NSW GOVERNMENT

NSW Resources Regulator

EXAMINATION PAPER

Mining engineering manager of underground coal mines certificate of competence

MB1 Mining Legislation

Written examination held 21 October 2020

Instructions to candidates

Unless otherwise stated all references to the Act and Regulations are to the:

- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2017
- Work Health and Safety (Mines and Petroleum Sites) Act 2013
- Work Health and Safety (Mines and Petroleum Sites) Regulation 2014
- Explosives Act 2003
- Explosives Regulation 2013

DOC20/842590

Question 1

The Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 (WHS (M&PS) Reg 2014) Clause 179 lists the Dangerous incidents.

a) List the 27 incidents. (7 marks)
b) Part 3 of the Work Health and Safety (Mines and Petroleum Sites) Act 2013 (WHS (M&PS) Act 2014) relates to Incident Notification. Explain in your own words Sections 14, 15, 16 and 17. (13 marks)

Question 2

The WHS(M&PS) Reg 2014 Clause 33 - Notification of high risk activities.

a) What are the requirements of this clause? (10 marks)

Schedule 3 high risk activities, part 3 section 10 refers to sealing.

b) What are the requirements for this section? (10 marks)

Question 3

The WHS(M&PS) Reg 2014 Clause 39 - Ensuring exposure standards for dust and diesel particulate matter not exceeded.

a) What are the requirements of this clause? (10 marks)

The WHS(M&PS) Reg 2014 Clause 57 - Requirements if air quality and air safety standards not met.

b) What are the requirements of this clause? (10 marks)

Question 4

The WHS(M&PS) Regulation 2014 Clause 88 - Duty to prepare emergency plan.

a) What are the requirements of this clause? (10 marks)

Schedule 7 - Matters to be included in emergency plan.

b) What are the requirements of this schedule? (10 marks)

Question 5

The WHS(M&PS) Act 2013 Section 30 – Suspending operations

a) What are the requirements of this section? (20 marks)

NSW Resources Regulator

CM9 reference: DOC20/842590

NSW Resources Regulator

CANDIDATE NUMBER: **EvtNot** _____

(MB1)

Mining engineering manager of underground coal mines

EXAMINATION FOR CERTIFICATE OF COMPETENCE

Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

MB1 Mining Legislation

Legislation to be assessed:

Unless otherwise stated all references to Act and Regulations are to:

Work Health and Safety Act 2011
Work Health and Safety Regulation 2017
Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2014
Explosives Act 2003
Explosives Regulation 2013

Examinations are held at the following location:
Kurri Kurri TAFE

10:50 am - 12:00 pm
21 October 2020

Q #		Mark	Available mark	Marked by *Initials*	Summary comments to justify
1	a		7		
	b		13		
	Total		**20**		
2	a		10		
	b		10		
	Total		**20**		
3	a		10		
	b		10		
	Total		**20**		
4	a		10		
	b		10		
	Total		**20**		
5	a		20		
	Total		**20**		
PAPER	**TOTAL**		**100**		*Marks checked by:*

NSW GOVERNMENT

NSW Resources Regulator

EXAMINATION PAPER

ANSWER BOOKLET

- Answers are to be written in the allocated spaces within this booklet ONLY.

- Answers must be written in pen, however, drawings may be completed in pencil.
- This booklet is not to be altered in any way, pages are not to be added or removed.

- Additional space is provided at the end of the paper. Please label which question the answer relates to.

DOC20/842590

Question 1 (total 20 marks)

The Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 (WHS (M&PS) Reg 2014) Clause 179 lists the Dangerous Incidents.

a) List the 28 incidents (7 marks)

	/7

b) Part 3 of the Work Health and Safety (Mines and Petroleum Sites) Act 2013 (WHS (M&PS) Act 2014) relates to Incident Notification. Explain in your own words Sections 14, 15, 16 and 17. (13 marks)

	/13

Question 2 (total 20 marks)

The WHS(M&PS) Reg 2014 Clause 33 – Notification of high risk activities.

a) What are the requirements of this clause? (10 marks)

	/10

Schedule 3 High Risk Activities, part 3 section 10 refers to 'sealing'.

b) What are the requirements for this section? (10 marks)

/10

Question 3 (total 20 marks)

