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Examiners Report January 2009

GCE

GCE Engineering (8371/9371)

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January 2009

Contents

GCE Applied Engineering
Principal Moderator's Report January 2009
Unit 2 – 6932
The Role of the Engineer

General Comments

There were 62 pieces of work submitted by a host of centres and a full range of marks were achieved within the 60 mark range. On the whole, the assessment by centre staff is now accurate with majority assessing accurately and any moderation of marks by Edexcel was slight.

Most centres now seem to have the hang of the engagement, which requires engagement and investigation of engineers and industry, and most of the candidates' work reflects some good links. The performance reflects the standard of last year and, four years in, the qualification now seems to have settled down. Centre staff are become more aware of the requirements and the candidates are being taught the material needed.

There were, however, a few centres who submitted work that did not properly address the assessment criteria across the mark bands and, here, significant moderation of marks was necessary.

Administration

Annotation and packaging continue to be concerning. Annotation should consist of the assessor making brief notes on the candidates' scripts to indicate where there is evidence of 'explanation' or 'description' or 'justification' which is required for the specific criterion's mark bands.

Unfortunately, work received in large plastic files, folders comb binders and ring binders still impedes the moderation process. The majority of centres, however, do send their samples exactly as requested – A4 paper, held together with one treasury tag in the top left hand corner.

Assessment criterion (a)

A small number of candidates still feel the need to include everything they know about engineering and the different roles of engineers around the world. This is not required for any part of the assessment criteria; neither are long introductions to the history of a chosen company, the engineer, his or her family background, etc. This section should start with a brief introduction, to set the scene, of at most half a page, and the majority of candidates did exactly this. Mark band 1 requires identification of the engineer (not the whole team, as in some cases) and some of the activities s/he normally carries out whilst at work. Developing this into relevant descriptions is then done by most candidates, with a few going on to address mark band 3 by providing clear explanations and justifications for carrying out certain activities which relate to the product or service. Some candidates achieve top marks in this section, and the majority achieve 6 or 7.

Assessment criterion (b)

A handful of candidates still interpret this section on 'technology' to be about the machines used by the engineer, and others interpret it as the software which helps them do their job. Both of these are only part of the expected content and as the specification indicates, the communications systems and control systems in use by the engineer, relevant to the product or service, also need analysing, reporting on and, again, justification for the high mark band.

A small number of candidates achieved the higher marks on this section whilst others used subheadings such as 'technologies', 'description', 'explanation' and even 'justification for use' to ensure the work addressed the mark band. If the work is of the a good standard the moderator can only agree with the score. This is a good alternative to annotation by the assessor.

Assessment criterion (c)

This section is still being confused, and even combined, with section 'd'. Many candidates are now showing some understanding of what is required and ISO9000 and BSEN numbers are being quoted for the standards, as well as the range of legislation which influenced the design, including employment law and Disability Discrimination Act, etc. Many quote health and safety legislation here, but that is the domain of section 'd'. The weakness in the coverage of this section, for the majority of candidates, is showing *how* the engineer ensures that standards are met and legislation is complied with. A few candidates made two or three simple statements, which addresses this top end section of MB3, and they achieved full, or almost full marks.

Assessment criterion (d)

Further to the comments made in section 'c', the majority of candidates generally score between 4 and 6 for this section. Health and Safety legislation abounds and a quick look at the HSE website gives many reminders and clues. The candidates need to concentrate, however, on *how* it is ensured that the legislation is being worked to. The high scoring candidates do this by making a few short statements about how someone checks by observing and recording findings, such as checking completed work sheets or job record cards, and explains how this is done.

Assessment criterion (e)

For a candidate, at this level, to evaluate and test a product for its fitness for purpose is a big challenge. The majority score between 7 and 11 marks and do not achieve full marks. The candidates who do achieve top marks for this section are generally those who choose the right topic to evaluate after testing and discussing it with their with their tutor, the engineer, or others at the workplace.

