

Name: _____ Student Number: _____

UNIVERSITY OF TORONTO

FACULTY OF APPLIED SCIENCE AND ENGINEERING

APS111TH1S: ENGINEERING STRATEGIES AND PRACTICE I

COURSE INSTRUCTORS: IVEY CHIU AND DARIO DEL DEGAN

FINAL EXAMINATION

MAY 1, 2007

The time allocation for this final exam is 2.5 hours. Answer all questions in the space provided. Do not write on the back of the page. Exam booklets will be provided as scrap paper for rough work ONLY. Please be sure your answers are clear and legible. Please write all answers in dark ink. Use a strike-through line to indicate a correction (E.g. ~~This is what how to indicate a correction in your written answers~~). This is a closed book exam. Only calculators from the list of those approved by the faculty are allowed. No other aids are permitted.

1a. Toys that are advertised, sold, or imported in Canada must meet the safety requirements defined in the _____ and the _____. These requirements are administered and enforced by _____. [3 marks]

1b. In which section(s) of your CDS would you include the above? [1 mark]

2. Identify and describe the four components of an effective oral presentation. [8 marks]

- i) _____
 - ii) _____
 - iii) _____
 - iv) _____
-

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3. Describe two alternatives to "free" brainstorming. [4 marks]

i) _____

iii)

4. Describe the decision making process of selecting one proposed conceptual design and alternative designs from all of your concepts. Identify and explain the three primary decision-making tools discussed in lecture. Also, indicate the approximate number of design concepts that are inputted and outputted from each decision-making tool. [8 marks]

5. List the four significant areas of constraint after identifying stakeholders. [2 marks]

i) _____

ii) _____

iii) _____

iv) _____

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6. The following five questions relate to the Mactaque power-generating case study discussed in lecture. [10 marks, 2 marks each]

a. Identify the two engineering products of the Mactaque design.

b. Indicate the different clients/users for both products.

c. Indicate one function for each of the two engineering products.

d. In this case, describe one resolution identified in lecture to resolve the conflict of maximizing profit for one group of stakeholders while lowering the prices for another group of stakeholders.

e. Based on the possible resolution identified in question 6 (d), explain the potential detrimental consequence that could arise from implementing this resolution. Be sure to identify which stakeholders would be most affected by this potential consequence and how.

7. List the four ways humans interact with designs. Describe each interaction in relation to how humans would interact with a water faucet. [8 marks]

i) _____

ii) _____

iii) _____

iv) _____

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8. The following three questions are based on Kim Vicente's text *The Human Factor*.

a. Identify two reasons that Vicente offers as to why computers are a good fit physically for humans. [2 marks]

b. Identify two reasons that Vicente offers as to why computers are not a good fit psychologically for humans. [2 marks]

c. Explain Vicente's description of the organizational level of the human-tech ladder and related technologies. Also describe, using an example, how decisions at the organizational level of the human tech ladder impact lower levels. [3 marks]

9. Apply and describe two levels of the human-tech ladder to your children's water toy design based on your Individual Conceptual Design Specification. [2 marks]

10. List the four steps of a life cycle analysis. [2 marks]

- i)
- ii)
- iii)
- iv)

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11. Sketch the life cycle diagram for toilet paper after the user stage. [2 marks]

12. Explain the three benefits discussed in lecture from reducing residuals. [3 marks]

- i) _____
- ii) _____
- iii) _____

13. List three ways that a product could be redesigned to reduce its environmental impact. [3 marks]

- i) _____
- ii) _____
- iii) _____

14. List the six skills that an engineer must possess. [3 marks]

- i) _____
- ii) _____
- iii) _____
- iv) _____
- v) _____
- vi) _____

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15. Identify and explain two tasks that an engineer must perform as a leader in society.
[2 marks]

- i) _____
- ii) _____
- _____

16. Laws based on court cases are called _____. [1 mark]

17. Laws created by the government are called _____. [1 mark]

18. Identify and explain the four types of legal contracts. [8 marks]

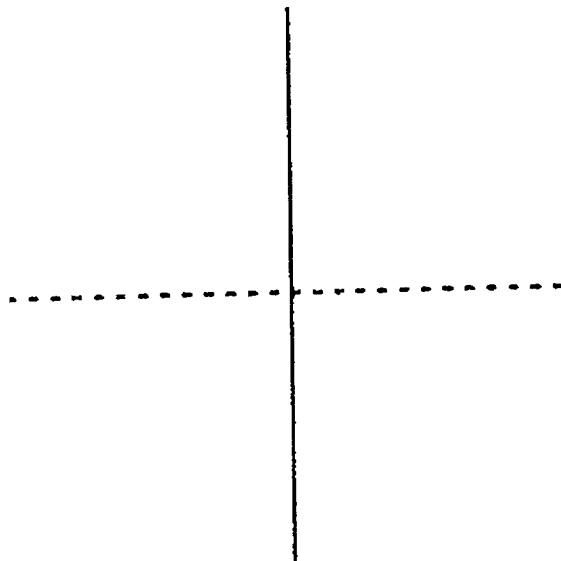
- i) _____
- ii) _____
- iii) _____
- iv) _____
- _____

19. Jim goes to the convenience store where he has an account, and picks up a newspaper. He holds it up so that the clerk sees him take it, and the clerk nods in return as he leaves the store. Based on this scenario, identify the type of contract Jim has made with the store. [1 mark]

- _____
- _____

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20 a. Label the quadrants of the ethics/law grid. [2 marks]



20b. Explain why one line in the grid above is dotted. [1 mark]

21. Write out the equation for determining Accounting Profit and explain each term. [2 marks]

22. Write out the equation for determining True Profit and explain each term. [2 marks]

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23. Explain why engineers should design for True Profit rather than Accounting Profit. [2 marks]

24. Describe the difference between Capital Costs and Operating Costs. Provide two examples of each. [4 marks]

25. Describe the purpose, components, and functions of the Life Cycle and the Social Impact sections in a Conceptual Design Specification. Use the object you selected for seminar presentation as an example to illustrate what information is provided in a Life Cycle and a Social Impact analysis. Your response will be evaluated both on your understanding of the content as well as your writing. Be sure to prepare a well thought out response that includes:

- a) a proper introduction with a purpose
- b) a thorough explanation of the Life Cycle section using your object as an example
- c) a thorough explanation of the Social Impact section using your object as an example
- d) a clear explanation of the purpose of these sections in a Conceptual Design Specification
- e) a proper conclusion that summarizes the explanation and re-enforces the importance of these sections to the Conceptual Design Specification

Do not exceed the space provided. [10 marks]

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