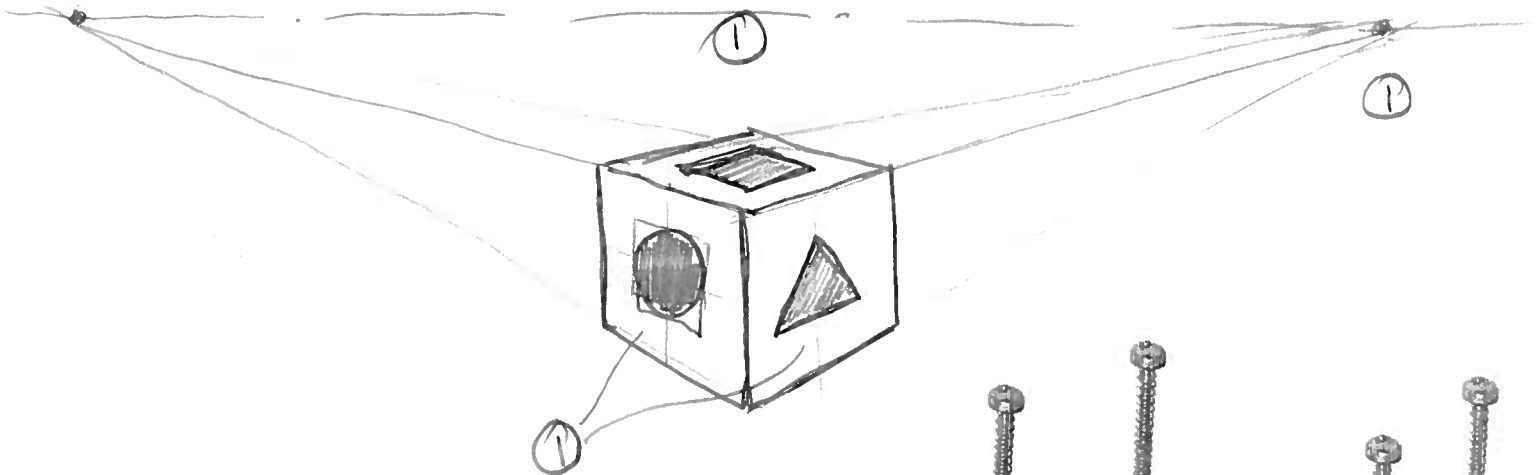


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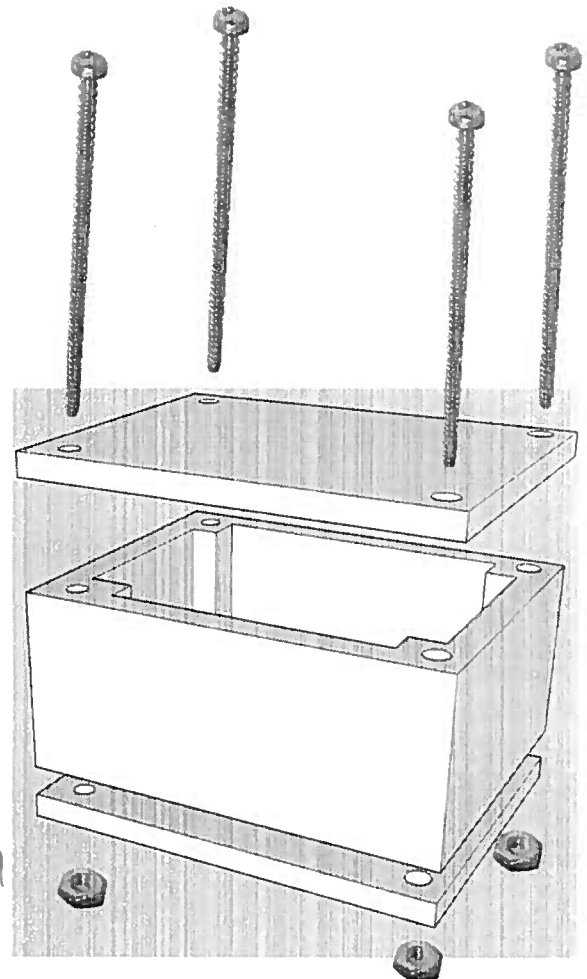
Student #: \_\_\_\_\_

**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.



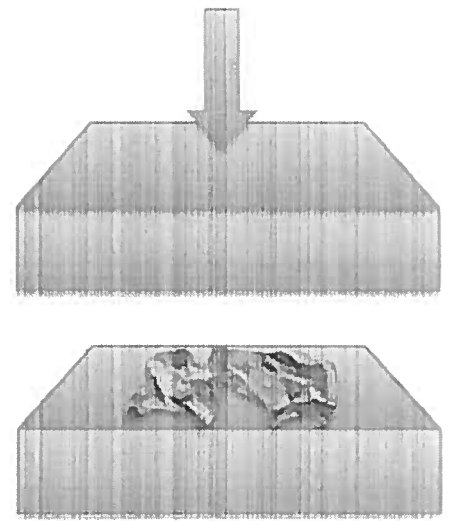
18) (2 marks) A plastics electronics housing consists of frame and two caps that are put together with 4 nuts and bolts as depicted in the drawing below. List two methods you could use to improve design for manufacturing and assembly.)



- any 2
- single concept
  - mould base and sides as one piece
  - snap fittings moulded in
  - mould threads into plastic to eliminate nuts
  - same tool top and bottom
  - bevelled bolts or holes
  - fixture for holding nuts

Name: \_\_\_\_\_

Student #: \_\_\_\_\_



19. In a 100 year old company, one of the original presses 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?

$$\text{risk} = \text{probability}^{①} \times \text{severity}^{①}$$

} Need one term to indicate each of these

b) (2 marks) List two responsibilities of the operator under workplace safety law?

Any 2 {  
- report problems  
- operate according to training & procedure  
- wear personal protective equipment

c) (1 marks) List one responsibility of the operator's supervisor under workplace safety Law?

Any 1 {  
- enforce standards  
- reasonable precautions  
- adequate training provided

- e) (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. Using some evidence of structured thinking, design at least three viable safety systems that could work together, and choose the best two to install on the existing

next page.

Name: \_\_\_\_\_

Student #: \_\_\_\_\_

- e) (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. Using some evidence of structured thinking, design at least three viable safety systems that could work together, and choose the best two to install on the existing

Hazard → crush injury when press moves while hands inside

stop press when hands in press. ①

hands never go in press

barrier interlock

guard  
light curtain

force sensor?

tie back for wrists

safety block

central placement

→ 2 handed  
→ distance away

robot placement

Jig (pizza oven tray)

CREATIVITY

- ANALOGY → pizza oven  
→ garage door opener

- SCAMPER

ANY MENTION ①

Objectives

① → reliable → maintain  
→ inexpensive  
→ quick to use

Choose 2 based on these  
quick → light curtain + guard ①