Care should be taken, when the teachers/tutors are helping candidates at the very start of this unit, to ensure they are selecting an engineer and product/service which they will be able to effectively evaluate after only being on the course for a few months. A turbine engine or a racing car, etc., does not, therefore, make a good choice of topic – along with the designer of such an item.

Assessment criterion (f)

This follows on from the previous section's evaluation and testing. Some combine 'e' and 'f' by using subheadings, such as 'evaluative statement' then 'possible improvement' and others keep the two areas separate. Either way, some candidates, and some centres, seem to have worked out the process of achieving high scores, 50-plus, only using a dozen or fewer sheets of A4 paper. The candidates get straight to the point and their reports are thorough and accurate, as is the centre assessment – in most cases.

A problem, which is especially apparent in sections 'e' and 'f', is the potential for collusion when a group work with, or are visited by, the same engineer. In every series, there are centres who have a number of candidates which report on the same company, engineer and even product or service. The difficulty arrives as the tutor tries to assess them and they have all written virtually the same. From a moderator's point of view, if there is evidence of collusion or plagiarism on two or more pieces or work, the material from that centre will be investigated to ensure compliance with proper examination procedures.

GCE Applied Engineering
Principal Moderator's Report January 2009
Unit 3 – 6933
Principles of Design, Planning and Prototyping

General Comments

Only five centres submitted work for moderation in January 2009, totalling nine candidates. Centre assessment of the work submitted was generally accurate and broadly within Edexcel's standards. Candidates in this limited cohort demonstrated an understanding of the required approach to 'Engineering' coursework where scientific and mathematic concepts were considered and there was little evidence of a 'Design & Technology' approach which focused on form and function without justification.

All coursework projects undertaken by candidates were appropriate to course requirements. The very popular Edexcel endorsed project titles 'PCB holder' and 'can shaker' were taken on by two candidates, while the remaining students pursued design and make projects focused on an angle poise lamp, pre-amplifier, and a 'green' battery charger. One centre focused the work of all students on designing and manufacturing an 'unusual' bicycle. This themed approach is often adopted by centres who have planned to maximise their resources and it lends itself to teaching the theory of the subject, so that students relate the knowledge and understanding of the subject to relevant and current practical applications.

Most centres submitted samples of work on time, and submitted marks appropriately, but some used copies of the assessment criteria photocopied from the subject specification and wrote marks on these. Where this occurred, there was no accompanying annotation, which hindered moderation.

Teacher assessment was generally accurate, the disagreements with moderated marks mainly occurred in criteria B and C.

Assessment criterion (a)

Where CAD was in evidence, drawing packages were used skilfully, but conventions such as title blocks, and appropriate dimensioning were sometimes neglected.
All candidates were able to produce some drawings that could be termed 'engineering drawings' and these usually included some industry standard symbols and drawing conventions. Most candidates now understand what the requirements of a 'range' of engineering drawings should involve and produced pictorial views, assembly drawings, exploded views etc.

Assessment criterion (b)

When planning, most candidates included a sequence of manufacturing operations, realistic timings and some quality control. Planning usually included a time chart or Gantt chart, but some charted the whole design and make process, instead of focusing only on product manufacture.

As in previous years, the quality of specifications presented varied in content and detail. Most candidates were able to identify some key points that were considered

important, but not many attempted to justify specification statements with additional information.

Sometimes, specification points that were presented were superficial and generic and lacked technical information that could have been used to evaluate the final outcome.

Assessment criterion (c)

As in all previous years so far, this assessment section caused candidates most problems. The standard of performance was disappointing and candidates failed to gain access to the higher range of marks available, although some centre assessors gave high levels of credit where there was not enough evidence to support the marks awarded.

Most candidates paid little attention to presenting alternative ideas in any detail, settling for a single solution with accompanying sketches of very similar solutions. Design ideas were not well analysed in terms of possible materials and processes that could be used in their manufacture and there was little evidence of research information being used in the designs presented, or of designs being evaluated against specification points.

Assessment criterion (d)

In this assessment section, all candidates succeeded in producing a practical outcome to their chosen problem that reflected their final design proposal and most work was competent, reflecting good levels of skill.

