

National Exams December 2014

04-BS-15 – Engineering Graphics & Design Process

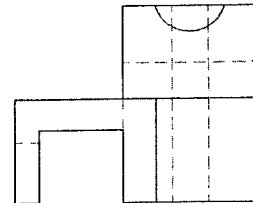
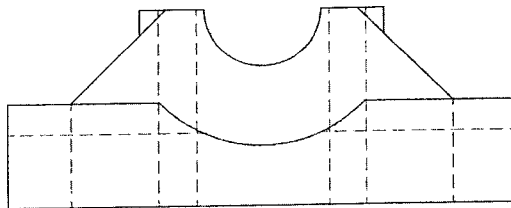
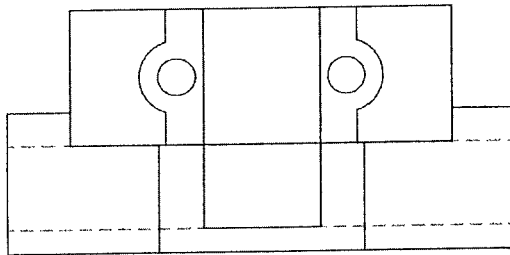
Duration of Examination: 3 hours

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 not use a calculator.
 3. Aids permitted during this examination:
 - (a) Straight edge
 - (b) Engineering squares or rolling ruler
 - (c) Pencil and eraser
 - (d) Engineering scale
 - (e) Protractor
 - (f) Compass
 4. This exam paper consists of ten (10) questions on 9 pages. Check to ensure your exam paper is complete. Clearly label your answers in the answer booklet.
 5. **Regardless of rubric total, all questions are of equal value.**
 6. Each question has a grading rubric attached. The rubric is a guideline that will be used to assign marks and penalties.
 7. All sketches must be made freehand, must be neat, and must be easy to read.
 8. Failure to follow the above directions will result in grade penalties.
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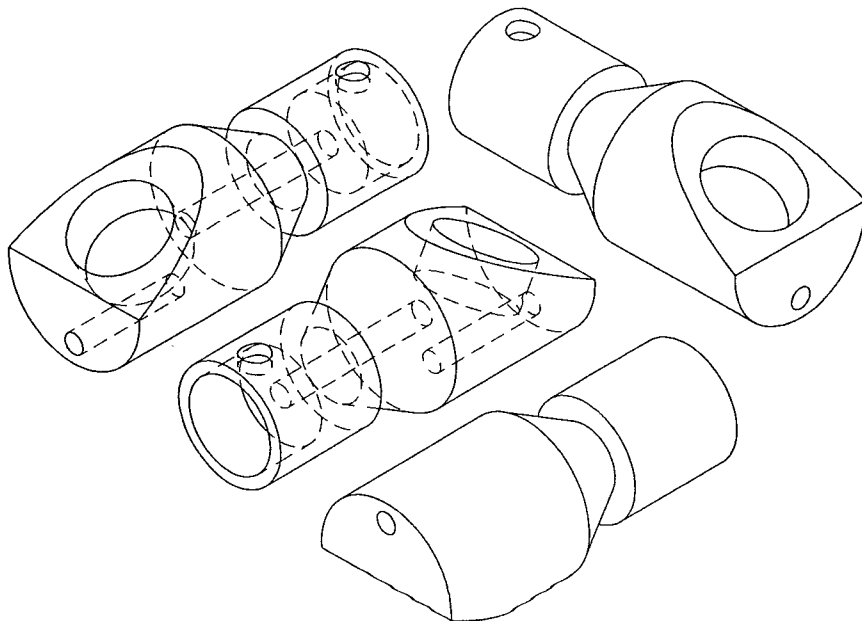
1. Sketch the isometric pictorial of the orthographic projection represented below. The orthographic is presented at a half of the part's actual size. State the scale according to your sketch.

