First Name: _____ Last Name: _____

Student #: _____

University of Toronto
Faculty of Applied Science and Engineering

APS112 & APS113 Engineering Strategies and Practice II

Quiz #2
April 14, 2015

This is a 50-minute quiz. The quiz is closed book and closed notes. The quiz has a total of 20 questions, worth 30 marks.

There are 15 multiple-choice questions, worth 1 mark each. For multiple-choice questions, you must use the multiple-choice answer sheet provided. Fill in your name and student number correctly. **You should mark only the single, most correct answer for each question.** Always mark the answer in the spot corresponding to the question number. There is no penalty for wrong answers.

There are 5 short-answer questions, worth 15 marks. These must be answered in the spaces provided on the question paper. The question paper, with your name and student number filled in, must be returned with the multiple-choice answer sheet slipped inside. Do not separate any pages.

Short-Answer Mark Breakdown

Question	**Possible Marks**	**Marks**
16	1	
17	3	
18	3	
19	2	
20	6	
Total	15	

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MULTIPLE-CHOICE QUESTIONS

1. Your company is preparing a bid for a project which is estimated to be worth $200,000. However, there are some risks involved. Each is associated with a Probability of it happening and a Cost if it happens:

Event	Probability	Cost
A	10%	$10,000
B	2%	$500,000
C	0.01%	$10,000,000

The total financial risk is:

a) $10,000,000
b) $10,510,000
c) $12,000
d) $21,000

2. Engineers are constrained by the communication practices of science; they must be logical and objective, supporting their arguments with evidence. Appropriate evidence is:

a) Any data that has been published in some form, be it a book, newspaper or website
b) Data that has been generated by scientific method and published in a reputable journal
c) Only data that has been generated by the personal observations of the writer
d) Any data that is obvious or might be referred to as “general knowledge”

3. The word "request," when used as a verb, is "transitive," which means it takes an object. Which of the following sentences uses the verb correctly?

a) Mr. Dinero, our client, has made a request of an exploded view drawing
b) Mr. Dinero, our client, has requested an exploded view drawing
c) Mr. Dinero, our client, has requested for an exploded view drawing
d) Mr. Dinero, our client, has made a request for an exploded view drawing

4. A successful presentation is one that ends:

a) With a video showing the benefits of the project the speakers presented
b) With the words “That’s all I have to say.”
c) With listeners feeling more trusting and confident of the speaker
d) With a light-hearted anecdote

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5. The purpose of a presentation should be determined to
   a) Serve the needs of the audience and the needs of the presenters at a particular point in a project
   b) Serve the needs of the presenters at a particular point in a project but not the needs of the audience
   c) Serve the needs of the audience at a particular point in a project but not the needs of the presenters
   d) Serve the needs of the project, since the project comes first, not the audience or presenters

6. Using a main message
   a) Is not as good as playing it safe when planning a presentation
   b) Pulls the presentation together at the start so that details "add up" to a meaningful statement
   c) Is unnecessary when the presentation simply follows the format of an accompanying report
   d) Is an opening strategy, like telling an anecdote or introducing the team

7. The Final Design Specification (FDS)
   a) Opens the design space widely, considering as many design ideas as possible
   b) Widens the design space, incorporating multiple possibilities developed through benchmarking and analogy
   c) Narrows the design space, providing the best possible information for the implementation of the recommended design
   d) Closes the design space, because the FDS represents the final stage in the design process

8. For the Human Factors section of an FDS for a new knife sharpener, which of the following is correct?
   a) On a psychological level, the instructions for the knife sharpener should be clear
   b) On a physical level, the knife sharpener is designed to fit the average adult hand – 172 mm for women, 189 mm for men
   c) On an organizational level, the knife sharpener should be placed on the counter near to where the knives are usually used
   d) On the political level, the knife sharpener must abide by all codes, regulations and laws

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9. You have invented a new pogo type of pogo stick (a bouncing toy) that relies on a magnetic spring arrangement. You are in the process of filing a patent and discover a 1991 patent that describes the same basic invention.

    a) You will not be granted a patent because your invention was known in the prior art.
    b) You cannot make the new pogo stick because you will be infringing on the 1991 patent.
    c) You cannot make the new pogo stick because it will still be covered under copyright.
    d) You may file a patent if you can prove that you invented the pogo stick prior to discovering the earlier patent.
    e) The answer depends on whether or not the original patent has been renewed by the inventor for a second 20-year term.

