

CANDIDATE EXAM PAPER

CANDIDATE NUMBER: _____

MB1 – Legislation

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

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

This Examination is held in the following location:

Region: New South Wales

Venue: Tocal College

Room: McFarlane Court 3

Start date/time: 10 Mar 2022 10:50:00

MB1 – Legislation

INSTRUCTIONS TO CANDIDATES

MB1 – Legislation | Mar-2022

| Q # | Marks | Available Marks | Marked by <i>Initials</i> | Summary comments to justify |
|--------------------|-------|-----------------|------------------------------|-----------------------------|
| 1 | | 20 | | |
| 2 | | 20 | | |
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| 5 | | 20 | | |
| Paper Total | | 100 | | <i>Marks checked by:</i> |

EXAM BOOKLET

Answers are to be written in the allocated spaces
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Answers must be written in pen however,
drawings may be completed in pencil

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Additional space is provided at the end of the paper.

Please label which question the answer relates to.

Question 1

Question 1

WHS (M&PS) Regulations 2014 - Subdivision 2 - Underground mines, Clause 96 talks about "Emergency Exits".

Explain the requirements of this "clause". (20 Marks)

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Question 2

Question 2

WHS (M&PS) Regulations 2014 – Clause 72 refers to the “Control and monitoring of methane levels”.

Explain the requirements of this “clause”. (20 Marks)

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Question 3

Question 3

WHS (M&PS) Act 2013 – Part 3 – Incident Notification has 4 sections (14,15,16 & 17)

- a. Explain the requirements of all 4 sections. (10 marks)

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WHS(M&PS) Regulations 2014 – Clause 179 lists the “Dangerous Incidents”.

b. From the following list select only the 10 incidents that are in this “clause” (10 marks)

- an electric arc occurring in the hazardous zone in an underground coal mine that is directly observed or that leaves visible evidence on an electric cable,
- a collision involving a vehicle or mobile plant,
- a vehicle or plant making contact with an energised source having a voltage greater than 1,200 volts (other than testing equipment applied to energised equipment in accordance with the WHS Regulations),
- an unplanned fall of ground, roof or sides that impedes passage, extends beyond the bolted zone or disrupts production or ventilation,
- the unintended interruption of the main system of ventilation in an underground excavation or tunnel,
- damage to, or failure of, any part of a powered winding system or a shaft or shaft equipment,
- a fire in the underground parts of a mine, including where the fire is in the form of an oxidation that releases heat and light,
- the inrush of water, mud or gas in workings in an underground excavation or tunnel,
- ejection of rock from blasting that falls outside the blast exclusion zone (being the area from which persons are excluded during the blasting)
- a misfire or unplanned explosion of an explosive or explosive precursor (but not in the case of a misfire at a mine other than a coal mine if the misfired explosive can be fired without any significant risk to a person),
- an unplanned event that causes less than 2 exits from an underground mine to be available for use,
- an uncontrolled escape of a pressurised substance,

- a coal burst or rock burst at an underground mine,
- the detection of a concentration of methane in the general body of the air in an underground coal mine (other than in a sealed area or goaf) that is 2.5% by volume or greater,
- the unintended activation, movement, or failure to stop of vehicles or machinery,

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Question 4

Question 4

WHS(M&PS) Regulations 2014 - Schedule 10 – Part 2 refers to “Statutory Functions” in underground coal mines.

List the 12 “Statutory Functions” referred to. (20 Marks)

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Question 5

Question 5

WHS (M&PS) Act 2013, Part 5 - Safety and Health Representatives for coalmines, Division 2– Industry Safety and Health Representatives, Section 30 refers to “Suspending Operations”.