ISOMETRIC PICTORIAL RUBRIC			
	WT	MARK	TOTAL MARK
PROJECTION	4	/3	/12
PROPORTIONS	2	/3	/6
PRESENTATION	1	/3	/3
PENALTIES	Use of straight edge		-21
FINAL MARK			21



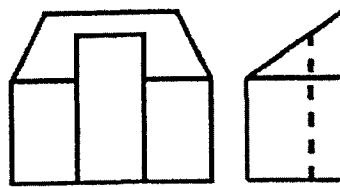
2. Sketch or draw the orthographic projection of the isometric pictorial design represented below. There are several pictorials of the same part to provide necessary detail. Pictorials are presented at double of the part's actual size. State the scale according to your sketch. Select and position the principal, section, and auxiliary views as necessary. Use common Canadian (CSA/ANSI) conventions and practises. Do not dimension. Your answer will be graded using the multiview rubric.

MULTIVIEW RUBRIC			
	WT	MARK	TOTAL MARK
VIEW SELECTION	4	/3	/12
PROJECTION	4	/3	/12
PROPORTIONS	2	/3	/6
CENTRE LINES & MARKS	1	/3	/3
PRESENTATION	1	/3	/3
FINAL MARK			36



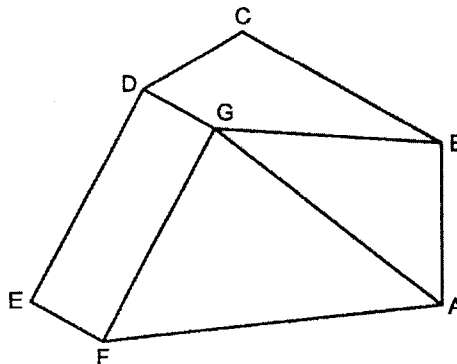
3. Two views of an object are shown below using standard CSA/ANSI convention. Correctly identify, label, and sketch the missing view.

CRITERION	MARK
CORRECT MISSING VIEW	4
ACCURATE SKETCH OF MISSING VIEW	4
CORRECT IDENTIFICATION & LABELLING OF MISSING VIEW	2



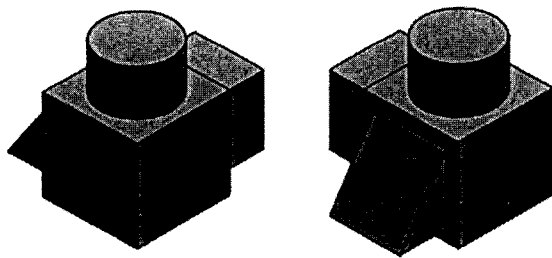
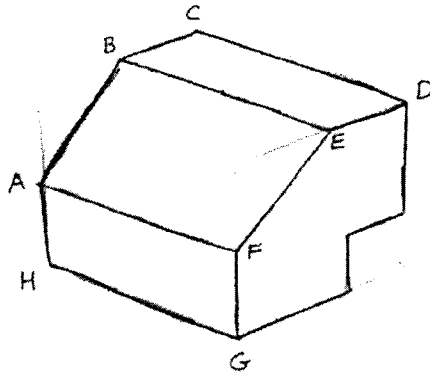
4. For the isometric pictorial of the cut block shown below, which edges are scalable (i.e., directly measurable)? For each labelled edge comment on why, or why not, it is scalable.

CRITERION	MARK
CORRECT IDENTIFICATION OF SCALABLE EDGE(S)	5
CORRECT REASON FOR SCALABLE/NON-SCALABLE EDGE(S)	5
CORRECT ENGLISH	-0.5 PER ERROR



