

## National Exams May 2010

### 04-BS-15, Engineering Graphics & Design Process

3 hours duration

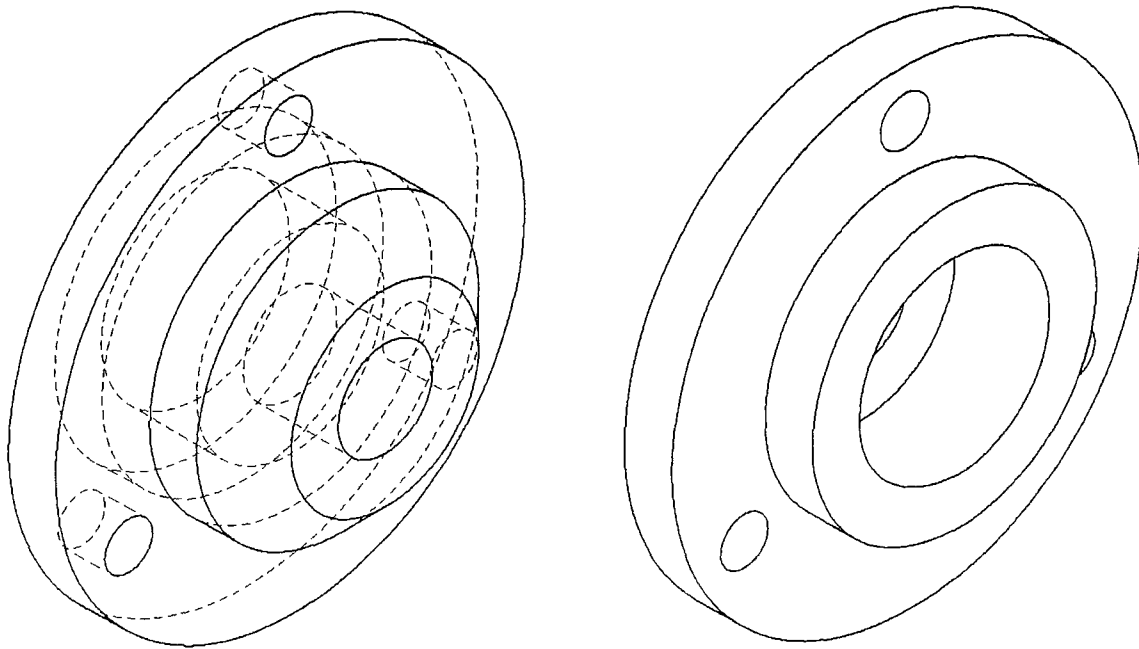
#### NOTES

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is a closed book examination. Candidates may use one of two calculators, the Casio or Sharp approved models.
3. Aids allowed:
  - a. Straight edge
  - b. Engineering squares or rolling ruler
  - c. Pencil and eraser
  - d. Engineering scale
  - e. Protractor
  - f. Compass
4. Ten (10) questions constitute a complete exam paper. Clearly label the answers in the answer book.
5. All questions are of equal value.
6. Failure to follow the above directions will result in the grade penalties.
7. All questions have a grading rubric attached. The rubric (with headings criterion and grade) is a guideline that will be used to assign marks and penalties.
8. All sketches must be made freehand and must be easy to read and neat.

