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THE UNIVERSITY *of York*

Degree Examination 2004

ENVIRONMENT DEPARTMENT

BSc in Environment, Economics and Ecology, Part 1b

ENVIRONMENTAL MANAGEMENT

Time allowed: **one and a half hours**

Answer any **two** questions

University calculators will be provided

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

1

- (a) How might a typical scheme of practice for environmental management look for a general environmental problem? Show how this might work in practice by reference to the Finningley Airport development. (25 marks)
- (b) Describe how the Living Planet Index and the Ecological Footprint may be used to assess whether the planet is being used in a sustainable manner. (10 marks)
- (c) What do these indicators tell us about the last 30 years? (15 marks)

2

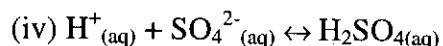
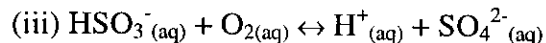
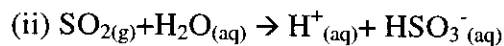
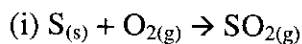
- (a) Calculate the kinetic energy of 1 tonne (1000 kg) of water moving at 5ms^{-1} through a hydro-electric power plant. If the same 1 tonne of water falls by 175 m from the head of the dam down to the generators, what is the change in potential energy it experiences (assume $g=10\text{ ms}^{-2}$). Remember to show all working and quote units. (10 marks)
- (b) Recent estimates have suggested that current supplies of oil will deplete at a rate of about 2.5-3.0% a year after 2005. Suggest possible alternatives to the conventional fossil fuel energy sources and discuss how these could meet energy needs in the UK in the future. (20 marks)
- (c) What is a life cycle assessment (LCA)? (8 marks)
- (d) How might you expect an LCA to rank nuclear, wind and photovoltaic cells in terms of primary energy use and greenhouse emissions? How does this compare to the same parameters for coal and gas? (12 marks)

3

Climate change is perhaps the biggest environmental issue facing us today. There are many natural causes of climate variability, but many scientists now believe that human activities are also playing a role.

- (a) What are the factors that lead to natural climate variability and how much of the observed variability through history can they explain? (25 marks)
- (b) How have human activities led to climate change and how strong is the evidence that they have done so? (25 marks)

The following equations describe the chemistry of London smogs that were prevalent in the 1950s.



- (a) Where appropriate, balance the equations above. (4 marks)
- (b) What are heterogeneous and homogenous reactions? State which of the reactions above are homogeneous and which are heterogeneous. (6 marks)
- (c) What does the \leftrightarrow symbol denote in reactions (iii) and (iv)? (2 marks)
- (d) Why did the prevalence of London smogs decline after the 1950s and what type of pollution might be seen in urban centers nowadays? Describe the origin of this 'new' type of pollution. (20 marks)
- (e) There are often complex issues facing environmental managers and solving one problem may often lead to another. Describe how using the chemical DDT has solved one problem but caused another and why some countries now have a differing approach to its use. (18 marks)