

Mechanical engineer of coal mines other than underground mines certificate of competence

Written examination held 9 August 2018

CME3 – Safety and mining legislation applicable to open-cut mines

Instructions to candidates

Unless otherwise stated all references to Act and Regulations are to the *Work Health and Safety Act 2011*

Work Health and Safety Regulation 2011

Work Health and Safety (Mines and Petroleum Sites) Act 2013

Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

Part A – Legislation

All questions are to be attempted

Candidates must provide reference to all relevant legislation and standards in their answers

Refer to the relevant legislative provisions when answering all questions

Question 1

1. WHS Act section 19 (3) relates to primary duty of care. What is your interpretation of how these requirements relate to, and are managed by, the mechanical engineer? (16 marks)
2. There are legislative requirements on the mine operator with respect to managing work at heights and the risk of falls. As mechanical engineer how do you manage each of these requirements? (9 marks)

Question 2

Part 1

A fitter at the coal preparation plant has been replacing a valve actuator when a section of grid mesh flooring has given way beneath them. They fell approximately 3 metres to the ground below, suffering a compound fracture to the leg, and been transported to hospital in an ambulance for surgery. You notice on the ground below there are three grid mesh retaining clips near the fallen section of mesh, two of which look like they have been there for some time.

1. Who must be notified of an incident? (2 marks)

2. Within what time frame must they be notified of this incident? (1 mark)
3. How is the notification to be made? (1 mark)
4. What clause(s) could you notify under? Identify all applicable clauses to the incident. (6 marks)
5. Under what circumstances can an incident scene be disturbed? (5 marks)

Part 2

The scene is preserved and you accompany the Resources Regulator inspector to the site. The inspector issues a prohibition notice stating “No persons are to access elevated walkways within all areas of the CHPP including conveyor gantries, except for the purpose of maintaining workers safety.”

1. Under what circumstances can a prohibition notice be issued? (3 marks)
2. What must the prohibition notice contain? (3 marks)
3. What must you do when you are given direction under the notice? (1 mark)
4. Who is eligible to apply for review? (3 marks)

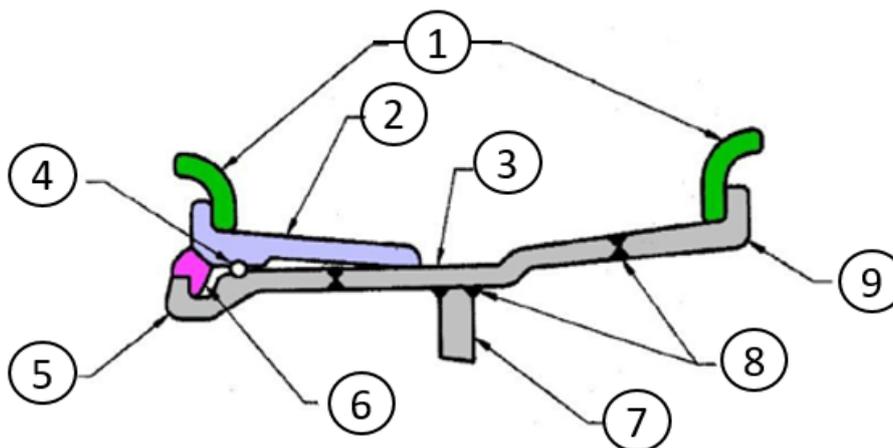
Part B – Legislation knowledge and application

Instructions as per Part A

Question 3

Part 1 – Five (5) piece rim components

1. Identify each of the numbered items in the sketch below (9 marks)



1. _____
2. _____
3. _____
4. _____
5. _____

6. _____
7. _____
8. _____
9. _____

Part 2 – Tyre and rim system management

You are observing a local contracting company changing the front tyre on a rear dump truck.

- (a) List five (5) major hazards you know the workers are exposed to? (5 marks)
- (b) List eleven (11) controls you would expect the contracting company to have in place? (11 marks)

Question 4

Part 1 – Hydraulic schematic circuit

1. Draw the Australian Standard schematic symbols for the following hydraulic components
 - i. tank (1 mark)
 - ii. in line filter (1 mark)
 - iii. double acting cylinder (1 mark)
 - iv. pressure relief valve (1 mark)
 - v. three position, four port, open centre, spool type directional control valve with hand lever operation and spring centering (1 mark)
 - vi. electric motor driven fixed displacement pump (1 mark)
2. Use all the components identified in question a) above to draw an operational schematic circuit? (6 marks)
3. Describe how you consider the schematic drawn in b) above will operate through its full sequence of operation. (6 marks)

Part 2 – Fluid power management

1. What are the six (6) key issues associated with pressurised fluids identified in *NSW code of practice: Mechanical engineering control plan*? (6 marks)
2. To which mining design guideline (MDG) would you refer in relation to fluid power system safety at mines? (1 mark)

Question 5

You are the mechanical engineer at a coal operation that has decided to implement a new process to recover and reprocess old tailings material using a dredge.

1. List five (5) processes you would undertake to ensure the dredge is fit for purpose? (5 marks)
2. Drowning is considered one of the key hazards associated with the use of dredges. List five (5) controls you consider are required to effectively manage the risk. (5 marks)
3. *NSW code of practice: Mechanical engineering control plan* section 4.5.8.5 Dredges lists 13 key risk issues associated with dredges. List five (5) of these, not including drowning. (5 marks)
4. From an engineering perspective list ten (10) controls you would consider implementing, specific to dredges, to manage the hazards associated with the operation of a dredge over its life cycle? (10 marks)

More information

NSW Department of Planning and Environment

Resources Regulator

Mining Competence Team

T: 02 4063 6461

Email: minesafety.competence@planning.nsw.gov.au

Acknowledgments

Mechanical Engineer of coal mines other than underground examination panel

© State of New South Wales through the NSW Department of Planning and Environment 2018.

This publication is copyright. You may download, display, print and reproduce this material in an unaltered form only (retaining this notice) for your personal use or for non-commercial use within your organisation. To copy, adapt, publish, distribute or commercialise any of this publication you will need to seek permission from the NSW Department of Planning and Environment.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (August 2018). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the NSW Department of Planning and Environment or the user's independent advisor.

DOC18/566286