

## EXAMINERS REPORT | CERTIFICATE OF COMPETENCE

# Electrical engineering manager of underground coal mines

November 2017

## Written examination

### Summary of results

Date:	6 July 2017
Number that sat:	8
Number who passed:	4

### CEE1 – Application of electrical engineering to mining

Highest mark:	48/60
Average mark:	35/60
Lowest mark:	23.5/60

#### Question 1 (total of 10 marks)

Highest mark	10/10
Average mark:	7.5/10
Lowest mark:	5/10

#### Examiner's comments

This question was handled reasonably well by most candidates, although there is still some confusion around SIL ratings and how it is reflected in equipment reliability.

#### Question 2 (total 10 marks)

Highest mark:	8/10
Average mark:	4/10
Lowest mark:	0/10

### Examiner's comments

This calculation appeared last year in the same format with different values as it was poorly completed last year. This year was similar with the candidates not understanding the basic electrical protection techniques in relation to full load current and fault levels which are fundamental to electrical engineering.

### Question 3 (total 10 marks)

Highest mark:	9/10
Average mark:	5.5/10
Lowest mark:	3/10

### Examiner's comments

There was generally a pretty good understanding of this question although the drawings and the level of detail in some was quite poor.

The earthing requirements was poorly answered with a number of candidates not answering the question and detailing the earthing requirements on the drawing – many chose to write some words on how it should look which was also poorly written.

The commissioning documentation wasn't well understood with some candidates just writing "AS3000 commissioning sheets". There are many more requirements other than what AS3000 asks for in relation to a substation i.e. earth grid testing, protection injection testing and functional testing, tx oil test results, just to name a few.

### Question 4 (total 10 marks)

Highest mark:	10/10
Average mark:	8/10
Lowest mark:	6/10

### Examiner's comments

This question was recognised quite well by most candidates.

The main concern was the lack of consistent understanding on how to process this on any other Safety Bulletin. This standard answer should be a given, but people still struggle to explain it clearly.

### Question 5 (total 10 marks)

Highest mark:	8.5/10
Average mark:	6.5/10
Lowest mark:	3.5/10

### **Examiners comments**

Many varied answers to this question. A design risk assessment should be recognised by all. This was not handled well.

Types of positioning of suitable monitoring equipment for this installation were not clearly understood. Control of people in this area was poorly handled.

### **Question 6 (total 10 marks)**

Highest mark:	6/10
Average mark:	4/10
Lowest mark:	2.5/10

### **Examiner's comments**

This question was poorly answered with candidates not having a general understanding of specific requirements in relation to power restoration after a fault or trip on the reticulation system.

Some candidates' inexperience was evident through not demonstrating an understanding of this type of installation and opting to insulate test the aerial system. A similar question has been in past papers and is still not being answered satisfactorily.

## CEE2 – Legislation and standards applicable to underground coal mines

Highest mark:	85/120
Average mark:	74/120
Lowest mark:	62.5/120

### Question 1 (total 10 marks)

Highest mark:	10/10
Average mark:	9/10
Lowest mark:	7.5/10

#### Examiner's comments

This question was handled quite well by most candidates. Again the risk management processes are still not understood by all candidates, but it needs to be as this is fundamental knowledge for industry.

### Question 2 (total 10 marks)

Highest mark:	10/10
Average mark:	9/10
Lowest mark:	8/10

#### Examiner's comments

This question was handled quite well across most candidates. "Systems and entity concepts" did confuse some candidates, and some people did not understand "pressure piling".

### Question 3 (total 10 marks)

Highest mark:	10/10
Average mark:	8.75/10
Lowest mark:	6/10

#### Examiner's comments

Candidates handled this question reasonably well. Some confusion on how to handle omitted tests and what is required for marking equipment.

### Question 4 (total 10 marks)

Highest mark:	7.5/10
---------------	--------

Average mark: 5.25/10

Lowest mark: 3.5/10

### **Examiner's comments**

Candidates had a general idea about the symbols on a certificate of conformity and the replacement of panel bolts. The two areas that the candidates struggle with was the pyramid or button headed bolt. The drawings regarding an in situ repair were also of a poor standard overall.

