risk analysis*.

- (10) (i) Provide and explain the use of two techniques to integrate various sources of knowledge to define environmental policy. In your explanation, select your own example or consider water and energy use planning in British Columbia, Canada, where stakeholder consultations at 22 hydroelectric facilities were conducted to ensure that all the stakeholder input was reflected in the final policy adopted.
- (10) (ii) Explain how risk analysis techniques or methodologies may affect regulations to control air emissions from industrial facilities (e.g., particulates) or provincial water quality objectives (PWQOs) (e.g., dissolved metals in effluent discharges to source waters). In your explanation, consider how uncertainties in measurements, causality and environmental or human impacts are dealt with.

Problem 7

Provide answers to the following questions related to *life cycle analysis* and *risk management*.

- (10) (i) Green design using economic input-output life cycle assessment models have been adopted as a way for companies to improve the environmental profile of their products and processes. Using an example, briefly explain the life-cycle-analysis, identify three challenges of conducting a truly representative analysis and some of the simplifications generally used which may lead to erroneous conclusions.
- (10) (ii) Explain the process of environmental risk management using an example (e.g., brownfields site remediation of a hazardous waste site). In your explanation, consider site inspection, type of pollution, sampling requirements and interpretation, regulatory compliance and economic issues.