The WHS(M&PS) Reg 2014 Clause 39 - Ensuring exposure standards for dust and diesel particulate matter not exceeded.

a) What are the requirements of this clause? (10 marks)

/10

The WHS(M&PS) Reg 2014 Clause 57 - Requirements if air quality and air safety standards not met.

b) What are the requirements of this clause? (10 marks)

	/10

Question 4 (total 20 marks)

The WHS(M&PS) Regulation 2014 Clause 88 - Duty to prepare emergency plan.

a) What are the requirements of this clause? (10 marks)

/10

Schedule 7 Matters to be included in emergency plan.

b) What are the requirements of this schedule? (10 marks)

/10

Question 5 (total 20 marks)

The WHS(M&PS) Act 2013 Section 30 – Suspending operations.

a) What are the requirements of this Section? (20 marks)

	/20

END OF QUESTIONS

END OF PAPER

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NSW Resources Regulator

EXAMINATION PAPER

Mining engineering manager of underground coal mines certificate of competence

MB3 Mining practice

Written examination held 22 October 2020

Instructions to candidates

Unless otherwise stated all references to the Act and Regulations are to the:

- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2017
- Work Health and Safety (Mines and Petroleum Sites) Act 2013
- Work Health and Safety (Mines and Petroleum Sites) Regulation 2014
- Explosives Act 2003
- Explosives Regulation 2013

Choose 4 questions from Section A – Underground coal mining and 1 question from Section B – Surface coal mining sections.

Section A – Underground coal mining (Choose 4 questions only)

Question 1

The shallow cover longwall mine you are mining engineering manager of has large rolls in the seam that creates plenty of drastic contour changes. Over the past several weeks there has been a marked increase in water make due to recent heavy rain.

As a result of a failed 'fish' tank in the pumping system, the roadway to the 'bleeder' road and ventilation inbye the longwall has been cut off.

a) What are the main issues associated with this event? (4 marks)

b) What immediate actions would you implement? (8 marks)

c) What long term actions would you implement? (8 marks)

Question 2

You are the mining engineering manager of a mine that operates a 'drift winder' system for both personnel and materials transport in the 980-metre-long main drift.

At 1:15 am on Sunday morning you receive a phone call from the shift undermanager, who is new to the mine, informing you that the 'dolly car' has derailed while taking down a full trailer of timber props and a trailer of bulk stonedust bags at the 635-metre marker.

a) What are your immediate concerns? (2 marks)

b) What are your immediate actions? (4 marks)

c) Explain in detail how this incident would be recovered. (10 marks)

d) What are your long-term actions to prevent a re-occurrence? (4 marks)

Question 3

You are the mining engineering manager of an underground coal mine; you have just been informed that the highwall above the men and materials and conveyor portals has collapsed blocking access and narrowly missing an underground (UG) man transport travelling out of the mine. There is a 3rd pedestrian egress from the mine via an old fan portal.

a) Describe your immediate actions on receiving the phone call. (5 marks)

b) What notifications are required to external stakeholders? (5 marks)

c) Describe in detail the process you will implement from first response through to resuming production. (10 marks)

Question 4

You are the mining engineering manager of a longwall mine that is partway through a longwall (LW) relocation, 40% of the shields have been recovered without issue. You are notified by the shift undermanager that the shields 40m outbye the E frame are starting to yield and the strata support is beginning to fail over a 15m zone in front of the shields.

a) Describe your immediate actions on being informed. (5 marks)

b) List the possible causes of the strata event. (5 marks)

c) Describe how you would rectify your listed causes to recommence LW recovery and what controls would be implemented to prevent the issue re-occurring. (10 marks)

Question 5

You are the new mining engineering manager of a longwall mine in a 5m coal seam at a depth of 360m. The development roadways are 3.8m high x 5.4m wide that are supported with 1.8m roof and rib bolts plus mesh.

Over the past 2 months, the mine has had a number of rib failures whilst developing the gateroads. This has resulted in 2 near misses and a bolter operator being transported to hospital with bruising and cuts to the shoulder. All continuous miners (CM's) are bolter miners in a similar configuration.

a) Describe the process you will implement to determine the cause of the rib failures. (5 marks)

b) Who would you involve in this process? (5 marks)

c) List the possible causes of the rib failures and the controls you would implement to safely mine coal. (10 marks)

Question 6

You have recently started as the mining engineering manager at an old underground mine that is reasonably gassy and is now on its 23rd longwall block. The seam is 2.2 metres thick. There are 6 x main heading roadways, including flanking 'returns'.