### **Question 5 (total 10 marks)**

Highest mark 9/10

Average mark: 7/10

Lowest mark: 4.5/10

### **Examiner's comments**

The mine winder unplanned movement question again should have been a bread and butter question about reporting an incident. Most candidates struggled with regards to detail, who to notify and, in what time periods. Incident investigation and reporting should be fundamental to the duties of the Electrical Engineering Manager.

### **Question 6 (total 10 marks)**

Highest mark: 9.5/10

Average mark: 5.5/10

Lowest mark: 2.5/10

### **Examiner's comments**

This question was produced because of the number of issues with portable buildings arriving on mine sites that are not set up in the same configuration as the mine supply.

Some candidates did not understand the earthing requirements and what would happen if you connected an IT and MEN system together.

There will be more questions in the future on this topic based on the poor understanding overall. There were only a small number of candidates that could draw an Isolation Transformer and some were lacking in detail due to poor understanding of how they work.

### **Question 7 (total 10 marks)**

Highest mark: 6/10

Average mark: 4.25/10

Lowest mark: 1.5/10

### Examiner's comments

This was a direct question from the requirements of AS3760. Again the candidates failed to answer the question in regards to what opportunities could be provided to the sites based on the standards requirements.

Many failed to answer the question in providing the operator with what can be done to remove some of the onerous testing requirements that may be in place at some operations.

Candidates did not provide any real detail or information giving the examiners any confidence that they understood the standard's requirements. Some of the tables drawn to indicate what frequencies would be used at their particular site were quite poor and lacking detail.

### Question 8 (total 10 marks)

Highest mark	9/10
Average mark:	5.5/10
Lowest mark:	1/10

### Examiner's comments

Generally a good understanding of the clause 32 requirements from one candidate. The remaining candidates provided answers that were not directly relevant to the questions.

Legislation is a fundamental requirement for an electrical engineer. Candidates should place a strong emphasis on knowing this information prior to sitting this exam.

### Question 9 (total 10 marks)

Highest mark:	5/10
Average mark:	4/10
Lowest mark:	2.5/10

### Examiner's comments

Generally candidates did not fully grasp the AS3000 requirements for access around switchboards nor the way to conduct an earth continuity check on small pump 100 metres away – some of the drawings could not be understood and were marked accordingly.

### Question 10 (total 10 marks)

Highest mark:	8.5/10
Average mark:	6.5/10
Lowest mark:	5/10

### Examiner's comments

There was a wide variety of answers to this question. Contractor management was not always recognised. Electric shock was not seen as the highest risk by several candidates when it should be. Part c) on 'live testing' was handled well generally. Don't be afraid to discuss.

### Question 11 (total 10 marks)

Highest mark: 7/10  
Average mark: 3.25/10  
Lowest mark: 0/10

### Examiner's comments

The automotive requirements for mobile plant on the surface of the mine was again not fully understood especially what the minimum standards would be as well as where the emergency stops are to be placed. The use of braided mechanical protection and the supporting of such harnesses were not well understood.

### Question 12 (total 10 marks)

Highest mark: 8/10  
Average mark: 5.75/10  
Lowest mark: 2/10

### Examiner's comments

The candidates were not all up to speed on how to apply for an exemption and what should be done at site level prior to even going down that path. There were some unrealistic time frames indicating the length of time it will take to get to the point of receiving an exemption which was from seven days through to 12 months.

## Oral examination

Date: 24 August 2017  
Number of candidates: 6  
Number competent: 0

## General comments

It is imperative that candidates listen to previous comments and feedback provided by examiners in relation to their knowledge base and the level of understanding required when answering oral questions. The oral exam places an emphasis on candidates answering all questions as if they are the electrical engineer in the role. Candidates were advised prior to the exam that no hints or prompting will be provided.

This round of assessments demonstrated that candidates are not adequately prepared to the level needed to fulfil the role before attempting the oral examination.