2530029

THE UNIVERSITY of York

Degree Examination 2007

ENVIRONMENT DEPARTMENT

BSc Environment, Economics & Ecology
BSc Environmental Science
Part 2

ENVIRONMENT & HEALTH

Time allowed: **two hours**

This examination is divided into **TWO SECTIONS (A & B)**. You should allow approximately 60-75 minutes to Section A and 45-60 minutes to Section B

You must answer **ALL** questions in **SECTION A (60% of the marks)**
You must answer **EITHER** question B1 **OR** question B2 in **SECTION B (40% of the marks)**

Pay adequate attention to spelling, punctuation and grammar, so that your answers can be readily understood

SECTION A

Answer **ALL** questions in this section. The 8 questions are each worth 7.5% of the total **Section A** mark. The space provided under each question is indicative of the maximum level of detail that is required.

A1- Identify three major difficulties associated with the understanding of causal relationships between exposure to environmental factors and effects on people's health.

A2- In the context of environment & health,

(i) what are the three components characterising exposure?

(ii) what does knowledge of the dose (or exposure)-response relationship permits to determine ?

A3- Explain what is meant by the terms "short-term health effect" and "long-term health effect" of air pollution, and describe in one sentence the approach commonly applied to detect these short-term and long-term effects.

A4- Roughly 27% of a hypothetical town's population of 1,245,630 is exposed to a given concentration of particulate matter (PM). Exposure to PM of the rest of the population is considered to be negligible.

Using the data given below, decide if people have more chances to develop a chronic obstructive pulmonary disease (COPD), or a cardiovascular disease (CVD) in relation to long-term exposure to PM.

number of COPD cases in the exposed population, n_{COPD}= 498

number of COPD cases in the unexposed population, N_{COPD}= 1,274

number of CVD cases in the exposed population, n_{CVD}= 774

number of CVD cases in the unexposed population, N_{CVD}= 1,998

A5- According to a recent World Health Organization report, indoor air pollution kills *ca.* 1.7 million people every year, with most of the burden being observed in developing countries. Explain why the largest impact occurs in developing countries.

A6- Identify the six components of the DPSEEA framework, and write one sentence to describe what each component represents.

A7- Explain how climate change can affect human health.

A8- Explain what is the purpose of the impending new EU regulatory framework for the Registration, Evaluation and Authorisation of Chemicals (REACH).

SECTION B

Answer **EITHER** Question B1 **OR** Question B2

B1- Modern diesel vehicles emit 15-20% less CO_2 per kilometer than petrol vehicles. In an effort to reduce CO_2 emissions and to tackle the global climate change issue, the UK is taxing vehicles according to CO_2 emission rates. As a result, the number of diesel vehicles sold in the UK has increased since 2001-02. This CO_2 policy is credited with contributing to the UK's success in reducing CO_2 emissions. However, diesel vehicles also emit various air pollutants, and emissions are likely to increase with the ongoing growth of traffic. Traffic is currently regarded as the major contributor to air pollution in urban areas.

Decision-makers need to be informed about the ancillary health benefits/disbenefits of this CO_2 policy. You are asked to produce a short report on this issue. To do that, you must provide:

(i) a brief *a priori* qualitative discussion on the pros and cons of this climate policy from an environment and health viewpoint (30% of the mark);

(ii) an outline of the methodology you would apply to predict the impact on health in relation to the increase in the number of diesel vehicles (40% of the mark);

(iii) a critical comment on the methodology you suggest to apply. This should highlight the underlying uncertainties and limitations (30% of the mark).

B2- A large hypothetical chemical/petrochemical complex has been in operation for 30 years. The complex includes a big oil refinery, a solid-waste incinerator and several chemical plants. Moreover, the local environment is also influenced by the presence of a highway with a high traffic density. In recent years, public concern over possible adverse health effects for the population living near the industrial complex has increased. Nevertheless, each operator claims that the risk is negligible because his/her company strictly complies with emission standards for both airborne and liquid effluents. In addition, the operators are confident that the industry does not pose a health risk, because there is no reported case of disease which has been linked to exposure to a specific pollutant released into the environment by the chemical/petrochemical complex.

You are asked:

(i) to comment on the operators' statements (30% of the mark);

(ii) to propose a strategy for evaluating the risk posed by chemical/petrochemical complex to the health of the local population (40% of the mark);

(iii) to briefly discuss the potential health significance of a highway with a high traffic density near the industrial complex (30% of the mark).