Explain what is involved in the section. (20 Marks)

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Regional
NSW

**MINING ENGINEERING MANAGER OF UNDERGROUND COAL MINES
EXAMINATION FOR CERTIFICATE OF COMPETENCE**

This Examination is held in the following region:

New South Wales

Tocal College

10 Mar 2022 12:50:00

MB2 – Mine ventilation

MB2 – Mine ventilation | Mar-2022

| Candidate Number | ID Number | Status | Comments |
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CANDIDATE EXAM PAPER

CANDIDATE NUMBER: _____

MB2 – Mine ventilation

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

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Room: McFarlane Court 3

Start date/time: 10 Mar 2022 12:50:00

MB2 – Mine ventilation

INSTRUCTIONS TO CANDIDATES

MB2 – Mine ventilation | Mar-2022

| Q # | Marks | Available Marks | Marked by <i>Initials</i> | Summary comments to justify |
|--------------------|--------------|------------------------|-------------------------------------|------------------------------------|
| 1 | | 100 | | |
| 2 | | 100 | | |
| Paper Total | | 200 | | <i>Marks checked by:</i> |

EXAM BOOKLET

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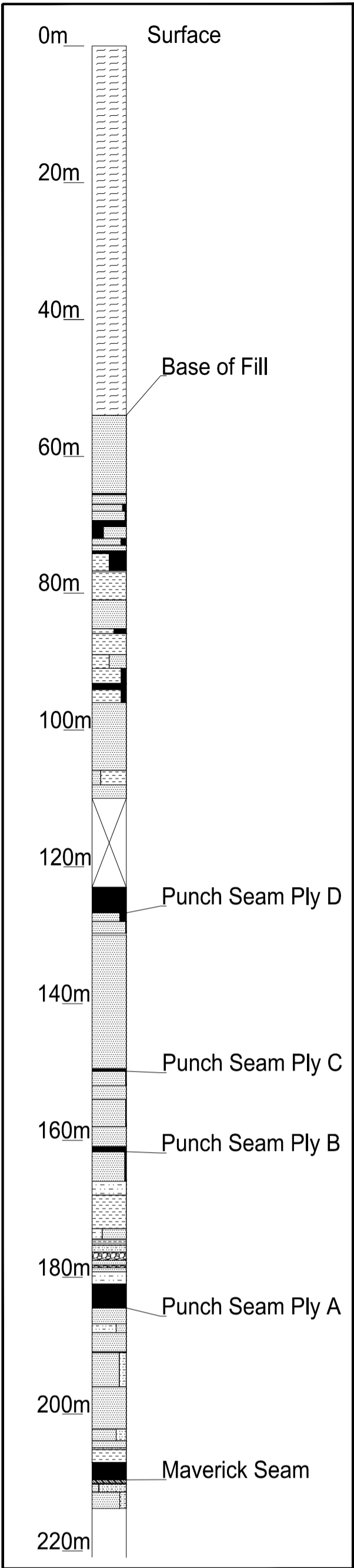
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SECTION OF STRATA



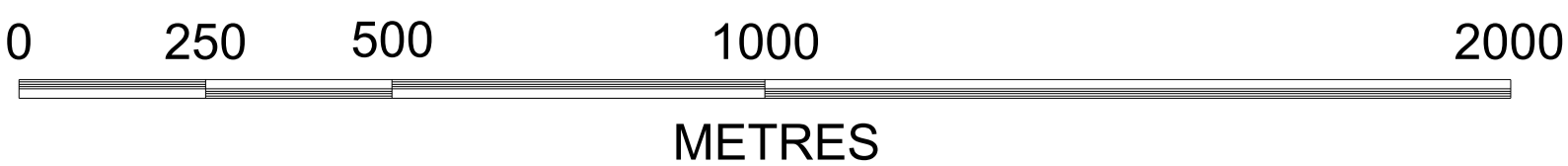
EXTENT OF OPEN CUT OPERATIONS

SHAFT B

SHAFT C

EXTENT OF OPEN CUT OPERATIONS

SCALE



**MAVERICK COLLIERY
Ventilation Plan**

| | |
|---------------------------------|----------------------------|
| SCALE : As Shown (1:10000 @ A2) | DWG No. : VENTILATION_1 A2 |
| DRAWN : S.SURVEYOR | REVISION : February 2022 |
| CHECKED : | |
| DATE : February 2022 | |

Question 1

Maverick mine workings are shown on the attached plan.

Maverick mine is an underground coal mine that you have only recently taken over as the mining engineering manager. The mine is achieving an average of 10 000t per day whilst having the capacity to achieve 30 000t per day from 1 longwall, 2 x development units. The Mine operates 5 days per week with 1 maintenance shift scheduled mid week and additional maintenance on weekends. The pillar panel adjacent to shaft B is still open and being ventilated with the option of re-entry dependant on coal price and operational issues.

