



Pearson

Moderators' Report/ Principal Moderator Feedback

Summer 2017

Pearson Edexcel GCSE
In Astronomy (5AS02)
Exploring the Universe

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The controlled assessment forms 25% of the overall mark for this specification. Candidates must undertake two tasks from lists that are provided in the specification. One task must be drawn from list A, unaided tasks and one task from list B aided tasks. Candidates must not undertake comparable tasks from each list. Thus if a candidate chooses A1 from the unaided list, they must not choose B1 from the aided list. These rules provided opportunity for the rich variety of tasks that were seen by the moderating team. In many cases the tasks that were chosen were able to complement the teaching of the course and enable candidates to support work they were undertaking on the written paper 5AS01. Candidates were expected to write the Design, Analysis and Evaluation aspects of the task under a high level of control.

As in previous series many candidates produced high quality work on which, clearly, a great deal of time had been spent, however in some cases centre marking remains generous for work that does not meet the criteria as set out in the specification.

It was pleasing to see that in most centres the candidates produce work that is relevant to the task set. In a few cases candidates provided unnecessary background detail that added bulk to the controlled assessment, but did not meet any of the criteria. This practice has declined significantly compared to earlier years; however there are still candidates who could save time by focusing on the assessment criteria rather than work which is tested in the terminal examination. The criteria does expect candidates to display astronomical knowledge and understanding; however it must be relevant to the task and to the point and linked into the task. Glossaries of terms do not show astronomical knowledge and understanding that is in the task context. It is expected that candidates use terms appropriately throughout their work.

Most centres provided the correct candidate record sheet and candidate declaration forms. A very few centres provided nothing other than the work the candidate did with no annotation as to how the marks the centre gave were arrived at. Centres should ensure that all samples sent for moderation have a fully completed candidate record sheet and candidate authentication form. A copy of the candidate record sheet can be found on page 59 of the specification. In this series the OPTEMS form was no longer sent out. Centres were expected to send a copy of the EDI sheet to identify the sample to the moderator. The sample should always include the work of the highest and lowest scoring candidate, irrespective of whether they were part of the original sample requested on the EDI form.

The choice of tasks was as last year wide ranging, however there remain a core group of tasks that were seen most frequently. For the unaided tasks, A1 Lunar Features, A4 Constellation Drawing, A6 Shadow Sticks and A7 Levels of Light Pollution were the most common. In the aided list the most popular were, B11 Drawings of Messier Objects, B1 Lunar Features, and B4 Constellation Photography and B6 Sundial.

It remains the case that some candidates fail to undertake the correct task as specified in the approved list in the specification. This was particularly so in the A1 Lunar Features task where some candidates undertook controlled assessments more akin to looking at phases of the moon and paid little regard to looking at the changing appearance of the three lunar features at

different times in the lunar cycle. For the A4 Constellation Drawing task some candidates appeared not to read the whole brief and failed to note magnitudes, comparisons with reference stars and where possible the colour of stars. In the aided B4 Constellation Photography and B11 Messier Object Drawing Task, it was not always clear as to whether the images were produced by the candidates or sourced from elsewhere.

Centres should ensure that candidates meet the requirements as set out in the specification. The specification should be the source of information regarding the tasks. It would greatly assist candidates if they were to write down at the start of their controlled assessment the title of the task. This would provide a focus for the candidate and ensure that the entire requirements of the task were carried out.

Centres should plan their controlled assessments into the teaching scheme so that sufficient time is allowed at appropriate times of the year to obtain observations. With robotic telescope imaging some candidates requested images too late or when the telescopes were not available and then ran out of time. If a robotic telescope is being relied upon for images the centre needs to make sure that there is sufficient time to get them. It is unacceptable to substitute stock images from a website as alternatives to the candidates own observations. No marks can be scored for the observation strand if this is done. In this series some centres experienced difficulties obtaining access to some robotic telescopes that have been used in previous series. This was due to the instruments being out of service for extended periods of time. Centres should make alternative arrangements, or undertake alternative aided tasks.

Candidates should be made aware that phone apps or computer programmes that display images of the night sky are not admissible as a means of obtaining an aided image. The specification makes clear as to what is permissible. There was a greater incidence of centres attempting to use such devices in this series; marks cannot be awarded if these apps or software are used as replacements for actual observations. In many cases candidates relied on these when their images from a robotic telescope failed to arrive or adverse weather made observations impossible. This is not an acceptable reason for using them. Centres need to ensure they plan well in advance when particular types of observations will be made and if this results in no observations being possible the task has to be changed to one that is more likely to give observations.

A large number of centres used robotic telescopes for some of the aided tasks to good effect. Where used appropriately the images produced were of high quality and the additional processing of the images gave a useful means of adding detail to the analysis of the chosen task. It should be noted that observations should be images produced from instructions given by the candidate. Pearson Edexcel provides information on the use of Robotic Telescopes in the controlled assessment section of the website, together with other useful material relating to managing controlled assessments.

