

GEOMETRICAL AND MECHANICAL DRAWING

Paper 7040/01

Plane and Solid Geometry

General comments

The general standard of response was slightly better this year, and candidates appeared to have a better understanding of the syllabus. There were fewer rubric errors than in the past.

Some Centres allowed the candidates to use small extra pieces of paper for their answers, which were not attached to the main answer paper.

Question 1

This was the most popular question on the paper.

The majority of candidates constructed the ellipse and positioned the boss and hole correctly.

Many candidates did not show the construction used to determine the centres of the radii.

Only a few candidates indicated the points of tangency.

Question 2

Another popular question in which the majority of the candidates could visualise the mechanism, and consequently there were more correct solutions given for this question than for any other on this examination paper.

This part of the syllabus had been well taught in most Centres.

Question 3

This question proved difficult to the majority of the candidates. The question asked for the construction of an involute curve which then changed into an archimedian spiral at a radius of 30 mm.

Many candidates either drew an involute for the whole area, or drew the archimedian spiral for their solution.

Most of the candidates were able to draw the various curves, but were unable to fully understand the question.

Question 4

The auxiliary view question has always caused problems for many candidates, and this year was no exception.

Some Centres had clearly taught this part of the syllabus, and their candidates answered this question exceptionally well.

The candidates' answers from other Centres only copied the two given views or added a plan view.

Question 5

Isometric view.

This question was not as popular as questions on this part of the syllabus in past sessions. The majority of candidates had difficulty in interpreting the actual shape of the bracket. The sloping feature was often mistakenly viewed as two external ribs.

No candidates successfully constructed the 50 mm diameter hole on the sloping face of the bracket.

Question 6

This question was either very well answered or extremely poorly answered.

It was obvious that some Centres had given a greater amount of time to this part of the syllabus and their candidates fully understood the idea of interpenetration, whilst other candidates had little or no knowledge of this part of the syllabus.

Question 7

Only a few candidates answered this question well.

The most frequent misunderstandings were:

- (i) The truncated pyramid was NOT symmetrical.
- (ii) Each sloping edge of the pyramid was of a different length.
- (iii) It was necessary to find the four true lengths of each edge.
- (iv) The correct development could only be determined by using these true lengths, and not by drawing a radius from the apex of the pyramid and stepping off the true lengths of the base on this radial curve.

Question 8

This was not a popular question and the candidates answers varied from,

- (i) square springs with various dimensions,
- (ii) square threads of various sizes.

Most candidates were capable of constructing some form of helical curve.

GEOMETRICAL AND MECHANICAL DRAWING

<p>Paper 7040/02 Drawing (Mechanical)</p>

General comments

The two questions for this examination have been designed to fit comfortably onto a single sheet of A2 cartridge paper. Centres that issue additional sheets do not assist their candidates. Those Centres that continue to supply A3 paper put their candidates at a distinct disadvantage since there is insufficient space for the correct projection of views for **Question 2**.

It would appear, that once again, many candidates had not read the rubric and had not devoted ten minutes to reading and understanding the questions before starting their answers. Many candidates failed to complete the three views for **Question 2** with a resultant loss of marks. In the final stages of preparation for this examination candidates need to develop the ability to work efficiently without loss of accuracy or quality of presentation.

Section 1

Question 1

Many of the freehand sketches for this question were poor in respect of proportions and the quality of lines. Regrettably far too many candidates ignore the instructions not to use instruments for this question and having done so, attempt to disguise the fact by drawing over the instrument drawn lines with freehand ones. However such deception is readily identified by the Examiner and the candidate penalised by the loss of marks.

- (a) The majority of candidates were able to translate the given pictorial view of the protractor guide into the specified orthographic views. Although the question clearly asked for a third angle projection a large number of first angle solutions were presented. Several candidates offered an assembly or part assembly of the components, when, in fact, they should have been drawn separately. A large number of solutions for the clamp were drawn with the threaded portion being represented incorrectly or not indicated at all.
- (b) Dimensions, when attempted, were generally poor, with the majority of candidates showing little awareness of BS308/PD7308 conventions. This is a topic worthy of more attention by many candidates in preparing for this examination.
- (c) A parts list was omitted by most candidates, but many included statements rather than the required information in an appropriate table such as below.

REF	Name	Material	No. off
5	Washer	Low carbon steel	1
4	Pivot pin	Medium carbon steel	1
3	Protractor head	Zinc/aluminium alloy	1
2	Guide	Aluminium	1
1	Clamp	Brass	1

Section 2

Question 2

Levels of understanding and the quality of presentation varied widely for this question. Many scripts indicated that insufficient thought and time had been given to the reading of the question and to relating the given information to the details shown in the accompanying drawing of the components in **Figure 2**. The random placing of views was rare since virtually all candidates projected from one view to another. Never the less, the projection symbol did not agree with the position of the drawn end view on a number of scripts.

(a) There were a number of incorrect assemblies with the following errors being common.

Failure to draw the assembled Tap in the closed position.

Base Plate positioned the wrong way round onto the body. (The webs of Base Plate should have faced Body).

Gland and Gland Nut were placed in unworkable positions.

Fibre Washer and Jumper were omitted

Spindle threaded too far into Body resulting in an impossible assembly

The Soft Washers were missing in the majority of answers.

The hollow Body had been drawn as a solid.

The M10 Nut, although present in most solutions, was incorrectly proportioned.

The sectional view was drawn 'handed' i.e. with the Spindle and Handle drawn on the left instead of the right hand side of the view.

This year far too many candidates positioned the end view incorrectly relative to the sectional front elevation and plan. This resulted in a mixed first and third angle orthographic projection.

Being a relatively straightforward view the main errors were failure to include Webs, Body, Gland, threaded end of spindle and/or Nut rather than misplaced components.

(c) Errors of assembly in the sectional front elevation were frequently projected to the plan view. Additional errors included:

No curve of intersection shown on the outline of Gland.

Omission of thread or knurling on Gland Nut.

Nut missing or rather more frequently not drawn according to BS308/PD7308 recommendations.

End of Spindle not threaded.

(d) A surprisingly high number of candidates failed to realise the importance of stating which form of projection they had used. The expected title was Tank Tap. Machine drawing or G.C.E. 'O' Level were not acceptable. Approximately 50% of candidates failed to state the scale used for their drawings which should have been either a statement, 'Scale full-size' or preferably a ratio, 'Scale 1:1'.