Despite submitting photographs of practical work, a number of images lacked the detail necessary to illustrate the complexity of task and the higher-level skills necessary to gain higher marks. A series of photographs taken over a period of time during manufacture is the ideal way of highlighting processes used and providing examples of precision and attention to detail that may not be readily noticeable in an image of the finished product.

Assessment criterion (e)

Most candidates provided appropriate evidence of oral presentations, which included hard copies of PowerPoint slides, CD-ROMs and teacher witness statements, which were generally informative and provided useful annotation regarding individual candidate performances. Where centre assessors award marks in the higher regions for criterion E, it is essential that evidence beyond simple witness statements is supplied in support of the credit given.

GCE Applied Engineering
Principal Moderator's Report January 2008
Unit 5 – 6935
The Engineering Environment

There were very low numbers submitted for this unit. There was a range of grades with the assessment by centres being reasonably accurate, if a little generous in places.

The candidates managed to find a range of industries and engineers to work with and the standard of work was good, with some sections being addressed very thoroughly and, on occasion, right to the top of mark band 3. The weak areas were found to be the extent of the justifications and clear explanations required for mark band 3.

The only administrative issue to raise with the samples moderated is the use of large folders to present the work. Please be reminded that the work should not be sent to a moderator as if it is being sent to a presentation or display table. It is requested that each candidate's work should be individually held together using one treasury tag in the top left hand corner. Anything extra only tends to impede the moderation processes.

Centre Assessors should be reminded to annotate where there is evidence of marks bands that are met in candidates introductions, as moderators are will be looking for evidence in the six sections from 'a' to 'f'.

Assessment criterion (a)

This section was quite well addressed by all candidates and very thoroughly by the high scoring candidates. Candidates who have spoken to an engineer and asked about regulations and standards produced very thorough work.

Assessment criterion (b)

This is generally an area of weakness in most series and this year was no exception in the majority of cases. Occasionally, candidates list and describe more than a dozen items, but this does not allow access to the higher mark bands. Greater depth on a handful of items with clear explanation and justification of purpose is what is required.

Assessment criterion (c)

Only one candidate had made an attempt to justify and clearly explain the energy efficiency measures and issues required for mark band 3. Many engineering companies are now making great improvements in this area of their business, but the candidates, or the engineers they speak to, are not reporting it at the depth required for higher marks.

Assessment criterion (d)

The candidates tended to attempt to achieve to meet the higher mark band requirements by breadth of coverage rather than depth. Even the highest scoring candidates for this series did not fully explain the key relevant environmental impacts of the product or service.

Assessment criterion (e)

Poorly attempted by the majority of candidates, this section was disappointingly done this year. This is surprising, as this is an area where the candidates could use all sorts of information about technologies and techniques used in the product or service.

Assessment criterion (f)

Always the difficult area in which to score highly, due to the advanced evaluative skills required. Where candidates ask the people who work with the product or service for ideas, they seem to cover irrelevant topics and wander away from the point. Even the high scoring candidates tend not to pick up all the marks available from mark band 3. The 'thorough approach' appears to be interpreted as covering a broad spectrum of ideas, without looking, in depth, at any particular idea.

GCE Applied Engineering
Principal Moderator's Report January 2009
Unit 6 – 6936
Applied Design, Planning and Prototyping

Although this unit was available, no student work was submitted for moderation this January.

Statistics

6932 The Role of the Engineer

Grade	Max. Mark	A	B	C	D	E
Raw Boundary Mark	60	46	40	34	29	24
Uniform Boundary Mark	100	80	70	60	50	40

6933 Principles of Design, Planning and Prototyping

Grade	Max. Mark	A	B	C	D	E
Raw Boundary Mark	60	48	42	36	30	25
Uniform Boundary Mark	100	80	70	60	50	40

6935 The Engineering Environment

Grade	Max. Mark	A	B	C	D	E
Raw Boundary Mark	60	51	44	38	32	26
Uniform Boundary Mark	100	80	70	60	50	40

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