## EXAMINATION QUESTIONS

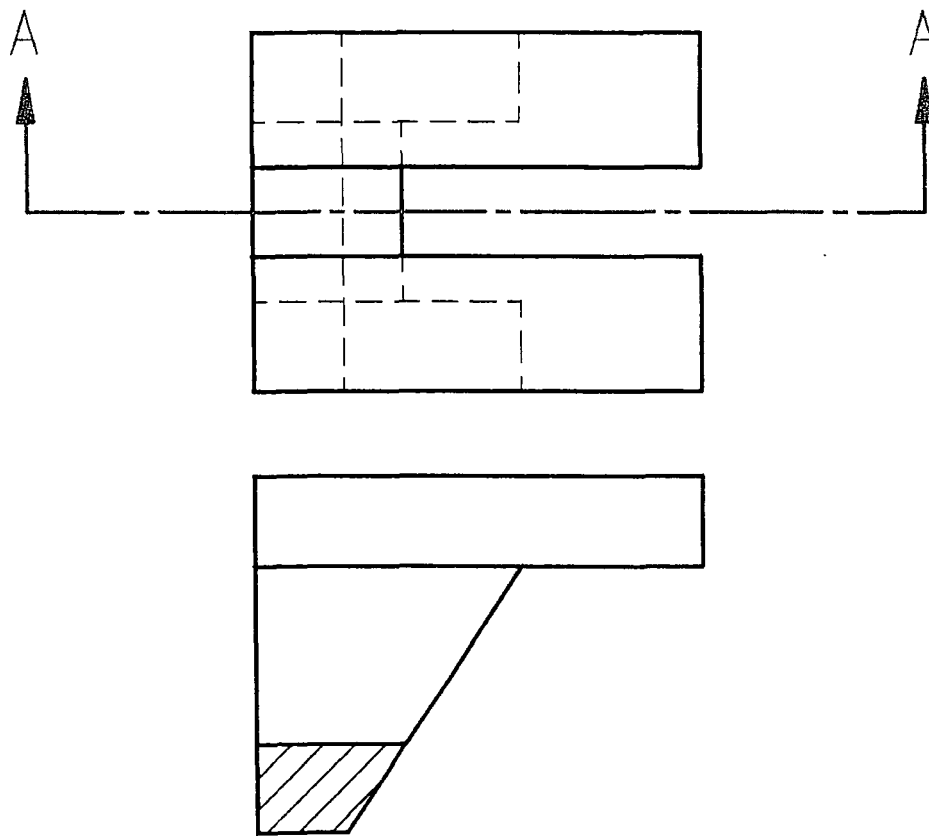
- Shown below are two isometric pictorials of a single component. Sketch or draw an orthographic projection of the component. Select and position principal, section, and auxiliary views as necessary. Use common Canadian (CSA/ANSI) conventions and practises. Do not dimension. All holes are through.

Criterion	Grade
Selection of views	3: Minimum necessary views 2/1: More views present than necessary 0: Missing views
Adherence to conventions	3: Flawless 2: Minor omissions 1/0: Incorrect application of conventions
Correctness of projections	4: Flawless 3: Minor errors 2: One or more significant omissions 1/0: Part could not be manufactured



2. Sketch an isometric pictorial of the following orthographic projection. Sketch; do not draw. Do not use a straight edge.

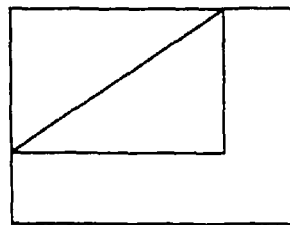
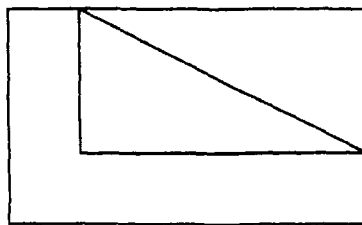
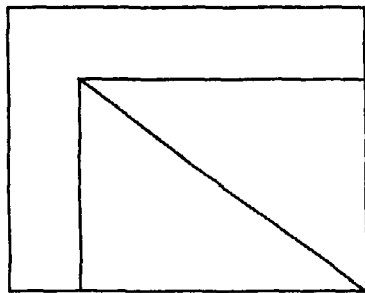
Criterion	Grade
Isometric pictorial	4: Correct angles of horizontal lines 3: Near correct angles of horizontal lines 0: Not an isometric pictorial
Correctness of projection	4: Flawless 3: Minor errors 2: One or more significant omissions 1/0: Part could not be manufactured
Penalties	-10: use of straight edge



