Tasmanian Certificate of Education

TECHNICAL GRAPHICS

Senior Secondary

Subject Code: TEG315110

External Assessment

2014

Time: Two Hours

On the basis of your performance in this examination, the examiners will provide results on each of the following criteria taken from the course statement:

**Criterion 2**  Complete complex geometric tasks and solve complex problems.

**Criterion 3**  Demonstrate geometric skills in interpreting and transferring drawings.
CANDIDATE INSTRUCTIONS

You **MUST** make sure that your responses to the questions in this examination paper will show your achievement in the criteria being assessed.

You must answer **SIX** questions in total (on the drawing paper provided):

- **ALL FOUR** questions from Section A
- **ONE** question from each of Sections B and C

You should spend approximately 60 minutes on Section A and approximately 30 minutes on each of the other two questions.

You are required to use correct linework and presentation, and are encouraged to include freehand sketches, where necessary, to show the development of ideas in the solution of problems. Construction must be shown.

All dimensions are in millimetres unless otherwise stated.

All written responses must be in English.
SECTION A

Answer ALL questions in this section on the drawing paper provided.

**Question 1** – This question assesses **Criterion 2**.

The cube in Figure 1 has sides of length 30 mm and has its six faces labelled A to F.

Reproduce the cube and plot the isometrically projected path of point P as the cube rolls onto face B, then face E, then face D and finally onto face C.

![Cube Diagram]

**Figure 1**

**Question 2** – This question assesses **Criterion 3**.

Construct a regular pentagon with a side length of 50 mm. Increase the area of this pentagon in the ratio 4 : 7.

Section A continues.
Section A (continued)

**Question 3** – This question assesses **Criteria 2 and 3**.

Reproduce the irregular pentagon shown in Figure 2. Draw the involute of the pentagon commencing from point P in a clockwise direction.

![Figure 2](image-url)

**Figure 2**
Section A (continued)

**Question 4** – This question assesses **Criteria 2 and 3**.

Figure 3 shows the front view of a public sculpture. The curve AB is parabolic with vertex A and the curve CB is an identical parabola with vertex C. The curve DEF is elliptical and the curve DGF is a portion of the same ellipse.

Construct the public sculpture design.
Answer **ONE** question from this section on the drawing paper provided.

This section assesses **Criteria 2 and 3** weighted 1:4 respectively.

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**Question 5**

Figure 4 shows a disc of radius 20 mm that rolls in a clockwise direction (without slipping) from A to B. Plot the path of point P until the centre of the disc is vertically above B.

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**SCALE 1:1**

*Figure 4*
Section B (continued)

Question 6

The cam EAD shown in Figure 5 is an Archimedean spiral about F.

Draw the Follower Displacement Diagram for the knife-edged follower A and plot the path of point P for one revolution of the cam EAD.

Figure 5
Section B (continued)

Question 7

The plan and elevation of a small tent are shown in Figure 6. The tent consists of a truncated semi-cone A and a half-cylinder B which is truncated as shown.

(a) Redraw the plan and elevation and project an end view from the direction of arrow P.

(b) Develop the truncated conical surface of A.

(c) Develop the truncated cylindrical surface of B.

Figure 6
Answer ONE question from this section.

This section assesses Criteria 2 and 3 weighted 4:1 respectively.

Question 8

Figure 7 shows a hexagonal prism intersecting a sphere. On the elevation, draw all the lines of intersection.
Section C (continued)

Question 9

Figure 8 shows an orthogonal drawing of a stainless steel yacht fitting.

Draw a **freehand** isometric sketch (dimensions not required) of the fitting when looking from the direction A.
Section C (continued)

Question 10

Figure 9 shows a symmetrical pin-jointed roof truss for a warehouse is shown below.

(a) Calculate the forces R1 and R2.

(b) Calculate the force in Beam X.

(c) Is Beam X under compression or tension?

Figure 9