

May 2023

Examiners' report

Electrical engineering manager of underground coal mines certificate of competence

Examiners' Report 2022 – 2023

Written examination

CEE1 – Electrical engineering applicable to underground coal mines

Summary of results and general comments

Exam date: 28 September 2022

Number of candidates: 2

Number passed: 2

Highest mark: 78%

Average mark: 73%

Lowest mark: 68%

The written examination saw the introduction of 3 essential questions in CEE1 and 5 in CEE2. Candidates have 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, 1 candidate had previously passed the written and completed the oral exam process.

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

Highest mark: 10

Average mark: 8.5

Lowest mark: 7

Examiners' comments:

An essential question requiring a minimum of 7 marks to pass the question and paper. Candidates answered this question well however, one candidate did miss putting the NER in the drawing of an equivalent circuit. The calculation part of the question was just ohms law. Note, this question was based on a real incident that occurred and was communicated in 2022.

Question 2 (total of 10 marks) Unplanned movement

Highest mark: 8

Average mark: 7.8

Lowest mark: 7.5

Examiners' comments:

This question was answered well however candidates lost marks in the first part of the question involving, 'What would be your initial steps' after receiving the information that an unplanned movement had occurred.

Question 3 (total of 10 marks) Cable construction

Highest mark: 9

Average mark: 8.5

Lowest mark: 8

Examiners' comments:

Candidates were able to draw the cross-sectional area of a shuttle car cable and identify key components that make this type of cable 'fit for purpose'. Candidates are expected to have a working knowledge of the construction of cables that are used in underground mines to supply electrical face equipment. This working knowledge should also extend to the repair of these cables.

Question 4 (total of 10 marks) Winder

Highest mark: 5

Average mark: 5

Lowest mark: 5

Examiners' comments:

This question was based an incident however involved a shaft winder and examiners are of the opinion it should have been answered better. Candidates are expected to know what type of incidents are to be reported immediately or as soon as practicable as per the WHS (MPS) Regulations.

Question 5 (total of 10 marks) Lightning management underground (essential Question)

Highest mark: 8

Average mark: 7.3

Lowest mark: 6.5

Examiners' comments:

An essential question requiring a minimum of 5 marks to pass the question and paper. Candidates were able to explain theory and controls to mitigate lightning events that can cause fires or explosions underground. Candidates should also have a working knowledge of how lightning protection systems are installed and maintained across their site. Most NSW coal mines are in lightning-prone areas.

Question 6 (total of 10 marks) Fault calculation (essential Question)

Highest mark: 6.5

Average mark: 6.5

Lowest mark: 6.5

Examiners' comments:

An essential question requiring a minimum of 6 marks to pass the question and paper. Both candidates only just achieved basic competence in this question. Candidates should be able to complete basic fault calculations.

CEE2 – Legislation and Australian Standards applicable to underground coal mines

Summary of results and general comments

Exam date: 28 September 2022

Number of candidates: 2

Number passed: 2

Highest mark: 64%

Average mark: 62%

Lowest mark: 60%

Question 1 (total of 10 marks) AS/NZS 2290.1 – Electrical equipment for coal mines

Highest mark: 4.5

Average mark: 4.5

Lowest mark: 4.5

Examiners' comments:

Overall, a disappointing result. AS/NZS 2290.1 Electrical equipment for coal mines - Introduction, inspection and maintenance for hazardous areas is a key standard for managers of electrical engineering and forms the bases of pre overhaul and overhauls of explosion protected plant. During the 2022 electrical briefing session, a list of standards were given and AS/NSZ 2290.1 was part of that list.

Question 2 (total of 10 marks) WHS(M&P) Regulation Schedule 2

Highest mark: 4

Average mark: 3.5

Lowest mark: 3

Examiners' comments:

This question was poorly answered. Candidates should know the regulatory requirements to be addressed when developing an electrical engineering control plan. Candidates should understand how the electrical control plan is developed and what it contains for their site. When candidates undertake site visits, this may be a good starting point to understand what risks the site has.

Question 3 (total of 10 marks) WHS(M&P) Regulation Clause 79 (WHS(MPS) Regulations 2014)

Highest mark: 7.5

Average mark: 7.0

Lowest mark: 6.5

Examiners' comments:

Explosions protection for electrical plant is managed by the manager of electrical engineering. Examiners expect candidates to have a high level of understanding of all aspects of explosion protection and this Regulation.