Design

Some centres still awarded high marks in situations where one observing site or instrument is considered they failed to evaluate fully a number of observing sites in the unaided task or instruments in the aided task. The idea of a programme of observations being planned was not evident in the work of the majority of candidates. Intermediate marks were awarded with a closer reference to the criteria, but there was a lack of appropriate astronomical terms in the work of many candidates. To gain a mark in the 4-5 band, candidates should consider a range of sites for the unaided tasks and a range of instruments for the aided task. This requires more than a few words, it needs to be an evaluation of the sites or instruments, leading to a conclusion. Some candidates attempted to demonstrate their astronomical knowledge with lists of astronomical terms in a glossary. This is not appropriate for a controlled assessment, candidates need to show the use of terms in the context of the task and in their explanation of their design and analysis and evaluation. A glossary does not give context in many cases terms are pulled together that have no relevance and it is evident that the candidate has little understanding of how the terms fit into the task. Candidates need to practice the skills to do this so they are confident when they come to produce a controlled assessment report. In addition to the instruments and sites being considered, a full programme of observations needs to be planned with repeated observations planned in. These should include dates and times and also the equipment needed. In some cases candidates dwelt excessively on trivial details such as hot drinks, food, clothing and other basic necessities that were not directly relevant to the task. Little credit is gained if these are the only aspects to be considered. Equipment details should be relevant and associated to the task set.

Observations

The quality of observations remains highly variable. Crude sketches which were unlabelled were awarded high marks by some centres, however there was less seen of this compared to previous series. In other cases excellent detailed drawings were submitted that met all the requirements. It appears that some centres were unaware of what constitutes an excellent programme of observations. In the A6 Shadow Stick task it is necessary to obtain multiple repeat readings over several days and the timing of readings should enable a good graph to be drawn to gain a mark in the 4-5 band. Some candidates started early in the morning and ended late in the afternoon with an hour between measurements. This is not appropriate; candidates should clearly focus on obtaining observations close to the local noon with small time intervals between measurements of shadow length. In the A4 Constellation Drawing task it is necessary to have multiple repeated observations of the apparent magnitudes and colours of stars. In many cases just one observation of each constellation was submitted as candidates focused on the number of constellations to be drawn and not repeating each observation several times for each of the three constellations. In both the unaided and aided Lunar Features task A1 and B1, the features selected must be visible at the times of observation and the change in the feature, not the moon phase should be the focus of the task. The link to conclusive data being produced was often lacking as a result. Candidates should provide sufficient observational data to enable full

and clear conclusions to be drawn about the problem set in the task title. Observational details should include date, time, and place, observing and weather conditions.

Analysis

There was good evidence of calculations being undertaken and these were then explained and appropriate conclusions drawn. In other cases high marks were awarded for attempts at using calculations and explanations. A series of unexplained numbers will not give a clear conclusion and hence they will elicit a lower mark. As with previous sections, some centres failed to engage with the assessment criteria and awarded high marks for comments and material that were not related to the task. Long descriptions and supplementary material were included in situations where they were not directly relevant. In the A1 and B1 Lunar Features task this was particularly the case, there were many who spent a great deal of time discussing the percentage of the Moon that was illuminated by the Sun at each phase. A discussion of the shadow lengths and relative sizes of the features based on measurements taken during the observation would have been more helpful. In the A4 and B4 Constellation Drawing/Photography task averaging detailed comparisons of observed and actual stellar magnitudes based on reference stars together with colour are expected for the higher mark band. In the B11 Drawing Messier Objects task, candidates gave descriptions of the various objects which were not creditworthy. Time should have been spent on discussing how the various objects could be rendered more visible by the use of software and filters. Candidates should be aware that there is a need to undertake some form of processing of the data obtained to score high marks in this section. Some tasks such as the A6 task on Shadow Sticks or the B6 task on Sundials, or the A8 and B8 Sunspots task lend themselves to this aspect more readily than others. Candidates should be guided by centres into choosing tasks that will meet the specification requirements for this section as fully as possible.

Evaluation

Some candidates continue to need practice in evaluating their work to enable them to securely meet the requirements of the top mark band. Some candidates spent too much time on general comments about how well or not the task went, rather than objectively discussing the procedure and their means of using data in a context appropriate to the task. Candidates sometimes wasted a good deal of space on unnecessary aspects and then wrote a few lines relevant to the criteria. In many cases feasible suggestions for extensions and improvements were offered, however in a number of cases very high marks were given for non-quantitative statements in situations where a quantitative evaluation could be made, for example in the A4/B4 Constellation drawing tasks percentage differences could be calculated between the observed magnitudes and the actual magnitudes. In the A6 Shadow Stick task the error could be calculated between the observed longitude and the actual longitude. In many tasks calculating errors is a possibility, these are just two examples. Very general comments such as 'use a better telescope' or 'look for better sites to observe from' were given high marks erroneously. Candidates need to give a justification for such comments and this was

usually lacking together with the appropriate astronomical terminology used in the context of the evaluation of the task.

Centres should be aware that an updated coursework guide has been written and is available on the Pearson Qualifications website. It has updated exemplars and commentaries on the marks awarded. This is a valuable source of information which should be accessed prior to assessing candidate work. It is strongly recommended that centres look at this before embarking on controlled assessments.

The above issues are now fully exemplified by the samples of Controlled Assessment work, each accompanied by a marking commentary, which are available from the Edexcel website at:

www.edexcel.com/quals/gcse/gcse09/Astronomy/Pages/default.aspx

