

Examiner's Report, May 2010

Certificate in the Repair, Restoration and Conservation of Clocks/Watches (Watch Pathway)

Unit 3 : Final Grade Part II : The Theory of Clocks and Watches and their Repair

Seven candidates submitted scripts for assessment. They were required to answer four long questions from eight, plus twenty questions from thirty in the short answer section. The overall standard was only fair with the majority achieving the required pass standard, but none achieving a Pass with Merit. All candidates attempted four long questions, as required, but one candidate answered twenty one questions instead of twenty in the short answer section. In general, most answers showed only a basic knowledge of the topic concerned and lacked the depth of knowledge and detailed understanding expected for Final Grade Part II.

Section A

Q1. Recoil, Graham and Brocot escapements. The answers were from candidates following the watch pathway; they did not score well. The knowledge of all three types was very basic and lacking in depth and detail.

Q2. Watch date work. There was one very good answer, scoring close to full marks. Others mostly scored well on the basic action of the mechanism, but rapid correction and safety devices were not well explained.

Q3. Double push-piece and split-seconds chronographs. Most were able to describe the action of the double push-piece mechanism reasonably well but there was some confusion with the action of the brake and minute recording function. Only two candidates were fully conversant with the split-seconds mechanism and able to score highly; others understood the basic principle and were able to score some marks, but their knowledge was only superficial.

Q4. Sun and planet maintaining power and grid-iron pendulum. The candidates were clearly familiar with the action of sun and planet maintaining power and scored reasonably well, but again descriptions lacked depth and clarity. However, little knowledge of the grid-iron pendulum was shown. It is not sufficient to know merely the use of alternate brass and steel rods and be unable to draw it correctly. A correct description and drawing are required to gain high marks.

Q5. Cylinder escapement and friction in gearing. Two candidates produced very good descriptions of the cylinder escapement and scored high marks; the others were lacking in detail. All candidates had problems describing friction - the laws of friction and its cause and effect were not well understood.

Q6. Flirt action striking and missing wheel and pinion calculation. It is important to understand and be able to describe the strike and repeat action of the mechanism. The calculation required the solution to a practical gearing problem – a missing wheel and pinion; it was not well answered.

Q7. Pin pallet escapement and balance and spring. The action of the escapement was poorly explained demonstrating only a rudimentary knowledge. The necessary condition for isochronism and causes of isochronal error in the balance and spring proved very difficult for candidates.

Q8. Self winding watch. Candidates were required to describe the overall action of the self winding mechanism shown on the question paper and also describe the specific action of the "reverser" component. Answers showed little or no knowledge of how the reverser works and overall descriptions omitted important and relevant details.

Section B, Short Answers. Most candidates scored well but none achieved a maximum score. The average mark of thirteen for this section is equivalent to 65%, which is considerably higher than the overall average for the paper.

Summary

Overall the standard of candidate responses was disappointing. There were some excellent answers but the majority of candidates were not sufficiently familiar with detailed information required for final Grade Part II. The syllabus is wide and technically demanding, too many students clearly gave insufficient attention to revision in preparation for the examination. Sketches can contribute an important proportion of marks for many questions. When revising, candidates are advised to actually practise sketches and diagrams; only by trying to recall the details will the nature and relationship of components be fully understood.

Unit 10 : Final Grade Part II : The Practical Repair of Watches

The examination requires candidates to:-

1. Submit a Record of Repairs giving details of ten watch repairs
2. Service an automatic watch and a stopwatch movement.

1 Record of Repairs

Four candidates submitted a Record of Repairs for assessment. These met the requirements and were consequently awarded a pass.

2 Service an automatic watch and a stopwatch movement.

Seven candidates each submitted two watches for assessment. Two of the automatics failed to achieve the required pass standard. The remaining watches all passed with three candidates achieving a Pass-with-Merit standard, on aggregate.

