Undermanager of underground coal mines
UB5 - Legislation and coal mining practice

Candidate no.: _____

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 2022*
- *Explosives Act 2003*
- *Explosives Regulation 2013*

Exam details

Region: New South Wales
Venue: Tocal College
Room: The Hall
Start date/time: Wednesday 9 April 2025 11:50am
End date/time: Wednesday 9 April 2025 3:00pm
Duration: 03:10

Instructions to candidates

- A HIGHLIGHTER ONLY (no pencil/pen) can be used during reading time
- 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
- All five (5) questions are to be attempted
- All questions are of equal value - 20 marks each
- Additional space is provided at the end of the paper. Please label which question the answer relates to.
- **Essential question - 2A: 6/10 pass mark required**

CANDIDATE NUMBER: _____ **(write in from your letter)**

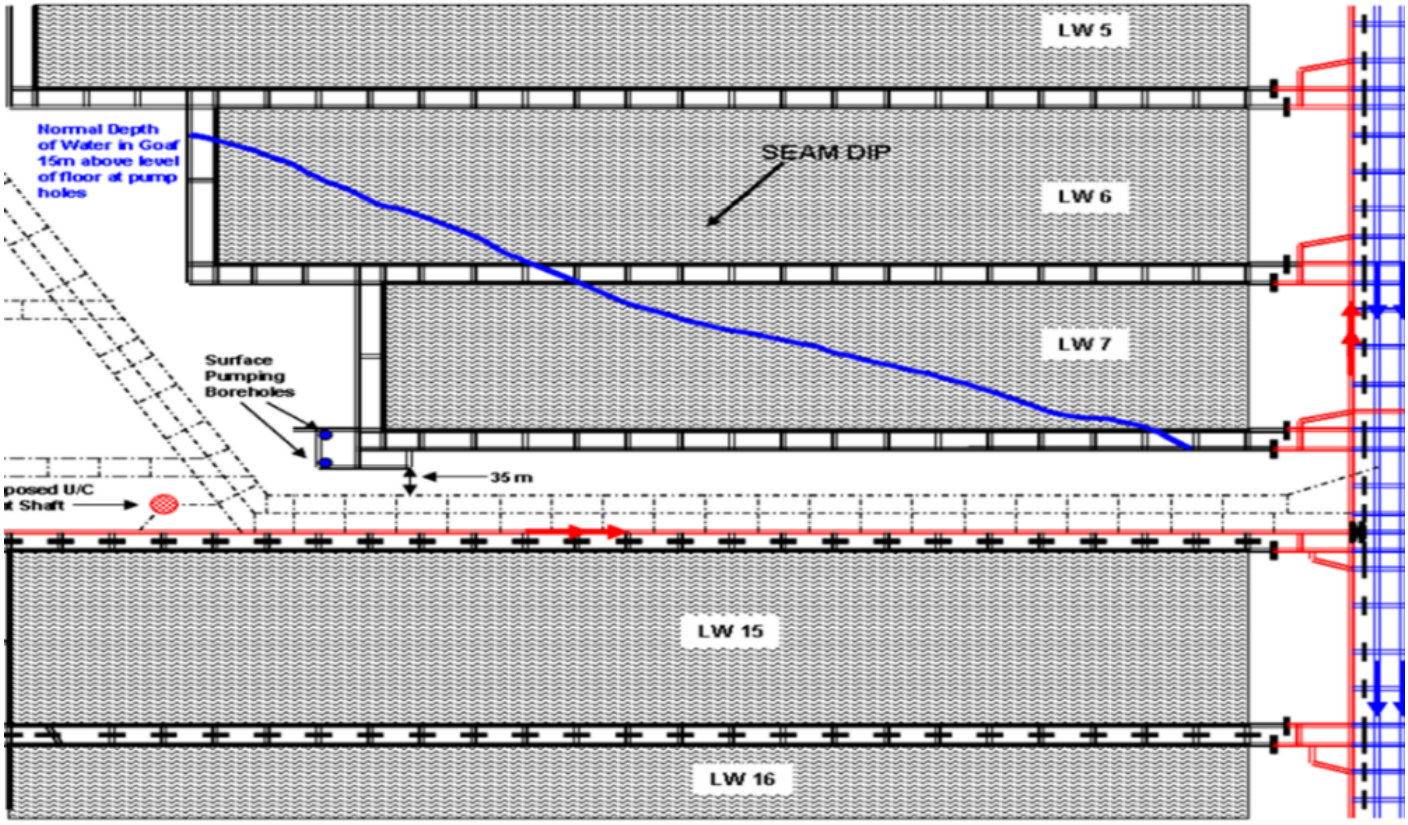
Question Number		Mark	Available mark	Marked by *Name*	Summary comments to justify, as necessary
1	A		20		
	Subtotal		**20**		
2	**A- Essential**		10		
	B		3		
	C		4		
	D		3		
	Subtotal		**20**		
3	A		5		
	B		10		
	C		5		
	Subtotal		**20**		
4	A		5		
	B		15		
	Subtotal		**20**		
5	A		5		
	B		3		
	C		5		
	D		7		
	Subtotal		**20**		
PAPER	**TOTAL**		**100**		*Marks checked by:*

Question 1

Total 20 marks

You are the undermanager of a longwall mine that has been operating for 15 years. The seam is a hard coking coal located at a depth of cover of approximately 150 m. The seam is 2.7m thick and has a low propensity for spontaneous combustion. Roof and floor conditions are considered good and the seam has a gas content of around 5 m3/tonne. The seam gas is 95% Methane, 5% Carbon Dioxide.