10. The Industrial Design act of Canada.
    a) Provides a set of safety standards covering all industries in Canada.
    b) Provides guidance for the design of complex scheduling systems.
    c) Certifies that engineers are qualified designers and can practice engineering.
    d) Describes the conditions under which the visual design of an object can be protected by a design patent.

11. An advantage of the Pugh Selection Process over a weighted decision matrix is that:
    a) It provides a more quantitative method of comparing alternatives.
    b) It is based on just one key objective and is therefore more decisive.
    c) It takes advantage of the fact that humans are better at relative comparisons than absolute judgments.
    d) It is based entirely on a set of codes and standards and thus makes use of the experience of past designers.

12. A commissioning engineer is most often responsible for
    a) Calculating the commission of sales engineers.
    b) Checking that a new facility such as a chemical plant or building is working as specified in the contract on behalf of the owner.
    c) Reviewing the initial contract on behalf of the design/build firm.
    d) Checking for compliance with codes and standards on behalf of the government.

<<Questions continue on next page>>

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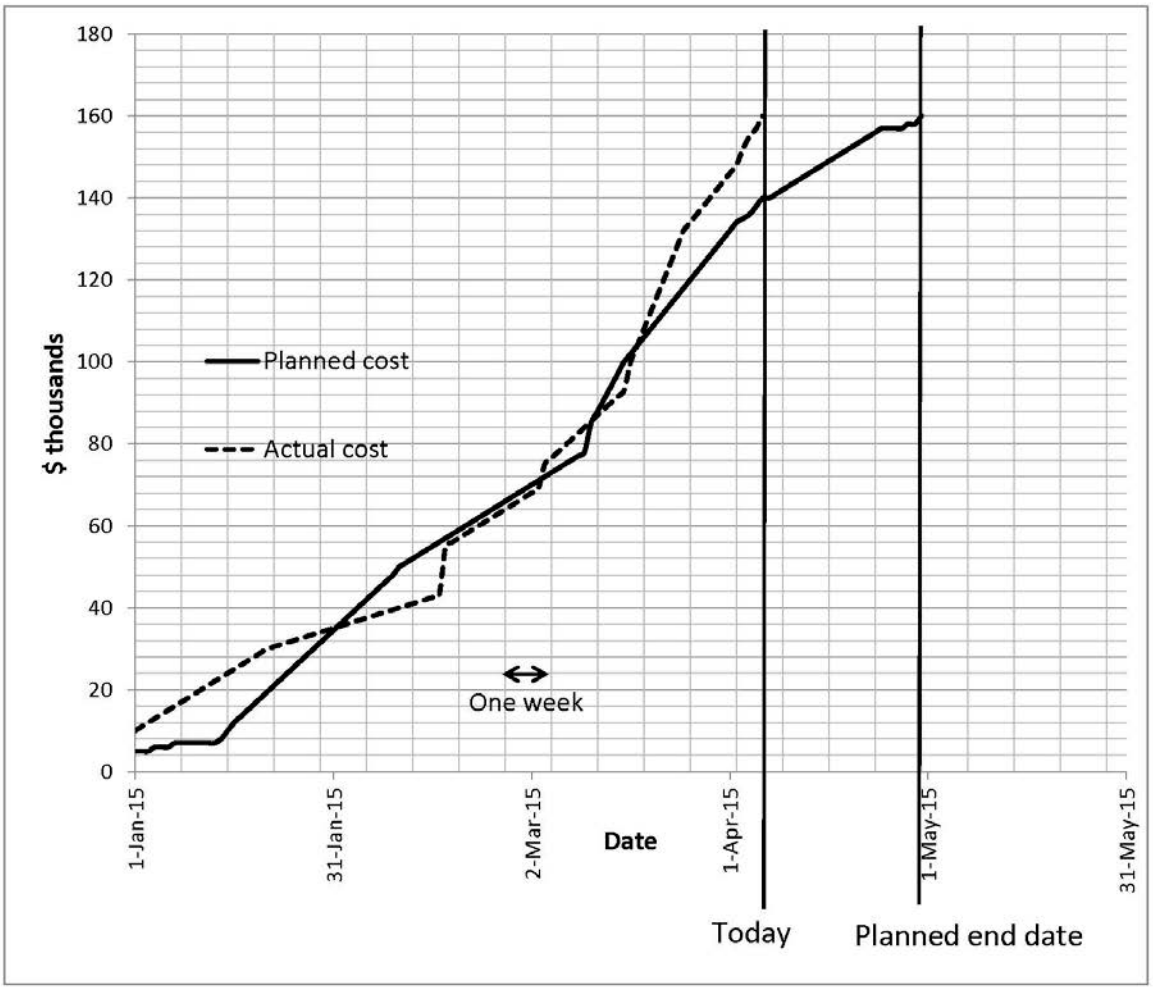
Questions 13, 14 and 15 refer to the graph below