Automatic watch

Candidates must take more care with cleanliness, some watches showed fingerprints and/or dust particles on the dial or inside the glass. Some watches were found to have several screws not tight enough. Movements were generally well cleaned but oiling was variable. Three were oiled correctly throughout, but others showed incorrect oiling of, for example, one pivot or the escape wheel and pallets. The self-winding work was also not always oiled correctly.

Balance springs were flat and concentric in most cases with correct curb pin clearance. One watch was not in a working condition and could not be tested. Another worked only with very low amplitude and was out of beat and losing time badly. Both of these watches failed. The others worked well with a good action and were correctly in beat or showing an acceptably small beat error. Several lost marks for showing a small losing rate, as received. Candidates should be aware that a small gain, of no more than 5 seconds a day, is required to score maximum marks for timing.

Most found and corrected either all four, or at least three, of the deliberately introduced faults. Often the faults were corrected without the candidate listing them as faults on the appropriate form. Although advised that dirt is introduced into the movements *in addition* to the four faults, several still put down, "movement dirty", as one of their four faults.

Stopwatch

General cleanliness was rather better than in the automatics. All the movements worked with start, stop and fly back functions performing correctly. Candidates had a better understanding of the mechanism this year and were more proficient at diagnosing and correcting faults. Five candidates identified and corrected all four faults, and the others three.

Oiling was mainly correct, but in every case otherwise good oiling was spoiled, and marks consequently lost, because one or two pivots were over- or under- oiled in an otherwise correctly oiled movement. It is important to achieve consistent oiling.

Unit 11 : Final Grade Part II : The Theory of Watches and Watch Restoration and Conservation

There were five candidates for this paper. One candidate answered two questions only, rather than the four required. The overall standard was low with two failing to achieve a pass standard and none achieving Pass-with-Merit.

Q1. Marine chronometer. The action of the spring detent escapement was understood but the correct names for the component parts were often not known and descriptions lacked clarity. Drawings and description of typical chronometer balance were often vague and inaccurate.

Q2. Missing wheel and pinion and duplex escapement.

Some candidates were able to calculate the correct numbers for the missing wheel and pinion but in one instance this section of the question was not attempted. All showed some knowledge of the duplex escapement but only one produced accurate sketches and full details of the action.

Q3. Mainspring calculation and Geneva stopwork.

Candidates were unable to successfully calculate the theoretical number of turns of winding from the given dimensions. Some did not know the formulae; others used diameter where radius was required. The reasons for the number of turns being fewer in practice were not well known. Only one candidate showed a good knowledge of Geneva stopwork.

Q4. The fusee. Again most showed a basic understanding of the device but lacked the expected depth of knowledge. In describing both the general action and the stopwork important principles were often missed. Candidates were not familiar with the use of the adjusting rod.

Q5. Equation work and perpetual calendar leap-year cam. Some knowledge was shown of the equation of time and that such mechanisms include a kidney shaped cam, but detail was lacking. Some aspects of the perpetual calendar were described, but the mechanism for managing leap years again lacked the detail required by the question.

Short Answers. This was a useful source of marks for most candidates. Scores were generally higher than on the long questions. The average mark of 11.4, equivalent to 57%, was higher than that for the paper as a whole.

Summary

The overall comments given for Unit 3 apply equally this paper. Generally, candidates may have read about the various topics that were examined but they were unable to recall the information at the level of detail required.

Unit 12 : Final Grade Part II : Practical Watchmaking Techniques

The syllabus requires candidates to be able to make small watch components. The assessment required the making of a balance staff for a platform escapement and three parts for a pocket watch movement; winding stem to fit, with button supplied, setting lever spring and return bar. Five candidates submitted work for this Unit and all passed, with two achieving Pass-with-Merit standard.

