



British Horological Institute

## Examiner's Report

### Certificate in Clock and Watch Servicing

#### Unit 1 : Technician Grade : Theory of Clock and Watch Servicing

Twenty one candidates submitted scripts for assessment. They were required to answer one long question from each of sections A, B, C and D, plus the twenty questions in the short answer section, E. It is important to read the instructions carefully. One candidate answered two from section A and two from section B, contrary to the instructions. The overall standard was good with few very low or very high marks. Apart from one very low scoring script, all other candidates showed a good or reasonable knowledge of the required work.

#### Section A – Clocks and Clock Servicing

**Q1 Going Train, Pillar fixings, Rack Striking.** (8 attempts) Some could not identify four different ways of fixing plates to pillars. The basic going train was well understood and all showed a sound knowledge of rack striking work with several very high scores.

**Q2 Letting down mainsprings, Going Barrel.** (13 attempts) In discussing the perils of not letting down the mainspring, few mentioned the risk of personal injury or damage. The procedure for letting down a going barrel was well known, but the fusee barrel less so. Surprisingly, the clickwork associated with the going barrel was not always fully or correctly described

#### Section B – Watches and Watch Servicing

**Q3 Basic watch train, Balance assembly, Rate adjustment.** (19 attempts) The major part of the question was to describe the balance assembly and explain how the rate can be adjusted. There were many good answers with most candidates scoring well but diagrams were seldom of a high standard. Some descriptions did not focus on the topic and included shock proof settings and poisoning. The importance of a minimal clearance between curb pin and boot was often not mentioned.

**Q4. Quartz Watch: main components, rate adjustment, quartz crystal, coil & rotor.** (2 attempts) Only one was able to answer all parts of the question, but both demonstrated a good basic knowledge of the quartz watch.

#### Section C – Escapements

**Q5 Lever Escapement.** (11 attempts) There were some good answers but the action of the escapement was not generally well understood. There was confusion between the

horns and the side of the notch, with several stating that the horns give impulse to the impulse jewel. Others confused the notch with the passing crescent, stating that the purpose of the notch is to allow the guard pin to pass the roller. Again the supportive sketches were often of poor quality.

**Q6 Recoil Escapement.** (10 attempts) All had a basic overview of the impulse, drop, recoil cycle of events, but many lacked detailed knowledge. Explanations of supplementary arc and why drop is necessary were often poor.

#### Section D – Workshop Processes

**Q7 Files, Bushing, Types of Steel.** (14 attempts) Many were able to show a good knowledge of the various types of file used in horology, but few were able to adequately describe bushing. Only one answer mentioned that bushing should be done from the inside; two candidates appeared to have little knowledge of the subject.

**Q8 Lathe Headstock, types of chuck, use of micrometer.** (7 attempts) The question required a labelled **section** of the headstock but only one candidate produced a section, the rest being external views. Descriptions of the three jaw and Jacob's chuck and split collet, lacked detail. Sketches of the micrometer were reasonably well drawn but only one candidate could name correctly the six principle parts.

#### Section E - Short Answers

Good marks were scored on this section, with several candidates answering fifteen or more of the twenty questions correctly. Only one candidate was able to give a correct alternative name for "pull-up piece" and the meaning of "tempering" was only answered correctly by five candidates. There was also some confusion between "cone pivots" and "conical pivots".

Twelve candidates submitted scripts for assessment. A broad range of ability was demonstrated, with the proportion of Passes and Pass with Merits similar to the long term average. Several candidates failed to attempt the correct number of questions. One candidate answered only three long questions, failing to attempt a question from section C, and two candidates answered five questions. If candidates answer too many questions, only the first four are assessed.

### Unit 2 : Technician Grade : Basic Practical Workshop Processes

Candidates were required to make a star wheel fitted to a collet and mounted on a blued post suitable for a carriage clock. A range of skills are necessary to complete the piece including turning brass, bluing steel, cutting a screw thread, flush riveting, filing a square and polishing flat and turned brass surfaces.

The assessment was based on the three categories of Dimensional Accuracy, Quality of Workmanship and Quality of Finish; fourteen pieces were submitted for assessment. The majority were adequate, but not of a high standard and demonstrated only a basic level of competence in the three areas. One piece was of a significantly higher standard than the rest.