The mine is situated under an opencut mine that has ceased operating. The spoil that contains a significant amount of remnant coal and tailings and easily spontaneously combusts with subsidence cracks. An exploration hole drilled for LW3 recorded a hole temperature of 90 degrees C at a depth of 50m.

The seam being extracted, the Maverick seam, is 2.9m thick at a depth of 210m. The insitu gas content is 6m³/t CH₄ and the seam has a medium to high propensity to spontaneous combustion. The seam has an average permeability of 100millidarcy. The punch seam A, which is only 25m above has a very high propensity to spontaneous combustion.

Only one shaft is currently in operation, shaft B, while shaft C has recently been completed. There is also a dyke that the LW mined through in LW2 that was extremely hard, up to 200Mpa, and took some five months to retreat through and nearly closed the operation. The business has conducted an options analysis and determined it is too expensive to relocate around the dyke in LW3 and have an improvement plan in place for LW output.

Question 1

- a. Identify and list all relevant critical issues and factors that you believe must be incorporated in, or be addressed by, the ventilation network you will adopt. Your answer should include but not be limited to issues regarding seam gassiness, seam thickness, goaf gas management, spontaneous combustion. (40 marks)

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Question 2

Question 2

On the accompanying Maverick mine plan;

- a. Show the locations of all production faces, together with their daily production levels. (20 marks)
 - b. i) Ventilate the plan using the code of signs specified by Survey and Drafting Directions for Mine Surveyors, addressing issues identified in question 1. (50 marks)
- ii) Show the air quantities entering each production panel measured 100m from the last completed line of cut throughs. (10 marks)
- c. Show location and type of gas monitoring sensor for each production district and outbye areas of the mine. Indicate methane alarm level limits at each sensor. (10 marks)
 - d. Show the ventilation quantities entering each surface intake entry to the underground workings and each surface return entry from the underground workings. (10 marks)

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This Examination is held in the following region:

New South Wales

Tocal College

11 Mar 2022 09:50:00

MB3 – Coal mining practice

MB3 – Coal mining practice | Mar-2022

| Candidate Number | ID Number | Status | Comments |
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MB3 – Coal mining practice

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Start date/time: 11 Mar 2022 09:50:00

MB3 – Coal mining practice

INSTRUCTIONS TO CANDIDATES

MB3 – Coal mining practice | Mar-2022

| Q # | Marks | Available Marks | Marked by <i>Initials</i> | Summary comments to justify |
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| 8 | | 20 | | |
| Paper Total | | 160 | | <i>Marks checked by:</i> |

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Question 0

Part A

Attempt only 4 out of 6 questions from Part A

Question 0

Attempt only 1 out of 2 questions from Part B

Question 1

Attempt only 4 out of 6 questions from Part A

Part A

Question 1

You are the Mining Engineering Manager of a modern underground longwall coal mine that has experienced a significant reduction in seam thickness from 3.6 metres down to 1.8 metres as it advanced towards its western boundary. There are still 14 proposed longwall blocks with approximately 7 million tonnes per block planned for this area. Exploratory drilling has confirmed the seam thickness will remain 1.8 metres thick.

- a. List the hazards that this seam thickness change will cause. (10 marks)
- b. List the controls that you would introduce for each hazard. (10 marks)

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Question 5

Part A

Question 5

You have just started as the Mining Engineering Manager of a large underground longwall coal mine. When you attend the “day shift” Undermanager’s “Start of Shift” address you note that it started 6 minutes late, not all persons were in attendance and some others weren’t paying attention.

- a. What are your concerns about this Undermanager’s “Start of Shift” address? (5 marks)
- b. What actions are you going to take to improve the Undermanager’s “Start of Shift” addresses on all shifts? (15 marks)

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Question 8

Part B

Question 8

You are the Mining Engineering Manager of an Open Cut coal mine that has spontaneous combustion issues.

Explain what controls you would have in your Spontaneous Combustion Management Plan. (20 marks)

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