It has been decided to access an area of coal located behind the previously mined Longwall 5, 6 and 7 panels to enable additional Longwall panels to be extracted. The plan entails the driving of two new roadways adjacent to Longwall 15, to be used as a conveyor road and a travel road for the new area. You intend to utilise the existing bleeder road as a third roadway for accessing the new panels. The goaf area of Longwall 5, 6 and 7 is known to contain water and the water is controlled by the use of two pumps via surface boreholes located at the inbye end of LW7, which represents the lowest area of this part of the mine. The water is usually maintained up to a depth of between 10 and 15 metres at the pump location. The pumps are fitted with pressure monitors which are used to calculate the head of water at the pumps underground. The attached plan shows the details of the workings and the planned workings.



A) As a shift Undermanager, what are the expected hazards that need to be considered and the associated controls you would be required to verify that are being followed to undertake this activity. **(20 marks)**

Expected Hazards

Associated Controls

Question 2

Total 20 marks

Three hours prior to the end of your shift as the shift undermanager, you are in a development panel when an outbye deputy arrives at the DCB where you are standing, driving a personnel transport. The deputy describes an issue where there was a loss of steering on the transport vehicle and the vehicle contacted the rib in an outbye area of the mine. On further evaluation it is identified the scrubber tank has a puncture in the tank and damaged bolts.

A) What are your actions at this point: **Essential Question (6/10 pass mark required)**

B) You are the Shift Undermanager at a gassy Longwall mine. The Roadway Dust Sampler reports to you under the management structure. What are the required sampling locations and frequencies as per Section 68 of the WHS (M&PS) Regulation 2022? **(3 marks)**

Roadway dust sampling is to take place at least once every –

i.

ii.

iii.

C) Explain the sampling process undertaken to determine incombustible contents of mine roadways **(4 marks)**

D) 2 of the samples indicates that the amount of incombustible material at part of the mine is lower than that required. What is required to occur and what is the prescribed time frame **(3 Marks)**

Question 3

Total 20 marks

You are the shift Undermanager at a longwall operation and one of the planned tasks for the day is to pre-shift the 2km longwall tailgate roadway in preparation for support crews to work in there during the routine weekly maintenance window on the following shift. The GU deputy has phoned up after he attempted to inspect the roadway indicating the tailgate is flooded in a known localised syncline area. He estimates the water level is approximately 500mm off the roof and extends for approximately 100 metres. The syncline area is approximately 1km from the LW face, and 1km from the tailgate double doors. The compressed air pump station in the middle of this syncline area is underwater, inaccessible and all the pumps are stalled.

A) What are the requirements under WHS (M&PS) 2022 Section 99 Emergency Exits? **(5 marks)**

B) What are your actions as the Shift Undermanager and what controls could be utilised to safely access this area to pump the water down? **(10 marks)**

C) You are tasked with investigating the incident, what are the likely controls that you would implement to prevent a reoccurrence? **(5 marks)**

Question 4

Total 20 marks

You are an Undermanager at a small board and pillar mine looking to restart mining operations in an old section of the mine. A new contractor has been engaged to undertake secondary ground support which includes installing groutable cable bolts in the roof and steel bolts and steel mesh as rib support. You have been nominated to run the project.

A) What are the obligations and requirements under WHS (M&PS) 2022 Regulation in relation to engaging contractors? **(5 marks)**

B) What are the key risks in this project and how will you manage them? **(15 marks)**

Question 5

Total 20 marks

The following are short answer questions on a range of matters which should be answered in dot point format:

A) List five factors that a shift undermanager would need to consider when determining the level of supervision and Inspection requirements for workgroups? **(5 marks)**

B) Under the WHS (M&PS) Act 2013, what is defined as a notifiable incident? **(3 marks)**

C) What immediate actions can be taken at the incident site where a Dangerous Incident has occurred, resulting in a serious injury to a Worker? **(5 marks)**

D) You are the shift undermanager of a moderately gassy mine which has a history of being susceptible to frictional ignitions of methane during development operations. List seven factors that may result in an increased risk of frictional ignition in a development panel (including environmental and operational factors). Against each factor, document suitable controls that can minimise the risk **(7 marks)**

Frictional Ignition risk factors	Suitable controls
1	
2	

3	
4	
5	
6	
7	

Blank Page

Blank Page

Blank Page

End of Document

Undermanager of underground coal mines
UB6 - Mine Ventilation Paper

Candidate no.: _____

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 2022*
- *Explosives Act 2003*
- *Explosives Regulation 2013*

Exam details

Region: New South Wales
Venue: Tocal College
Room: The Hall
Start date/time: Wednesday 9 April 2025 8:50am
End date/time: Wednesday 9 April 2025 11:00am
Duration: 02:10

Instructions to candidates

- A HIGHLIGHTER ONLY (no pencil/pen) can be used during reading time
- 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
- All three (3) questions are to be attempted
- Additional space is provided at the end of the paper. Please label which question the answer relates to.