#### **Dimensional Accuracy:-**

No candidate made the star wheel accurately; very few gained any marks for the root diameter and only half the candidates scored on tip diameter. A lack of consistency was the problem with measurement across different pairs of roots or points giving different results. Half the pieces had a variation of over 0.5mm and in two cases it was over 1mm.

Better accuracy was achieved with the dimensions of the collet and post and several candidates achieved maximum marks for these two items.

#### **Quality of Workmanship:-**

In several cases the fit of the collet on the post was poor with both side and end shake being excessive. A sharp corner, where the post joins the base, was rarely present and the rounded undercut at the base of the thread was often either too big or omitted. Other aspects of the threads were of reasonable quality. The tapped holes in the star wheel were generally good but a small number of candidates failed to ensure that the tap was held squarely at 90° to the work; in one instance, the error was as much as 10°.

#### **Quality of Finish:-**

Nearly all candidates left underlying scratches on the star wheel which marred the final finish. The corners and edges were poorly finished with many file and abrasive marks remaining; in some cases edges were left unfinished with very coarse file marks. A number of candidates had used blue lacquer to blue the post; this is not acceptable - no marks are awarded. This point was included in the Examiner's Report last year. The turned surfaces of the post and collet were finished to a fair standard but file and abrasive marks were often still visible on the four flats which form the square base of the post.

### **Unit 3 : Technician Grade : Technical Drawing**

The eleven candidates were required to prepare a drawing of a ratchet wheel, click and click spring assembly. Two elevations were required, a front elevation and a sectional view from below; ten dimensions were required for the front elevation together with a title block. All drawings were produced manually; CAD was not used by any candidate this year. The drawings were of an acceptable standard and all achieved a pass but none was of outstanding quality.

All candidates showed some familiarity with either first or third angle projection but in most cases the associated cone symbol was poorly drawn. Those candidates using third angle projection often drew the sectional view in the wrong position relative to the front view.

The standard of lettering varied from adequate to poor; none was of a good standard. The conventions for page layout were not always known, with only four title blocks correctly placed and three drawings did not include the page border. One candidate used the incorrect scale - 3:1 instead of 4:1.

Quality of line work left much to be desired; there was often little or no difference in weight between what should have been thick and thin lines and the proportions of dashed and chain lines were often poor. Smudging and inconsistent weight was also much in evidence. Hidden detail was often missed with five candidates omitting hidden detail entirely.

The convention for representing screw threads in end view was not widely known; eight drawings showed the side view correctly but only one correctly showed the end view.

The conventions required for sectional views were well known and candidates scored well in this area. The cutting plane and sectional view were correctly labelled in all cases and candidates correctly cross hatched the required areas and knew that screws should not be sectioned. The only real difficulty was the presence of three components which all

touched each other. This necessitated two of them being hatched in the same direction. Only one candidate knew how to deal with this situation correctly.

Only five candidates included ten dimensions, as requested; the rest including a smaller number. The correct conventions were known and applied. Arrowheads were often not the recommended size and shape, but were filled as convention dictates.

The given pictorial view was correctly interpreted in most cases with no major misunderstandings. Some features shown that were commonly omitted from one or both views were the decorative groove in the ratchet wheel, the click spring steady pin and the chamfer on the winding arbor. Also the rounded end of the winding square was not correctly drawn; *two* arcs are required to show it correctly in side view.

#### **Unit 4 : Technician Grade : Practical Clock / Watch Servicing**

Three Record of Repairs were submitted at Technician Grade. All met the requirements in respect of the number of completed items signed by a qualified member; one candidate failed to have his key processes signed.

**The Examiners exercise considerable care to ensure that there can be no error in the final mark awarded. If, however, you believe that a mistake has occurred then you may request that your paper be assessed again. The charge for remarking is £40.00 per unit, which must accompany the request. This should be received on or before 31<sup>st</sup> August 2009. The fee will be returned if it is found that as a result of the appeal process the outcome of the examination (i.e. Pass / Fail or Pass / Pass with Merit) is changed.**