

19 June 2025

Open Cut Electrical Engineering Certificate of Competence

Examiners' report 2024-2025

Written examination

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

Summary of results and general comments

Exam date: 4 September 2024

Number of candidates: 5

Number who passed: 4

Highest mark: 83.5%

Average mark: 70.3%

Lowest mark: 50.5%

Examiners' comments:

Candidates for this year's exam demonstrated overall strong performances, with candidates showing a solid understanding of essential areas such as the role of the statutory electrical engineer, arc flash management, and practical aspects of AS/NZS 3007.

Key strengths were noted in handling electrical protection and safety management, particularly in relation to arc flash categories and PPE requirements.

However, there were notable challenges in areas such as understanding the rolling sphere method for lightning protection, defining welding categories, and recognizing the applicability of AS/NZS 4871 to both quarries and mines.

Additionally, there was room for improvement in structured approaches to risk management and consultation.

Question 1 – WHS(MPS) Reg 2022 (ESSENTIAL)

Candidates must get 6 out of 10 marks to pass this question.

Highest mark: 10

Average mark: 8.6

Lowest mark: 3

Examiners' comments – this question was essential, requiring candidates to get at least 6/10 to pass. Candidates are expected to have a good knowledge of the defined role of the statutory electrical engineer & electrical live work requirements. Candidates were informed of this expectation at this year's briefing session. Most candidates answered this question well.

Question 2 – Isolation

Highest mark: 8

Average mark: 6.7

Lowest mark: 5.5

Examiners' comments – part b contained essential elements requiring candidates to identify risk management and consultation as part of their process. This was done well by all candidates. Answers indicate that candidates are not taking a structured approach to developing the safe system of work.

Question 3 – Earthing

Highest mark: 9

Average mark: 6.7

Lowest mark: 4

Examiners' comments – candidates are expected to be familiar with Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 section 34 – Electrical Safety. Earthing is a fundamental aspect of electrical design, as such it is expected that candidates will possess the required knowledge to manage earthing systems onsite. SSHR & ESHR consultation was overlooked by most candidates.

Question 4 – Protection & Arc Flash

Highest mark: 9

Average mark: 7.3

Lowest mark: 5.5

Examiners' comments – electrical protection & arc flash management have been the focus of multiple presentations at the Surface electrical engineers forums & EESS. Candidates are expected to have a sound understanding of arc flash categories, reduction strategies and PPE requirements. This question was handled well by all candidates. TCC understanding greatly improved on previous exams.

Question 5 – Calculations

Highest mark: 8.5

Average mark: 6.5

Lowest mark: 4

Examiners' comments – high voltage installations on mine sites often have multiple configuration modes available. The statutory electrical engineer needs to be able to identify which configuration best suits the needs of the operation. It is important that candidates understand the impact changing operating mode has on fault levels.

Question 6 – Lightning

Highest mark: 10

Average mark: 7.3

Lowest mark: 4.5

Examiners' comments – AS1768 is a key standard utilised for design & management of lightning protection systems on mines. Rolling sphere was poorly understood by candidates.

Question 7 – Welders & Generators

Highest mark: 10

Average mark: 8.1

Lowest mark: 6.5

Examiners' comments – coal mines often utilise large numbers of welding machines. Electrical standards of welding equipment have been identified as an issue at multiple sites in NSW, often the subject of Statutory Enforcement Notices. Candidates struggled with the definition of welding categories.

Question 8 – AS3000

Highest mark: 9

Average mark: 7.7

Lowest mark: 6

Examiners' comments – AS/NZS 3000 is one of the few standards directly referenced in legislation. It is expected that candidates have a good understanding of mandatory tests and equipment classes. Candidates need to be aware of the latest acceptable values for earth continuity.

Question 9 – AS3007

Highest mark: 8.5

Average mark: 6.3

Lowest mark: 4.5

Examiners' comments – this question related to the practical elements within AS/NZS 3007. Generally well managed by all candidates.

Question 10 – AS4871

Highest mark: 7

Average mark: 5.1

Lowest mark: 2

Examiners' comments – most candidates failed to identify that AS/NZS 4871 applies to Quarries and mines. Candidates failed to identify requirements for interlocking.

Oral examination

Exam date: 20 November 2024

Number of candidates: 4

Number deemed competent: 1

Examiners' comments:

Q1 – reclaim tunnel:

- while candidates had some general understanding of the operating philosophy and hazards associated with active stockpile reclaim tunnels, their understanding of hazardous area classification (HAC), hazardous zones, and the associated equipment protection levels (EPLs) required to manage these risks was lacking. Most candidates did not outline processes to manage the equipment requirements and competency to maintain equipment in all classified areas of the reclaim tunnel.
- candidates need to be familiar with the triggers for withdrawing personnel and removing power from reclaim tunnels, as well as the ongoing maintenance and inspection requirements.

Q2 – ESSHR consultation and conveyor upgrade

There were two main areas of focus in this question: workforce consultation and collaboration, and the practical application of the lifecycle management process – specifically the installation, commissioning, and maintenance of functional safety systems. Candidates need to demonstrate a solid understanding of the SIL determination process and the subsequent requirements for installing, commissioning, and maintaining these systems to ensure the high integrity of the safety systems.

Q3 – electric shock management:

Candidates generally demonstrated an understanding of electric shock response plans and incident management processes. Continued knowledge of legislative requirements is required, including the

requirements around dangerous incident notification process. Their understanding and application of a methodical investigation and testing plan to determine the source of an electric shock was also explored. Some candidates handled this question well.

Post oral examination

Exam date: 30 May 2025

Number of candidates: 3

Number deemed competent: 2

Examiners' comments:

3 scenarios were presented to candidates involving earthing, protection, and project management. Earthing systems and project management were handled well by candidates. Candidates need to understand electrical engineering hazards and controls at a deeper level to understand why controls are required. They need to clearly explain the scope they would provide subject matter experts and the detailed deliverables they would expect. It is not sufficient to just engage a subject matter expert and trust their deliverable without having the ability to review the quality and applicability of it.

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