CANDIDATE NUMBER: _____ **(write in from your letter)**

Question Number		Mark	Available mark	Marked by *Name*	Summary comments to justify, as necessary
1	A		15		
	B		30		
	C		20		
	D		10		
	E		10		
	F		15		
	Subtotal		**100**		
2	A		70		
	Subtotal		**70**		
3	A		5		
	B		5		
	C i)		2		
	C ii)		3		
	D		5		
	E i)		2		
	E ii)		4		
	E iii)		4		
	Subtotal		**30**		
PAPER	**TOTAL**		**200**		*Marks checked by:*

Question 1

Total 100 marks

Jacob's Creek Colliery is an operating longwall mine. The mine operates in the Williewarrina seam. Workings are shown on the attached plan.

The Williewarrina seam, which is 7 metres thick in total, and has a high propensity to spontaneous combustion. There are several laminated shale seams spread throughout the overall 7m coal seam. Typical roadway dimensions are 3.6m high by 5.4m wide, with LW920 having an extraction height of 4m. The target working seam is the lower section of the total 7m seam which includes laminated shale regularly.

The immediate strata below the Williewarrina seam are shale and mudstone, with areas of igneous rock up to 1.0 metre thick.

The Jacob's Creek Colliery workings are accessed via 3 portal drivages. One of these portal drivages is connected to the main ventilation fans, there is a transport roadway, with the third being a dedicated conveyor roadway.

The Williewarrina seam is moderately gassy with high permeability characteristics. Total in situ-seam gas content is up to 9 m^3/t, with a CO_2:CH_4 ratio of 15:85. Approximately 60% of the insitu gas in the cut coal is liberated during the production process.

Typical roof support is 6 x 2.1 metre bolts and a 1 metre x 5.2 metre mesh module per metre. Ribs are friable and prone to failure in the upper third of the rib, requiring support with mesh and 2 x 1.2 metre point anchor bolts every metre.

The mine produces approximately 3.8 million tonnes per year of Coking coal from 4 Continuous Miners in development units seven days per week and a longwall panel (LW920) five days per week.

Continuous miners:

Two (2) continuous miners are advancing the new maingate 930 headings

One (1) continuous miner is being used to develop a 4 heading mains roadway in district 800

One (1) continuous miner is being used to develop a 4 heading mains roadway in district 600

A) Identify the location of all production faces and show calculations of their daily production levels. **(15 marks)**

B) Ventilate the plan using the code of signs specified by the Regulations and Standards, addressing the issues identified in question 1. **(30 marks)**

C) Show calculations and briefly describe what the minimum air quantities are required to be available at the production face of the following locations to maintain compliance to WHS legislation during an operating shift: **(20 marks)**

(i) LW920 production face

(ii) MG930 development panel

(iii) District 800 panel

(iv) District 600 panel

D) Show calculations for the general body methane concentration in the longwall tailgate **(10 marks)**

E) Show the air quantities entering each surface intake entry into the underground workings and each surface return entry from the underground workings and briefly describe how these quantities have been determined. **(10 marks)**

F) Show the locations and type of required atmospheric monitoring. **(15 marks)**

Question 2

Total 70 marks

From the data supplied in Question 1 and in relation to the mine layout, list and describe the relevant hazards associated with the mine layout and the proposed controls that should be put in place to address those hazards. **(70 marks)**

Question 3

Total 30 marks

A) In gassy longwall mines, methane is often a significant safety concern. Discuss the controls that you could expect to be implemented to support longwall mining operations. **(5 marks)**

B) Describe the function of a longwall face ventilation system. What types of longwall ventilation circuits are available and what method would you recommend for a gassy mine? **(5 marks)**

C) Brattice wings/ Curtains are often used in gassy longwalls to control the flow of seam gasses and O2 depleted atmosphere.

(i) How are they typically positioned, and why are they important for safety? **(2 marks)**

(ii) What are the hazards associated with brattice wings / curtains and how are these hazards controlled? **(3 marks)**

D) In gassy longwall operations, the bleeder heading plays a critical role in maintaining safe and compliant ventilation. Describe the function of the bleeder heading and how it assists in controlling gas concentration in the mine. **(5 marks)**

E) Bleeder Road regulators are a critical part of a mines ventilation system.

(i) What is the purpose of bleeder road regulators, and how do they contribute to the overall ventilation system? **(2 marks)**

(ii) Describe key factors that influence the positioning of bleeder road regulators in relation to gas management. **(4 marks)**

(iii) The location of the bleeder road regulator can introduce other hazards, list these hazards and explain the mechanism? **(4 marks)**

Blank Page

Blank Page

Blank Page

End of Document