Due to a decision to extract the longwalls to within 50m of the returns to increase 'recovery', water has affected the 350-millimetre clay band just below the coal floor of the returns causing 'floor heave'. This in turn is creating a restriction on the mine's ventilation.

a) Explain in detail how you will reduce the resistance of the mine in the short term. (8 marks)

b) Explain in detail how you would reduce the resistance of the mine in the long term. (12 marks)

Section B – Surface coal mining (Choose 1 question only)

Question 7

You are the mining engineering manager of an open cut mine that has been operating during an extended dry period (drought). The forecast for the coming week is for heavy rain (+100mm) over 4 days.

a) What are the potential hazards associated with this rain event? (6 marks)

b) Explain the controls for each hazard listed in part (a). (14 marks)

Question 8

You are the mining engineering manager of an open cut mine that has recently seen an increase in minor incidents involving the loss of control of light vehicles.

a) List the possible causes of these incidents. (6 marks)

b) What preventive actions would you consider for each cause? (14 marks)

CM9 reference: DOC20/842613

NSW Resources Regulator

CANDIDATE NUMBER: EvtNot _____

(MB3)

Mining engineering manager of underground coal mines

EXAMINATION FOR CERTIFICATE OF COMPETENCE

Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

MB3 Mining Practice

Legislation to be assessed:

Unless otherwise stated all references to Act and Regulations are to:

Work Health and Safety Act 2011
Work Health and Safety Regulation 2017
Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2014
Explosives Act 2003
Explosives Regulation 2013

Examinations are held as follows:
at
Kurri Kurri TAFE

9:50am - 1:00pm
22 October 2020

Q #		Mark	Available mark	Marked by *Initials*	Summary comments to justify
Part A – Underground coal mining *(Choose 4 questions out of 6 and indicate the questions you attempt by circling the question number below)*					
1	a		4		
	b		8		
	c		8		
	Total		**20**		
2	a		2		
	b		4		
	c		10		
	d		4		
	Total		**20**		
3	a		5		
	b		5		
	c		10		
	Total		**20**		
4	a		5		
	b		5		
	c		10		
	Total		**20**		

Q #		Mark	Available mark	Marked by *Initials*	Summary comments to justify
5	a		5		
	b		5		
	c		10		
	Total		**20**		
6	a		8		
	b		12		
	Total		**20**		
Part B – Surface coal mining *(Choose 1 question out of 2 and indicate the question you attempt by circling the question number below)*					
7	a		6		
	b		14		
	Total		**20**		
8	a		6		
	b		14		
	Total		**20**		
PAPER	**TOTAL**		**100**		*Marks checked by:*

NSW GOVERNMENT

NSW Resources Regulator

EXAMINATION PAPER

ANSWER BOOKLET

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- This booklet is not to be altered in any way, pages are not to be added or removed.

- Additional space is provided at the end of the paper. Please label which question the answer relates to.

Question 1 (total 20 marks)

The shallow cover longwall mine you are mining engineering manager of has large rolls in the seam that creates plenty of drastic contour changes. Over the past several weeks there has been a marked increase in water make due to recent heavy rain.

As a result of a failed 'fish' tank in the pumping system, the roadway to the 'bleeder' road and ventilation inbye the longwall has been cut off.

a) What are the main issues associated with this event? (4 marks)

/4

b) What immediate actions would you implement? (8 marks)

	/8

c) What long term actions would you implement? (8 marks)

	/8

Question 2 (total 20 marks)

You are the mining engineering manager of a mine that operates a 'drift winder' system for both personnel and materials transport in the 980-metre-long main drift.