13. The project is
    a. On schedule and on budget
    b. Ahead of schedule and on budget
    c. Behind schedule and on budget
    d. On schedule and over budget
    e. Behind schedule and over budget

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14. In this project, the Cost Variance (*CV*) and the schedule variance (*SV*) are
    a. CV = 0, SV = -14%
    b. CV = -14%, SV = -14%
    c. CV = -14 %, SV = 0
    d. CV = 14%, SV = 14%
    e. CV = 0, SV = 14%

15. We estimate the project to be completed on (*Date*) at a total cost of (*Cost*)
    a. Date: May 15, Cost: $140,000
    b. Date: May 23, Cost: $140,000
    c. Date: April 7, Cost: $180,000
    d. Date: May 15, Cost: $180,000
    e. Date: May 23, Cost: $180,000

<<End of multiple-choice questions>>

<<Short-answer questions start on next page>>

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SHORT ANSWER QUESTIONS – ANSWER IN THE SPACES PROVIDED ON THE QUESTION PAPER.

16. (1 mark) The best way to prepare for an extemporaneous prepared presentation is to:

17. (3 marks) Sketch an ordinary 4-door sedan (a passenger car like a Honda Accord) viewed at an angle so that you can see both the front windshield and both side doors. Use two-point perspective to make the drawing realistic, and show your construction lines (or guidelines).

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18. (3 marks) A room air-conditioner is to be designed for minimal manufacturing and assembly cost. List three ways that you could accomplish this goal. Short bullet point answers are fine.

19. You are the industrial designer responsible for the external look and feel of a new line of power tools aimed at the serious home handyman.

    a) (1 mark) How would you ensure that other companies don't sell copies of your design?

    b) (1 mark) If your target market wants to feel that the tools they are buying are more rugged and durable than cheaper versions on the market, how could you adjust the industrial design to accomplish that goal? Describe one feature you would add to the design.

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20. In an auto repair shop, cars are lifted to a height of 2 metres on mechanical or hydraulic lifts, so mechanics can work underneath them. The motors needed to move the lift would be activated by buttons on a control panel.

a) (4 marks) Design two safety features you could build into the system to reduce the chance of a mechanic from hurting herself while the lift is moving.

b) (1 mark) Design a safety feature that would prevent a mechanic from being hurt if someone else tries to move the lift while she is underneath it working on the car.

c) (1 mark) Write a one-sentence warning for users, to be placed on a label near the controls.