DAMAGE, MARKING OR MISUSE OF CWB PROPERTY WILL RESULT IN VIOLATION OF THE ACADEMIC CODE OF CONDUCT AND THE COST OF REPLACEMENT OF MATERIAL AND/OR EQUIPMENT

Examination Instructions:

Please read **carefully** the following instructions before beginning the examination. Failure to follow to these instructions could result in a failing grade. The CWB assumes no responsibility for candidates who do not follow the examination instructions.

This examination consists of the evaluation of **5** test specimens.

The examination is intended to show your ability to:

- Identify common discontinuities associated with welds;
- If applicable, to measure the extent/size of the discontinuity;
- Assess the discontinuity against a generic welding standard.

Please note the following:

- All measurements must be recorded in metric units.
- Measurements must be recorded as a single value. Answers given as a range may result in the loss of marks.
- Select **only one** observed discontinuity, or circle "No Discontinuity" if none found.
- Insignificant or very minor indications are to be disregarded.
    - **NOTE: There is a chance a given sample may be displaying a defect related to the 3D printing process. Disregard these printing defects. (Eg: Wood grain effect on surfaces or scratches on "parent" material and printing lines or cross-sectional slices)
- Do not write on or mark or scribe the specimens in any way.
    - Any such actions will result in immediate failure of the examination and you could be held responsible for the costs to repair or replace the damaged specimens.
- The "Generic Welding Standard" provides requirements for weld and joint inspection and acceptance criteria. Please read this document carefully before inspecting or assessing any samples.

The following tools may be used during the examination:

- magnifying glass
- fillet weld gauges (supplied for exam)
- bridge cam gauge (supplied for exam)
- depth gauge
- scale / rule (supplied for exam)
- "hi-lo" gauge
- weld size gauge (supplied for exam)
- Mirror
- Flashlight

Time Limit, Marking and Pass Mark:

- The time limit for the examination is 45 minutes.
- The total marks available for the exam is 50 marks.
    - Total available marks are shown in parenthesis below each question.
    - Part marks may be awarded for partially correct answers.
- A score of 70% is required to achieve a passing grade.

CSA Standard W178.2: Generic Welding Standard

Generic Welding Standard

1. Scope

1.1 This Standard shall only be used for the evaluation of weld and/or joint samples during a candidate's practical skills examination under CSA Standard W178.2.

1.2 The use of this standard for any other application is not permitted.

2. Inspection Requirements

2.1 All welds shall be visually inspected.

2.2 Visual inspection shall be restricted to the face of the welds and the adjoining surfaces of the base materials.

2.3 The cut ends of welded samples shall not be considered during visual inspection.

3. Acceptance Criteria

3.1 Welds subject to visual inspection shall be considered acceptable if visual inspection shows:

a) no surface cracks;

b) no visible porosity with any single pore exceeding 1 mm in diameter or in length;

c) no weld termination craters;

d) no undercut exceeding 2 mm in depth;

e) no visible lack of fusion between welds and base metal;

f) no overlap;

g) no visible weld spatter;

h) for butt joints, no weld reinforcement exceeding 2 mm;

i) for butt joints, no weld bead width exceeding 25 mm;

j) for fillet welds, no convexity greater than 0.07 times the actual face width of the weld + 1 mm; and,

k) for fillet welds with legs of unequal length, difference between leg lengths shall not exceed 2 mm.

3.2 In addition to the requirements of 3.1, welds and/or joints to be welded shall be subject to the following criteria:

a) no insufficient weld throat is permitted;

b) no underfill is permitted;

c) no arc strikes are permitted;

d) no weld misalignment is permitted;

e) no joint misalignment (i.e. no offset) greater than 1mm is permitted;

f) Root openings shall have a tolerance of no more than + 1 mm / - 1 mm;

g) Root faces shall have a tolerance of no more than + 2 mm / - 0 mm;

h) Prepared bevels shall have a tolerance of no more than + 2° / -2°; and,

i) The surface of prepared edges to be welded shall have no notches or surface variations exceeding 2 mm.