At 1:15am on Sunday morning you receive a phone call from the shift undermanager, who is new to the mine, informing you that the 'dolly car' has derailed while taking down a full trailer of timber props and a trailer of bulk stonedust bags at the 635-metre marker.

a) What are your immediate concerns? (2 marks)

/2

b) What are your immediate actions? (4 marks)

	/4

c) Explain in detail how this incident would be recovered? (10 marks)

/10

d) What are your long-term actions to prevent a re-occurrence? (4 marks)

/4

Question 3 (total 20 marks)

You are the mining engineering manager of an underground coal mine; you have just been informed that the highwall above the men and materials and conveyor portals has collapsed blocking access and narrowly missing an underground (UG) man transport travelling out of the mine. There is a 3rd pedestrian egress from the mine via an old fan portal.

a) Describe your immediate actions on receiving the phone call. (5 marks)

/5

b) What notifications are required to external stakeholders? (5 marks)

/5

c) Describe in detail the process you will implement from first response through to resuming production. (10 marks)

/10

Question 4 (total 20 marks)

You are the mining engineering manager of a longwall mine that is partway through a longwall (LW) relocation, 40% of the shields have been recovered without issue. You are notified by the shift undermanager that the shields 40m outbye the E frame are starting to yield, and the strata support is beginning to fail over a 15m zone in front of the shields.

a) Describe your immediate actions on being informed. (5 marks)

/5

b) List the possible causes of the strata event. (5 marks)

/5

c) Describe how you would rectify your listed causes to recommence LW recovery and what controls would be implemented to prevent the issue re occurring. (10 marks)

	/10

Question 5 (total 20 marks)

You are the new mining engineering manager of a longwall mine in a 5m coal seam at a depth of 360m. The development roadways are 3.8m high x 5.4m wide that are supported with 1.8m roof and rib bolts plus mesh.

Over the past 2 months, the mine has had a number of rib failures whilst developing the gateroads. This has resulted in 2 near misses and a bolter operator being transported to hospital with bruising and cuts to the shoulder. All continuous miners (CM's) are bolter miners in a similar configuration.

a) Describe the process you will implement to determine the cause of the rib failures. (5 marks)

/5

b) Who would you involve in the process? (5 marks)

/5

c) List the possible causes of the rib failures and the controls you would implement to safely mine coal. (10 marks)

/10

Question 6 (total 20 marks)

You have recently started as the mining engineering manager at an old underground mine that is reasonably gassy and is now on its 23rd longwall block. The seam is 2.2 metres thick. There are 6 x main heading roadways, including flanking 'returns'.

Due to a decision to extract the longwalls to within 50m of the returns to increase 'recovery' water has affected the 350-millimetre clay band just below the coal floor of the returns causing 'floor heave'. This in turn is creating a restriction on the mine's ventilation.

a) Explain in detail how you will reduce the resistance of the mine in the short term. (8 marks)

	/8

b) Explain in detail how you would reduce the resistance of the mine in the long term. (12 marks)

/12

Question 7 (total 20 marks)

You are the mining engineering manager of an open cut mine that has been operating during an extended dry period (drought). The forecast for the coming week is for heavy rain (+100mm) over 4 days.

a) What ae the potential hazards associated with this rain event? (6 marks)

	/6

b) Explain the controls for each hazard listed in part (a). (14 marks)

	/14

Question 8 (total 20 marks)

You are the mining engineering manager of an open cut mine that has recently seen an increase in minor incidents involving the loss of control of light vehicles.

a) List the possible causes of these incidents. (6 marks)

/6

b) What preventative actions would you consider for each cause? (14 marks)

	/14

END OF QUESTIONS

END OF PAPER

NSW GOVERNMENT

NSW Resources Regulator

EXAMINATION PAPER

Mining engineering manager of underground coal mines certificate of competence

MB2 Mine Ventilation

Written examination held 21 October 2020

Instructions to candidates

Unless otherwise stated all references to the Act and Regulations are to the:

- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2017
- Work Health and Safety (Mines and Petroleum Sites) Act 2013
- Work Health and Safety (Mines and Petroleum Sites) Regulation 2014
- Explosives Act 2003
- Explosives Regulation 2013

DOC20/842590

Preamble in reference to the associated A1 size mine plan :

Caves Colliery is a longwall mine that produces 6.3mt "run of mine" per year from under Lake Leak.

The production comes from the longwall, 2 x development units and a Place Change (Cut / Flit) unit.

The Great Lakes Seam is 3.8m thick semi soft coking coal, low in gas, liable to spontaneous combustion and very wet.

The floor is a 5m hard mudstone with several thin gassy coal seams below. The roof is a 9m thick competent sandstone, with weaker mudstones above that, before another 62m thick hard sandstone up to the bottom of Lake Leak which averages 8m deep.