The balance staff

All were able to produce a staff but some candidates had difficulty with the pivot - incorrect side and end shake with one or two pivots bent due to unsuitable material or insufficient hardening. The balances were all correctly seated but only one ran perfectly true. All, however, showed only a slight poising error when tested. One candidate slightly damaged the balance spring collet in transferring it to the new staff and another refitted both spring collet and roller so that they were poorly aligned. All but one of

the split collets fitted the staff accurately, one was too loose. The finish of the staffs was good to fair; none had a high quality finish.

The Stem

These were made to the correct length, with well formed squares and pivots and were a good fit in the dial plate and barrel bridge. All but one was reliable in its action. However, only one was a good fit with the winding wheel, clutch pinion and setting lever. The thread was unfinished in one example but otherwise the finish of thread, square was good; two had an excellent finish.

Setting lever spring

One example was slightly oversize and had not been effectively hardened; otherwise they were a good match for the originals and fitted and worked well.

Return Bar

One did not fit well with the groove in the sliding clutch pinion and was also not hardened. The others were suitably hardened and fitted and worked well in conjunction with the other components. All were a good match with the original.

Finish

Although they fitted and worked well for the most part, the finish of the return bar and setting lever should have been of a higher standard. The underside was particularly poorly finished and in one case not at all. There were sometimes quite deep scratches left in the metal when the final polish was applied. On some parts the finish was not uniform, being rough in some areas and polished in others.

Unit 8 / 13 : Final Grade Part II : The Practical Restoration / Conservation of Clocks / Watches

Candidates are required to provide a portfolio of illustrated documentation of the restoration or conservation of five clocks or watches, each needing complex repairs that require the use of advanced repair techniques, under the headings of:-

- a. Appraisal
- b. The Conservation / Restoration Process
- c. Justification of the Conservation / Restoration Approach
- d. Research

Two candidates submitted portfolios. Both candidates' work met the published criteria but each had difficulty arranging the required additional information appropriately under the above headings. Discussion on different ways of carrying out the work and reasons for adopting the chosen methods are correctly placed under the heading "Justification of the Conservation / Restoration Approach" – but this sometimes appeared elsewhere. In other cases the "Justification" or "Research" heading also included a detailed description of the work carried out. The headings are provided to make the preparation of the Portfolio easier for the candidate and to simplify marking. Whilst Examiners do try to include all content which is incorrectly placed within a heading, marks can be lost.

In the work of both candidates, the supplementary material varied in quality from item to item. As all items carry equal marks, two or more low scoring items make a high overall total very unlikely.

1. **Appraisal:** Generally sound, with candidates able to identify what new work was required and whether pre-existing repairs were still sound. Photographs of the movements as received should augment this section but were seldom included.
2. **The Conservation Restoration Process:** Descriptions of the processes were mostly good or at least adequate, but the use of photographs and diagrams was not always appropriate. In some cases where new components were made by the candidates, there were no photographs of the finished items. In other cases photographs of "new items" were shown in a rough, unfinished state without explanation, leaving the Examiners in doubt as to whether they were actually finished before fitting, or left rough.
3. **Justification of the Restoration / Conservation Approach:** The approaches adopted in the candidates' work were all sound and appropriate to the piece, but not always well justified. Reasons why candidates felt their chosen approach to be a good one were often present and correct but there was little or no mention of other possible approaches and reasons why they felt their approach to be better than the alternatives.
4. **Research:** Sometimes research into makers yielded a substantial amount of information but often there was evidence of simply looking up the maker in a single directory to find his address and nothing more or a statement to the effect that all efforts to find any information failed. Where little or nothing is known about a particular maker, candidates can still achieve a high mark for research, but only if full details are included of the steps they have taken to search for it.

The guidance notes state that, "Research to determine the design of a replacement component" is acceptable, and this is indeed so. However, the use of theoretical calculations to find the length of a missing pendulum, frequency of a missing balance, dimensions for a missing mainspring, etc. do not constitute research. Such calculations are correctly placed under the heading "The Conservation / Restoration Process" – where they will help to secure a high mark for that section.

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 31st August 2010. 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.