Question 4 (total of 10 marks) AS/NZS 60079.25 Explosive atmospheres

Highest mark: 5.5

Average mark: 5.3

Lowest mark: 5

Examiners' comments:

Candidates are expected to have a high level of knowledge on flameproof, intrinsic safety and increased safety explosion protection techniques. They are also expected to understand other explosion techniques that are used across a mine site. This question was based on exploring candidates' understanding of intrinsically safe systems.

Question 5 (total of 10 marks) Electrical engineer statutory function (essential Question)

Highest mark: 8

Average mark: 8

Lowest mark: 8

Examiners' comments:

This was an essential question requiring candidates to get a minimum of 6 marks to pass the paper. Candidates were able to demonstrate a good understanding Schedule 10 of the WHS(MPS) Regulation.

Question 6 (total of 10 marks) AS/NZS IEC 60079 (essential Question)

Highest mark: 7

Average mark: 7

Lowest mark: 7

Examiners' comments:

An essential question, candidates are expected to have a high level of knowledge of flameproof (Exd). Candidates only demonstrated basic competency in this question.

Question 7 (total of 10 marks) Bow tie analysis (essential Question)

Highest mark: 6.5

Average mark: 6.3

Lowest mark: 6

Examiners' comments:

Candidates should come to the examination with a high level of knowledge of risk assessments and which type of risk assessment should be used. Candidates are encouraged to complete at least G2 risk management training (or equivalent) as part of their studies to sit the examinations.

Question 8 (total of 10 marks) Emergency preparedness

Highest mark: 8

Average mark: 6.3

Lowest mark: 4.5

Examiners' comments:

Emergency Preparedness is now a prerequisite to sit the examinations. Candidates should also know the requirements of the WHS (MPS) Regulations, and what the legislated requirements are.

Question 9 (total of 10 marks) Intrinsic safety (essential Question)

Highest mark: 7.5

Average mark: 6.8

Lowest mark: 6

Examiners' comments:

Candidates are expected to have a high level of knowledge of intrinsic safety (Exi). Candidates only demonstrated basic competency in this question. Being able to read certificates of conformity and understand how to match IS parameters is an important part of the electrical engineering manager role

Question 10 (total of 10 marks) Effective communication (essential Question)

Highest mark: 10

Average mark: 9.3

Lowest mark: 8.5

Examiners' comments:

Essential question. This question looked at AS/NZS 3800 Repair and overhaul. Candidates answered this question well.

Question 11 (total of 10 marks) Protection

Highest mark: 6

Average mark: 5

Lowest mark: 4

Examiners' comments:

Managing electrical protection is an important part of the electrical engineering manager's role. This question was based on the candidates starting a new role and what they would do when they found out that the electrical infrastructure was not satisfactory. The question involved the candidate demonstrating what they would do and what information they would be expected to give to a consultant to complete a new load flow study for the mine. Candidates should make themselves familiar with the current electrical load flow documents at their sites. This question was only asked in its very basic form. Candidates were not asked about what effect motor contribution would have or changes made by the supply authorities.

Question 12 (total of 10 marks) Terminology

Highest mark: 6

Average mark: 5.5

Lowest mark: 5

Examiners' comments:

This type of question has been asked a few times now. It's still surprising to the examiners that candidates are not achieving full marks. All the terminology that was asked is in use at all mines.

Oral examination

Date: 24 November 2022

Number of candidates: 4

Number deemed competent: 1

Examiners' comments:

The successful candidates were able to demonstrate in each question they could communicate and apply their technical knowledge. Candidates were expected to identify the risks associated with a switch yard and how they would address and manage these risks. Examiners were looking for how

candidates addressed which earthing system they would require and demonstrated they had a high level of understanding of these systems and the pros and cons of each system. Candidates had to explain how they, as the site electrical engineer, would manage an incident and investigation at their respective sites.

More information

Regional NSW

Resources Regulator

Mining Competence Team

T: 1300 814 609 (Options 2 and Options 3)

Email: mca@regional.nsw.gov.au

Acknowledgments

Electrical Engineering Manager of 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 May 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.

RDOC23/105794