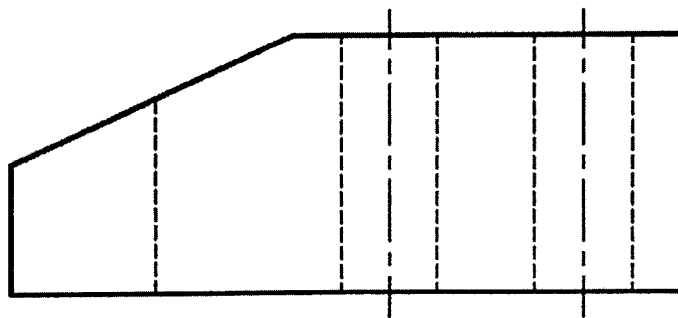
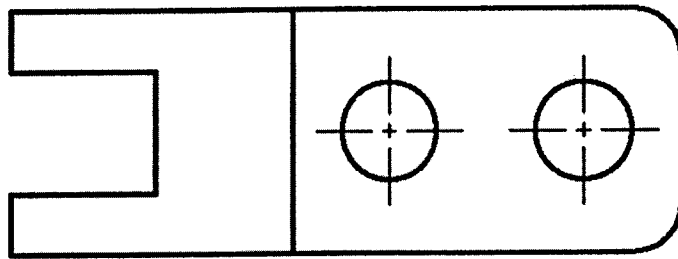
5. Given the isometric pictorial with several labelled vertices, re-sketch this part using the same rotation presented.

ISOMETRIC PICTORIAL & ROTATION RUBRIC			
	WT	MARK	TOTAL MARK
PROJECTION	4	/3	/12
PROPORTIONS	2	/3	/6
PRESENTATION	1	/3	/3
CLEAR & CORRECT ROTATION	2	/3	/6
PENALTIES	Use of straight edge		-21
FINAL MARK			27



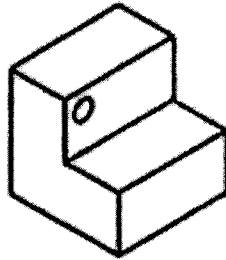
6. Dimension the following orthogonal projection using Canadian conventions (CSA/ANSI) in millimetres. The part is drawn at full scale. Complete the answer on the drawing provided.

CRITERION	MARK
CORRECT DRAWING DIMENSIONS	10
PENALTY	-1 PER UNECESSARY DIMENSION
PENALTY	-1 PER MISSING DIMENSION
PENALTY	-1 PER CONVENTION ERROR



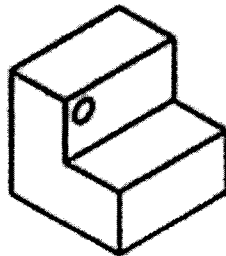
7. For the part shown below, clearly sketch a first angle projection and a third angle projection. The projection type must be labelled, the selection of view(s) in your sketches must clearly illustrate the difference between the two projection types, and the part must appear different in each projection.

CRITERION	MARK
CORRECT FIRST ANGLE PROJN	5
CORRECT THIRD ANGLE PROJN	5



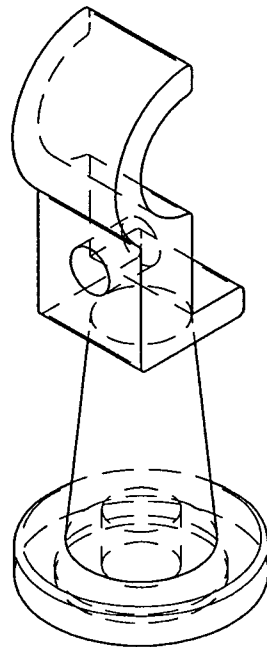
8. For the part shown below, clearly sketch using orthographic views. Use the size, location, and coordinate dimensions following CSA/ANSI conventions. Label one of each of the following types of dimensions: 1) size dimension, 2) location dimension, 3) coordinate dimension.

CRITERION	MARK
CORRECTLY DRAWN AND LABELLED EACH DIMENSION TYPE	9 (3 EACH)
SKETCH IS ACCURATE & CORRECT	3



9. Given the following isometric pictorial of a bracket, sketch an appropriate orthographic projection section view.

SECTION VIEW RUBRIC			
	WT	MARK	TOTAL MARK
VIEW SELECTION	4	/3	/12
PROJECTION	4	/3	/12
PROPORTIONS	2	/3	/6
CENTRE LINES & MARKS	1	/3	/3
PRESENTATION	1	/3	/3
FINAL MARK			36



10. A simple assembly of a hinge is shown. The exploded view is shown below from both sides. List the stages of the design process from the initial problem statement to final drawings. Explain each step with reference to the given hinge.

CRITERION	MARK
STAGES	5
EXPLANATIONS	5