The depth of cover at pit bottom is 87m and the current longwall is 142m.

The mine has just acquired the neighbouring virgin lease of 130mt recoverable coal to the north.

This lease starts at the lake's water's edge and a new set of mains headings have been turned to drive the approximate 150m.

Using the code of signs specified by Survey and Drafting Directions for Mine Surveyors where appropriate answer the questions below, answering each question on separate copies of the plan.

Question 1

a) Ventilate the mine plan 60 Marks
b) Show the quantity of air at each production face, each main intake and at the Main Fan 20 Marks
c) Show the location of all gas monitoring points 10 Marks
d) Show the size of the Main Fan and efficiencies 10 Marks

Question 2

a) List the issues that the mine currently faces 10 Marks
b) What action would you take to control each issue in the short term? 10 Marks
c) What action would you take to control each issue in the long term? 10 Marks
d) What is the production for each unit? (Show workings) 20 Marks
e) You have been asked to increase the "run of mine" output to 9.5mt per year within 3 years. How would this be achieved? (Show workings) 50 Marks

CM9 reference: DOC20/842611

NSW Resources Regulator

CANDIDATE NUMBER: **EvtNot** _____

(MB2)

Mining engineering manager of underground coal mines

EXAMINATION FOR CERTIFICATE OF COMPETENCE

Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

MB2 Mine Ventilation

Legislation to be assessed:

Unless otherwise stated all references to Act and Regulations are to:

Work Health and Safety Act 2011
Work Health and Safety Regulation 2017
Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2014
Explosives Act 2003
Explosives Regulation 2013

Examinations are held at the following location:
Kurri Kurri TAFE

12:50 pm - 4:00 pm
21 October 2020

Q #		Mark	Available mark	Marked by *Initials*	Summary comments to justify
1	a		60		
	b		20		
	c		10		
	d		10		
	Total		**100**		
2	a		10		
	b		10		
	c		10		
	d		20		
	e		50		
	Total		**100**		
PAPER	**TOTAL**		**200**		*Marks checked by:*

NSW GOVERNMENT

NSW Resources Regulator

EXAMINATION PAPER

ANSWER BOOKLET

- Answers are to be either marked on the associated mine plan or written in the allocated spaces within this booklet ONLY.

- Answers must be written in pen, however, drawings may be completed in appropriately coloured pencil.

- This booklet is not to be altered in any way, pages are not to be added or removed.

- Additional space is provided at the end of the paper. If used, please label which question the answer relates to
- Mark the first copy of your plan with your candidate number and **Question 1** and the second copy with your candidate number and **Question 2** .

DOC20/842590

Caves Colliery

Preamble in reference to the associated 2 x A1 size mine plans of Caves Colliery :

Caves Colliery is a longwall mine that produces 6.3mt "run of mine" per year from under Lake Leak.

The production comes from the longwall, 2 x development units and a Place Change (Cut / Flit) unit.

The Great Lakes Seam is 3.8m thick semi soft coking coal, low in gas, liable to spontaneous combustion and very wet.

The floor is a 5m hard mudstone with several thin gassy coal seams below.

The roof is a 9m thick competent sandstone, with weaker mudstones above that, before another 62m thick hard sandstone up to the bottom of Lake Leak which averages 8m deep.

The depth of cover at pit bottom is 87m and the current longwall is 142m.

The mine has just acquired the neighbouring virgin lease of 130mt recoverable coal to the north.

This lease starts at the lake's water's edge and a new set of mains headings have been turned to drive the approximate 150m.

Question 1

a) Ventilate the mine plan 60 Marks

b) Show the quantity of air at each production face, each main intake and at the Main Fan 20 Marks

c) Show the location of all gas monitoring points 10 Marks

d) Show the size of the Main Fan and efficiencies 10 Marks

Question 2

a) List the issues that the mine currently faces 10 Marks

b) What action would you take to control each issue in the short term? 10 Marks

c) What action would you take to control each issue in the long term? 10 Marks

d) What is the production for each unit? (Show workings) 20 Marks

e) You have been asked to increase the "run of mine" output to 9.5mt per year within 3 years. How would this be achieved? (Draw on the plan and show workings) 50 Marks

END OF QUESTIONS

END OF PAPER