SECTION A-A

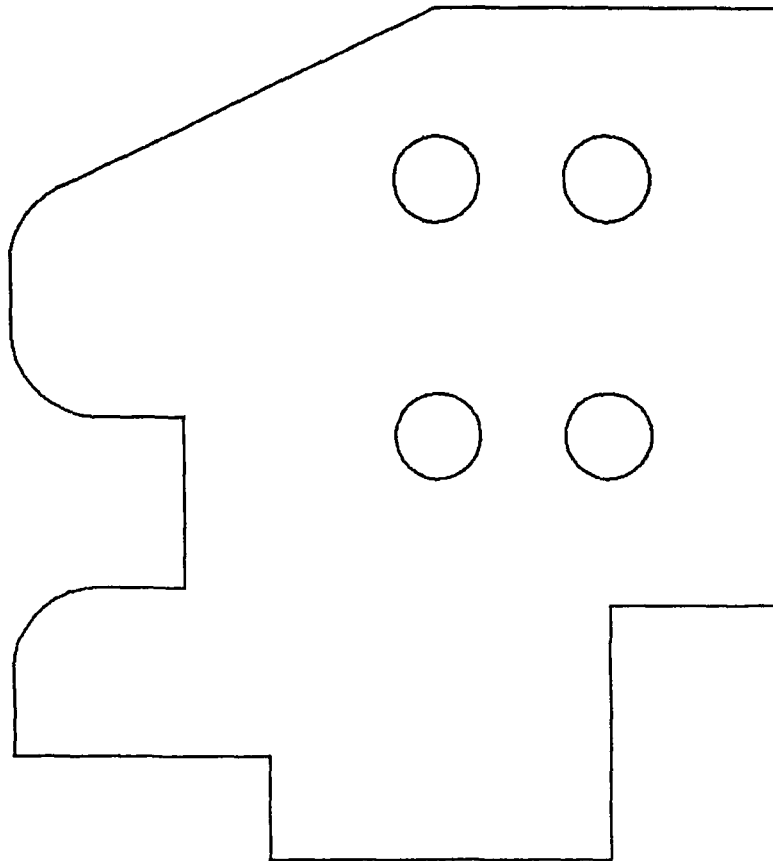
3. Draw both oblique faces of the following component in true shape. Show all work. Clearly label auxiliary views. Complete the answer in the space provided below.

Criterion	Grade
Selection of views	2: Two correct auxiliary views 1: One correct auxiliary view
Adherence to conventions	3: Flawless 2: Minor omissions 1/0: Incorrect application of conventions
Correctness of projections	4: Flawless 3: Minor flaws 0: True shape not obtained



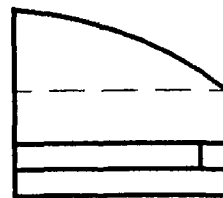
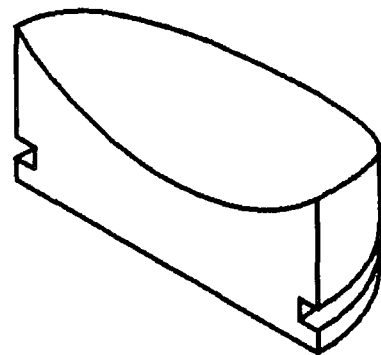
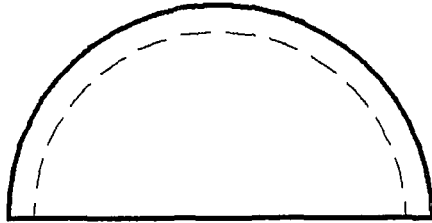
4. Dimension the following orthogonal projection using Canadian conventions (CSA/ANSI) in millimetres. The component is drawn in full scale. It is a sheet metal part. Complete the answer on the drawing provided.

Criterion	Grade
Drawing	10: dimensioned figure
Dimensioning	-1 per unnecessary dimension -1 per missing dimension
Adherence to conventions	-1 per error



