

May 2023

## Examiners' report

# Electrical Engineer of coal mines other than underground coal mines certificate of competence

Examiners' Report 2022 – 2023

## Written examination

CEE3 –Legislation, Australian Standards and electrical engineering applicable to open-cut mining

### Summary of results and general comments

Exam date: 28 September 2022

Number of candidates: 5

Number passed: 4

Highest mark: 85%

Average mark: 72%

Lowest mark: 53%

General comments:

The written examination saw the introduction of six essential questions. Candidates had to achieve a mark nominated in the questions that were used to assess competency as per the examination blueprinting. Overall, the written results were pleasing. However, two candidates had previously passed the written and completed the oral exam process previously. Candidates should read the questions and answer the written questions as the electrical engineer.

### Question 1 (total of 10 marks) Electric shock (essential Question)

Highest mark: 10

Average mark: 7.6

Lowest mark: 5

Examiners' comments:

This question was essential and candidates had to get a minimum of 7 marks to pass the paper. Many candidates could not draw an equivalent circuit and include all components (e.g. NER) that would make up the equivalent circuit. The calculation part of the question was just ohms law. This style of question has been asked over the last 2 years as examiners believe that the electrical engineer should be able to draw an equivalent circuit which they would use in the development of a testing plan to identify the cause of the electric shock.

### Question 2 (total of 10 marks) Bow tie analysis (essential Question)

Highest mark: 8.5

Average mark: 7.1

Lowest mark: 6

Examiners' comments:

Management of risk is a big part of the electrical engineers' function and a good understanding of all types of risk assessment techniques is expected by the examiners. Candidates are encouraged to complete at least a risk management training like G2 Risk Management Processes and have been actively involved in risk assessments at their site.

### **Question 3 (total of 10 marks) Welding - AS 1674.2 Safety in Welding allied processes**

Highest mark: 10

Average mark: 7.6

Lowest mark: 6

Examiners' comments:

Welding processes at surface mines have significantly improved over the last 10 years however, there are still several incidents reported annually involving welding equipment. Overall, this question was answered well.

### **Question 4 (total of 10 marks) Powerline management**

Highest mark: 9

Average mark: 8.7

Lowest mark: 8

Examiners' comments:

Overall, this question was answered well.

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

Highest mark: 9

Average mark: 7.6

Lowest mark: 3.5

Examiners' comments:

There was a large variation in the answers given by candidates which reflected in the marks. Candidates need to think about what they would do if they were to take over either at a new site or their current site. Electrical protection is a key control in reducing the likelihood of fires and explosions on site.

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

Highest mark: 10

Average mark: 7.7

Lowest mark: 5

Examiners' comments:

Most NSW coal mines are in lightning-prone areas. Candidates should come to the examination with an understanding of lightning theory and working knowledge of what controls their mine uses to minimise the risk from lightning.

### **Question 7 (total of 10 marks) Trailing cable**

Highest mark: 6.5

Average mark: 4.1

Lowest mark: 2

Examiners' comments:

Candidates could not draw the cross-sectional area of a dragline cable and identify the key component that makes this type of cable 'fit for purpose'. Candidates are expected to have a working knowledge of the construction of cables that are used in the surface mine to supply large electrical mobile plant.

### **Question 8 (total of 10 marks) AS/NZS 2081 Electrical protection devices for mines and quarries (essential Question)**

Highest mark: 10

Average mark: 7.7

Lowest mark: 6

Examiners' comments:

An essential question requiring candidates to get a minimum of 6 marks to pass the paper. This standard provided the bases of protection devices used at mines and candidates should have a very good understanding and knowledge of this standard. Everyone achieved competency in this question.

### **Question 9 (total of 10 marks) Terminology**

Highest mark: 10

Average mark: 8.4

Lowest mark: 7

Examiners' comments:

This question was confirming candidates' understanding of electrical acronyms, and candidates answered it satisfactorily.

### **Question 10 (total of 10 marks) Electrical engineer statutory function (essential Question)**

Highest mark: 10

Average mark: 8.6

Lowest mark: 6.5

Examiners' comments:

An essential question requiring candidates to get a minimum of 6 marks to pass the paper. Understanding the elements of the statutory function of the electrical engineer is critical in fulfilling the role. Candidates were able to demonstrate that they understood the function of the position.

### **Question 11 (total of 10 marks) Multiple choice (essential Question)**

Highest mark: 9

Average mark: 8.4

Lowest mark: 6

Examiners' comments:

An essential question requiring candidates to get a minimum of 6 marks to pass the paper. Candidates are expected to have a good working knowledge of certain Australian Standards. At the

2022 electrical briefing session, candidates were advised which standards would be involved in the 2022 examinations.

## Question 12 (total of 10 marks) Fault calculation (essential Question)

Highest mark: 9

Average mark: 5.8

Lowest mark: 1

Examiners' comments:

An essential question requiring candidates to get a minimum of 6 marks to pass the paper. Candidates are expected to be able to complete fault calculations or another style of calculation to prove that they can check work done if required by consultants. One candidate did not answer this question which brought the average mark down.

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## Oral examination

Date: 24 November 2022

Number of candidates: 6

Number deemed competent: 3

Examiners' comments:

Successful candidates were able to demonstrate that they could communicate, take control, identify risks, and apply their technical knowledge. Examiners wanted them to demonstrate how they would address and manage risks. Examiners were looking for how candidates addressed which earthing system they would require and demonstrate they had a high level of understanding of these systems and the advantages and disadvantages of each system. Candidates had to explain how they as the site electrical engineer would manage an incident/investigation that would be required if an incident occurred on their respective sites.

## More information

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## Acknowledgments

Electrical Engineer of coal mines other than underground coal mines examination panel

© State of New South Wales through Regional NSW 2023. The information contained in this publication is based on knowledge and understanding at the time of writing March 2023. However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate officer of the Regional NSW or the user's independent adviser.

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