

University of Toronto
Faculty of Applied Science and Engineering
APS112 and APS113 Engineering Strategies and Practice

Quiz #2 April 07, 2016

This is a 50-minute quiz. The quiz is closed book and closed notes. The quiz has a total of 18 questions, worth a total of 30 marks. The questions are divided between two booklets.

Question Booklet #2 – Short-Answer Question Booklet

First Name:																			
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UTOR Email:																			

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There are 3 short-answer questions, worth a total of 15 marks. These must be answered in the spaces provided in this Short-Answer Question Booklet. This question booklet, with your name and UTOR Email filled in, must be returned with the multiple-choice answer sheet slipped inside. Do not separate any pages. Do not write on the QR code at the top of the pages.

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

- 16) (3 marks) Sketch a realistic two-point perspective drawing of a child's toy, which is a simple wooden block with geometric shapes painted on the sides. In your drawing, three sides must be visible. On the top side is a square. On one side is a circle, and on the other is an equilateral triangle (see Figure 1).



Figure 1: Shapes to be included

- 17) (2 marks) A plastics electronics housing (see Figure 2) consists of frame and two caps that are put together with 4 nuts and bolts as depicted in the drawing below. List two methods you could use to improve design for manufacturing and assembly.

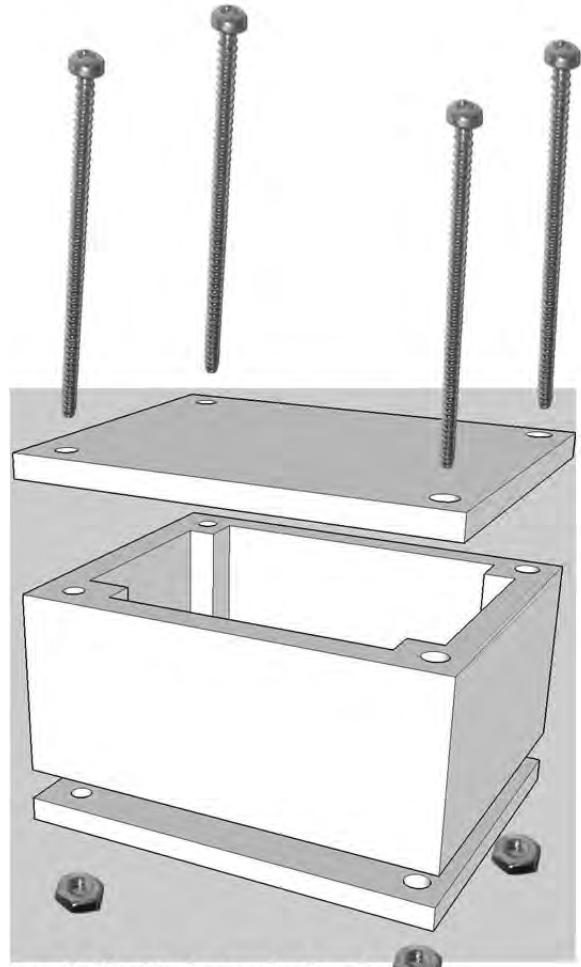


Figure 2: Plastic electronics housing

18) In a 100-year-old company, one of the original presses (see Figure 3) is still being used to punch leather patterns for the manufacture of handbags. The operator is sitting down and places large leather pieces in the press by hand, and then actuates the press with a foot switch, which punches out the pattern. The press closes with enough force to crush the operator's fingers or hands.

- a) (2 marks) What two factors combine to make this a high-risk operation?

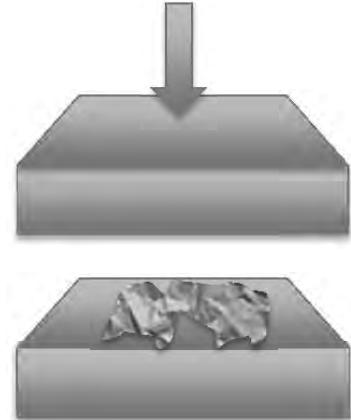


Figure 3: Press configuration

- b) (2 marks) List two responsibilities of the operator under the Occupational Health and Safety Act.
- c) (1 mark) List one responsibility of the operator's supervisor under the Occupational Health and Safety Act.

<<Question 18d is on the next page>>

- d) (5 marks) The new owner of the company has determined that the risk is so high that two separate safety systems are required, so that even if one fails, the second will prevent injury. Providing some evidence of structured creative thinking, design at least three different safety systems that could work together, and choose the best two to install on the existing press.