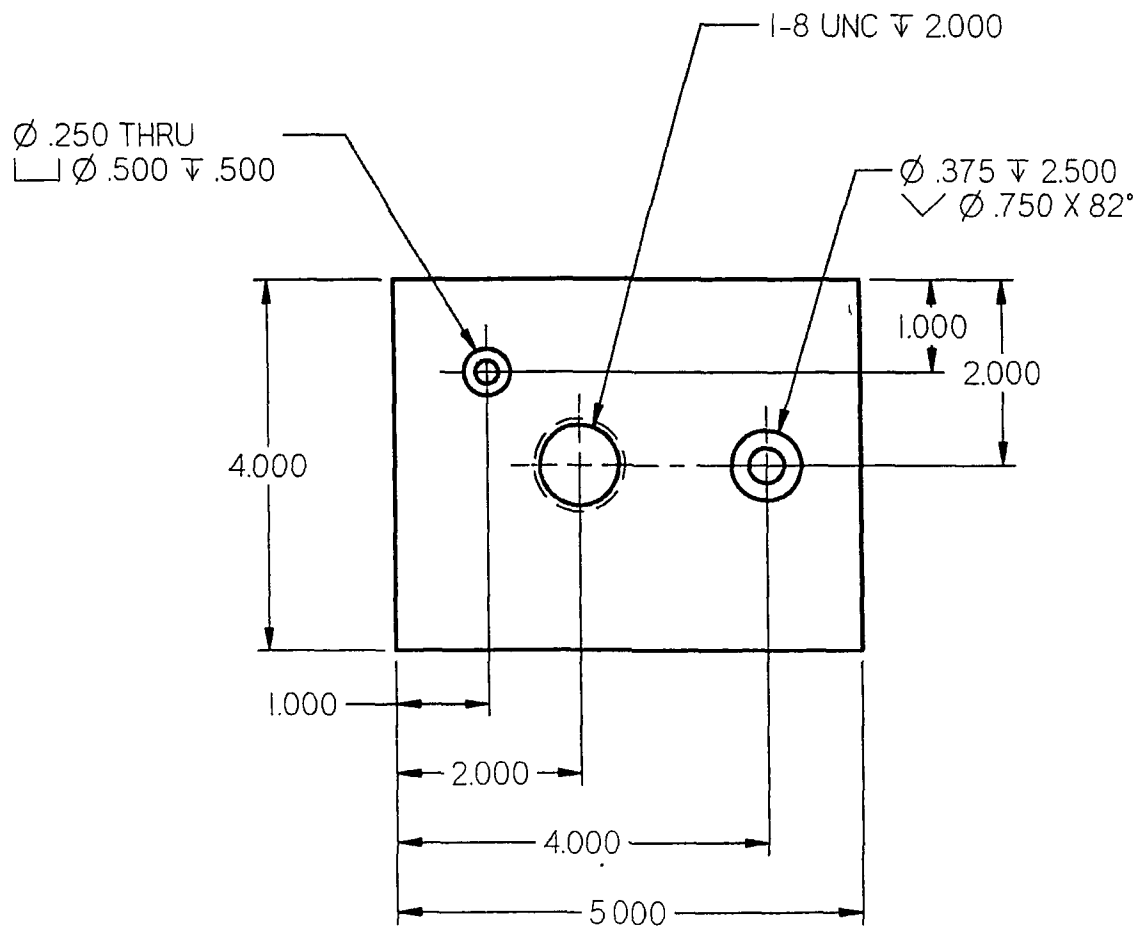
5. Sketch the steps that could be used to construct the following object using primitives (i.e., block, sphere, cylinder, etc.) using only Boolean operations (union, intersect, subtract).

Criterion	Grade
Overall correctness	10: flawless description of steps to reproduce object
	8: minor errors
	4: object could not be reproduced



6. Sketch an appropriate section view for the following component. The plan view is shown. The component is a three inch high block with three holes.

Criterion	Grade
Selection of section view	3: Correct 2/1: Wrong type of section view 0: Inappropriate
Adherence to conventions	3: Flawless 2: Minor omissions 1/0: Incorrect application of conventions
Correctness of projections	4: Flawless 3: Minor errors 2: One or more significant omissions 1/0: Part could not be manufactured





7. For two of the three following terms write a paragraph with explaining the term and providing an example.

Criterion	Grade
Correct English	-½ per error
Explanation (×2)	2: clear and concise 1: minor flaws
Example (×2)	2: clear and concise

- Product Life Cycle Management (PLM)
  - Geometric Dimensioning and Tolerancing (GDT)
  - Computer Aided Manufacturing (CAM)
8. Explain the difference between aesthetic design, functional design, and product design. Given an example of each.

Criterion	Grade
Correct English	1: well written -½ per error
Definition (×3)	2: clear and concise 1: minor flaws
Example (×3)	1: clear and concise

9. For two of the three following terms write a paragraph with explaining the term and providing an example.

Criterion	Grade
Correct English	-½ per error
Explanation (×2)	2: clear and concise 1: minor flaws
Example (×2)	2: clear and concise

- Class of fit
  - Weld symbols
  - Threads
10. For two of the three following terms, sketch an example.

Criterion	Grade
Identification (×2)	1: Correctly labelled sketch
Sketch (×2)	4: Simple and concise sketch following conventions 3: Minor errors 0: Not a section view

- Half section
- Removed section
- Revolved section