

UNIVERSITY OF TORONTO  
FACULTY OF APPLIED SCIENCE AND ENGINEERING  
FINAL EXAMINATION, DECEMBER 2001  
APS 103 – ENGINEERING, SOCIETY AND ENVIRONMENT I

EXAM TYPE: A

Examiners - W.H. Vanderburg and N. Khan

Instructions

You must answer 4 questions, each of equal value:

PART A: Answer Questions 1 and 2.

PART B: Answer Question 3 or 4.

PART C: Answer Question 5 or 6.

Please answer each part in a separate examination booklet.

PART A:

1. In the nineteenth and twentieth centuries, it was common to regard industrialization as gaining a greater dominance over nature. Using the first and second laws of thermodynamics, it could also be argued that nature imposed ever-growing constraints on the evolution of industrializing societies. Explain how such an argument could be made.
2. Explain Keynes' proposal for stabilizing the economies of industrial societies, which was widely adopted by many nations following the Second World War. What were some of the consequences for energy policy, military policy and the exploration of space?

PART B:

3. How would the technological cycle of a product change if its manufacturer adopted a marketing strategy of selling the services the product renders instead of selling the product itself? If the manufacturer adopted product stewardship instead, what would the changes be? Which of the two strategies is likely to be the most sustainable with respect to the biosphere and why?
4. Explain how electric utilities came to focus exclusively on the production and distribution of electricity. What competitive advantages could these utilities gain by turning themselves into energy service companies? What would be the benefits to the utility, its customers, the economy, society and the biosphere?

PART C:

5. Volvo developed a unique production system for the assembly of automobiles at its Uddevalla facility. Using the demand-control model, compare this production system with one based on the assembly line and predict the consequences this change had on the health of production workers, their recreational activities, their community participation, and their political involvement in society.