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## FOREWORD

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This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned.**

# GEOMETRICAL AND MECHANICAL DRAWING

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## GCE Ordinary Level

Paper 7040/01  
Plane and Solid Geometry

### General comments

Considerable variation in the quality of scripts submitted for this subject. Far too many of the weaker candidates simply copied out the diagrams as they appeared on the Examination Paper without any additional construction. However the better candidates produced work of a very pleasing standard that was a credit to them and their Centres.

Several candidates lost time shading and/or dimensioning their solutions. Centres should ensure that candidates realise that neither of these processes are awarded marks in this Paper and that time is more profitably spent on the drawings.

Invariably these candidates whose results do not reflect their ability are working too slowly. Average ability candidates who complete five questions will nearly always achieve a good grade. Examiners cannot stress enough that candidates from Centres where they are trained to work quickly have a distinct advantage.

Very disappointing to note, once again, that several Centres provided paper of a very poor quality that is really unsuitable for this style of working. Additionally A4 paper is far too small and Centres are requested to supply sheets of A2 cartridge/drawing quality paper.

### Comments on specific questions

#### **Section 1**

#### *Plane Geometry*

#### **Question 1**

- (a)(i) Many trial and error solutions, rather than constructed triangles. Candidates were expected to realise that the  $45^\circ$  angle was that subtended by the chord of 80mm within a circle passing through the corners **A**, **B** and **C**.
- (ii) Surprisingly, large numbers of candidates calculated the size of their squares. Candidates entered for this examination should realise that solutions should be obtained by construction if they wished to obtain full marks.
- (b) Examiners required the 170mm length of wire be divided up with similar triangles in the ratio of 2.8:4.3:5.6 before constructing the triangle. Unfortunately many lost marks by once again calculating the three lengths.

#### **Question 2**

- (a) One or two wild solutions but this popular question was generally well drawn. Several solutions lost accuracy when candidates worked from only 8 positions of crank **OA**. For this style of question Examiners are generally expecting 12 plots.
- (b) Many candidates lost several marks because they had not noted the maximum and minimum distance of **E** with respect to fixed point **S**.

**Question 3**

Several candidates lost marks by drawing solutions out of scale. However rather more failed to determine the centres for the arcs of 85mm, 75mm and 20mm respectively, preferring to use trial and error methods with corresponding loss of marks.

A number of parabolic curves were presented rather than ellipses. Disappointingly only a handful of candidates determined the focal points for the ellipse before drawing the normal and then the tangent as specified.

Centres are respectfully reminded to stress upon candidates the need to show the geometrical construction used to realise their solutions. Failure to do so results in the loss of marks, whilst ellipse templates and French curves could have a useful role in the Mechanical Drawing Paper 2 they should not be issued to candidates for Paper 1 because candidates using them are penalised.

**Section 2***Solid Geometry***Question 4**

- (a) Not a very popular question, tackled by less than 10% of candidates. Drawing the given views appeared to cause few problems and the majority of candidates attempting this question were able to correctly position the cables in the plan view.
- (b) Regrettably only a small number of candidates were able to demonstrate that they were competent in determining true lengths using rotation of line or auxiliary views. Candidates would undoubtedly benefit if Centres were to increase the time spent on teaching this, often neglected, aspect of the syllabus.

**Question 5**

- (a) Drawing the given views caused few problems to the majority of candidates attempting this question however there were a number of out of scale solutions.
- (b) The auxiliary plan was generally correct although many candidates sketched rather than constructed the semi-ellipse generated when the R20 semicircle was projected onto this view. A number of scripts showed the auxiliary view incorrectly projected from the given plan instead of the elevation.
- (c) A relatively small number of candidates attempted the second auxiliary elevation. There were however some excellent solutions. Candidates projecting from the original plan rather than their first auxiliary view was a common error and a number of candidates stepped off heights incorrectly because they worked from the wrong base line.

**Question 6**

The majority of candidates completed the given plan views of this popular question satisfactorily. Where candidates had not taken at least 12 plots for determining the intersection between the two pipes, their accuracy was compromised with a corresponding loss of marks. Centres should ensure that their candidates realise that Examiners expect cylinders in questions such as this to be divided up into a minimum of 12 generators if full marks are to be achieved. Several solutions for the development were for the wrong piece of pipe. However, generally candidates who had developed the outline of piece **AB** were able to correctly determine the true shape of the hole.

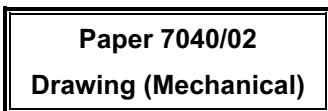
**Question 7**

Many solutions submitted went no further than the outline of the given blank. Whilst the majority of candidates were able to construct the outer helices for the thread correctly many failed to construct the core. Other common errors were: working from 8 instead of 12 generators; and not appreciating that a RH and LH thread was required for the separate portions.

**Question 8**

One of the more popular questions. Pleasing to note that all solutions were in isometric projection, nevertheless several candidates had let the Tee Square and Set Square slip affecting accuracy. Generally most candidates submitted creditable solutions for this question. The main errors were: out of scale drawings; freehand instead of constructed isometric curves; and block lying horizontally instead of corner **C** to the forefront of the view.

A number of candidates also wasted time by dimensioning their solutions for which no marks were awarded. This time should have been more profitably utilised working on other questions.

**Comments on specific sections****Section 1**

The freehand sketches were generally of a reasonably good standard.

Candidates in some Centres did not attempt this section of the Question Paper. The freehand sketching is an important part of the syllabus and should not be neglected.

**Section 2**

Most candidates answered this section reasonably well.

**Front elevation**

A common mistake was to view the required section on the front elevation in the opposite direction to the one requested in the question. The required view should not show the outside edges of the rib.

Some candidates did not draw a sectional front elevation, but drew a standard outside view of the assembled components.

The positioning of the centre of the 56 mm diameter hole caused some confusion. Some candidates aligned the centre line of the hole with the top of the Bracket and not 4 mm below the top of the Bracket as shown on the drawing.

There should have been a 2 mm gap between the Bracket and the lugs on the Cap. The Cap was often drawn flush with the Bracket top. The idea of the gap is to allow the bush to be secured in position, by tightening the nuts on to the studs.

**End elevation**

Generally well answered, by the majority of the candidates.

Some candidates did not fit the bush in position in the sectional view.

**Plan**

Of the three required views this was the worst answered.

The base of the Bracket was frequently omitted, or the cap was drawn the same length as the base. The flanges of the Bush were missed off.

*Cross Hatching* was not of a good standard. Many candidates drew lines at 45° irrespective of the relative position of the component in the sectional view.

*Dimensioning* of the drawing was not of a suitable standard, and frequently did not conform to British Standard. The dimensioning of components is an important part of an engineering drawing.

It would appear that many Centres place little importance in the dimensioning of an engineering drawing.

The symbol for the method of projection used on the drawing did not always correspond to the method used in the candidate's solution.

### **Conclusion**

The general standard of line definition and the quality of the drawings were good in this year's candidate's solutions to the questions.