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FOREWORD

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

GCE Advanced Level

Paper 9351/01

Applied Geometry

General comments

There was a mistake in **Question 6**. The scale given was 10 mm = 10 kN. This should have been 10 mm = 1 kN. No candidate suffered as a result of this, since suitable credit was given in all cases. Also this question was reworked in a more conventional form.

More detail is given in the question details.

Comments on specific questions

Question 1

This was a very straightforward construction question which should have been a very easy beginning to this paper. A vast majority failed to construct the tangent point for the angled line and the R20. The construction for the spacing of the holes was rare to see.

Question 2

Here again this question was one which centred upon a reasonable knowledge of the subject at a lower level. A large number of attempts began with a more or less accurate layout of the basic question, and a reasonable number did understand how to construct a half cycloid. However, a disturbing amount of answers gave a helix instead of a cycloid, and far too many divided the horizontal distance into 12 instead of 6. Only a very few managed to construct the angled cycloid or put the change-over point in the correct position.

Question 3

This straightforward auxiliary projection seemed to be beyond a large number of candidates. Most were able to lay out the question as set (for 2 marks) although there were only a few correct attempts to construct the inclined plane and to determine the true length of 'CD'.

Question 4

Here again candidates often gained the 2 marks for laying out the question as given, however it is sad to note that so many could not even do this. Rather too many did not offset the prism in plan.

A number of attempts here did not divide the square prism properly, many took the square to be round and consequently obtained an incorrect interpenetration.

Only a very few showed a correct development. An easy aspect was to draw in the correct development length – only a small number did so. Many showed the side length as that in the question, without gaining a true length.

Question 5

As expected there were very few attempts at this question, which was a sensible decision, for although many of the marks could have been gained by an O Level candidate the isometric questions are always rather time-consuming. The few who did attempt this did not do well – only one or two candidates demonstrated a thorough understanding and gained high marks.

Question 6

The sample answer given was reworked, with projections taken from the vector diagram – this was as the candidates who attempted this question answered.

There was an error in the scale of the question which inevitably made some answers small. No candidate was penalised for this and marks were awarded for any sensible scale. Those candidates who worked to the scale given were allowed a wider tolerance on the answers for RL and RR.

The Shear Force diagram was reasonably well attempted although only a few showed zero shear force.

The bending Moment diagram drawn on a horizontal base proved to be beyond most candidates, a common error being to put the support points at the ends of the beam. Very few candidates showed either position or magnitude of maximum bending moment.

Question 7

The transition piece was a very conventional one, and it was very disappointing to mark so many wrong and incomplete answers. Only very few managed to get beyond laying out the question as set. Certainly only a few seemed to recognise that it was necessary to obtain some true lengths or to triangulate.

Question 8

The construction for the piece of jewellery was not good. Here again much of the first section of the question did not require specialist A Level knowledge. Most attempts at constructing an ellipse were reasonable, although there were some attempts that did not apply the scale required, and some candidates did not use the correct axes for the half ellipse. Generally candidates did not know how to construct a normal to the ellipse, although a mark was given to anyone who at least drew lines which looked to be at right angles to the figure. The curves were generally well produced.

Many candidates did not make an attempt to find the area of the shape by integration, although there were some very good attempts. It was almost universal that candidates applied the wrong scaling factor – most seemed to believe that to multiply the answer by two instead of four was the correct procedure, forgetting that the scale applies to length and height.

Question 9

This was probably the most often attempted question in the optional section. There were a lot of good attempts at producing a performance graph. Unfortunately there were too many answers that started out incorrectly, failing to show the 25 mm offset. A lot of answers also did not draw tangential lines at the correct offset.

Paper 9351/02

Drawing: Engineering

General comments

Centres are earnestly requested to ensure that sheets of A2 drawing paper are available for this examination so that candidates are not unfairly penalised. Sheets of A3 drawing paper are simply inadequate for the size of answers required for this examination.

It would be much appreciated, in Centres where candidates use draughting paper or sticky tape for the temporary fixing of paper to the drawing boards – if invigilators could make sure the tape was removed prior to the dispatching of scripts.

Once again several candidates fully dimensioned their answers thereby losing valuable time that could have been more profitably spent on other aspects of the question.

It was disappointing to note that a large percentage of candidates were obviously not adequately prepared for the design element of this examination. Whilst the majority of candidates produced a creditable assembly of the given components of the *shaft governor*, few presented realistic solutions for the set design features indicating a limited awareness of common engineering fixings and fastenings.

Design features

- The method of attaching the *governor balls* to the *governor arms* required an 8 mm diameter pin suitably restrained. The commonly suggested solution of a nut and bolt was clearly inappropriate in this situation.
- A method of ensuring that the *governor arms* rotate with the *main shaft* required an appropriate key or spline. Grub screws and taper pins often offered as solutions would soon fail in such a situation.
- A method for attaching the *flange plate* to the *body*, incorporating the gasket, could be satisfied by suitably positioned bolts or studs and nuts with spring washers to prevent working loose in use. Super glue, mastic and welding were not considered suitable solutions.
- For connecting the 10 mm diameter pipe to the bosses of the *body* there are several suitable standard compression fittings that use olives or coned sleeves. Silicon sealant, soldering and threading the end of the 10 mm diameter tube were not acceptable.

Comments on specific questions

Question 1

It is regrettable that many candidates lose marks by failing to support their response to the *Design features* with sketches and notes. Centres should ensure their candidates are aware of this requirement of the examination in addition to the requested views.

(a) The majority of candidates completed this view, however there were a number of solutions where the lower half was also shown in section. Generally the various components were correctly assembled although several candidates did not position the line MM 50 mm to the left of line NN.

Occasionally the *governor balls* were omitted but rather more candidates failed to position the *nut* onto the *main shaft* to secure the *governor arms* in place. Sectioning was generally correct and competently executed.

(b) Several solutions were viewed from the wrong direction. However, rather more candidates drew a complete elevation or section rather than a composite view with only the right hand half in section. Surprisingly, a large number of candidates failed to include the 10 mm diameter holes in the flange of the *body*.

(c) Frequently, the view was not completed or attempted by the slower candidates. Several candidates, contrary to instructions, included the *body* and *flange plate* in addition to the requested main shaft sub assembly. Disappointing at this level, to note, several solutions were drawn in mixed projection. It was also disappointing to find a handful of plan views on the back of the drawing sheet rather than in projection with the elevations (a) and (b).

Question 2

Generally the projection symbol, when present, was in accordance with BS 308 but it was omitted from too many scripts.

Question 3

A tabulated parts list was generally included, with the majority of parts included. However, many candidates suggested unsuitable materials from which the various components might be manufactured.