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

EXAMINATION: **Undermanager of underground coal mines**

EXAM PAPER: **UB1 – Legislation**

DATE: **Tuesday 5 March 2024**

EXAMINATION

BOOKLET

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

Question Number		Mark	Available mark	Marked by *Name*	Summary comments to justify, as necessary
1	a		12		
	b		8		
	Subtotal		**20**		
2	a		10		
	b		5		
	c		5		
	Subtotal		**20**		
3	a		12		
	b		8		
	Subtotal		**20**		
4	a		10		
	b		10		
	Subtotal		**20**		
5			20		
Subtotal			**20**		
PAPER	**TOTAL**		**100**		*Marks checked by:*

(UB1)

Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2022

EXAMINATION FOR CERTIFICATE OF COMPETENCE
Undermanager of underground coal mines

Mining Legislation Paper

Tuesday 5 March 2024
8:50am to 9:50am (60 minutes)

Venue: Tocal College, Paterson NSW 2421

Room: North Court 2

INSTRUCTIONS TO CANDIDATES

This exam is for EXISTING CANDIDATES ONLY

All five (5) questions are to be attempted.

All questions are of equal value - 20 marks each

10 minutes reading time is allowed prior to the start of the examination

Unless otherwise stated all references to 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 2022
Explosives Act 2003
Explosives Regulation 2013

ANSWER BOOKLET

- A HIGHLIGHTER ONLY (no pen/pencil etc) can be used in this part of the exam paper during reading time

- If you have a question raise your arm and wait for an exam supervisor

- 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

Question 1 (total 20 marks) (Essential 60% pass)

a) What are the requirements of the following 4 x statutory functions under Schedule 10 of the Work Health and Safety (Mines and Petroleum Sites) Regulations 2022? **(12 marks)**

i) Undermanager

	/3

ii) Deputy

	/3

iii) Fire officer

	/3

iv) Roadway dust sampler

	/3

b) Section 60 of the Work Health and Safety (Mines and Petroleum Sites) Regulations relates to the requirements if air quality and air safety standards are not met. Under subsection 5, 'The person with responsibilities of the affected area to do the following:….'

Note below what is to be done? **(8 marks)**

	/8

Question 2 (total 20 marks) (Essential 60% pass)

Schedule 6 of the Work Health and Safety (Mines and Petroleum Sites) Regulations 2022 refers to sampling airborne dust at mines. Briefing explain the requirements of the following 3 parts:

a) General requirements (10 marks)

/10

b) Longwall mining area (5 marks)

/5

c) Continuous miner operating area (5 marks)

	/5

Question 3 (total 20 marks)

a) Part 3 of the Work Health and Safety (Mines and Petroleum Sites) Act 2013 refers to Incident notification. Briefly explain the following and any requirements where appropriate: (12 marks)

i) What is a notifiable incident? (3 marks)

ii) What responsibilities does the mine operator have regarding their duty to notify of notifiable incidents, and who must be notified? (4 marks)

iii) Under what circumstances can a preserved incident scene be disturbed? (5 marks)

b) Section 42 of the Work Health and Safety (Mines and Petroleum Sites) Act 2013 refers to the functions of mine safety and health representatives. Briefly explain what each of those functions are? (8 marks)

	/8

Question 4 (total 20 marks)

a) Section 35 of the Work Health and Safety (Mines and Petroleum Sites) Regulations 2022 refers to Notification of high-risk activities. Briefly explain the following and any requirements where appropriate:

Using the approved way and form from the regulator, what must be included in all high-risk activity notifications? **(10 marks)**

/10

b) Under Schedule 3, what additional requirements are there for each of the following high-risk activities**: (10 marks)**

i) Driving underground roadway wider than 5.5m

/5

ii) Roadway or drift without intersection for 250m

	/5

Question 5 (total 20 marks)

Section 91 of the Work Health and Safety (Mines and Petroleum Sites) Regulations 2022 refers to duty to prepare an emergency plan. Briefly explain the requirements of this section any requirements where appropriate. **(20 marks)**

/20

END OF QUESTIONS

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NSW GOVERNMENT | Regional NSW

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

EXAMINATION: **Undermanager of underground coal mines**

EXAM PAPER: **UB2 / UB6 – Mine Ventilation**

DATE: **Tuesday 5 March 2024**

EXAMINATION

BOOKLET

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		25		
	c **(Essential Question)**		15		
	d		15		
	e		15		
	f **(Essential Question)**		15		
	Subtotal		**100**		
2 (Essential Question)			70		
	Subtotal		**70**		
3	1		10		
	2		10		
	3		10		
	Subtotal		**30**		
PAPER	**TOTAL**		**200**		*Marks checked by:*

(UB2/UB6)

Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2022

EXAMINATION FOR CERTIFICATE OF COMPETENCE
Undermanager of underground coal mines

Mine Ventilation Paper

Tuesday 5 March 2024
9:50am to 12:00pm (120 minutes)

Venue: Tocal College, Paterson NSW 2421

Room: The Hall

INSTRUCTIONS TO CANDIDATES

All three (3) questions are to be attempted.

Existing Candidates: 60% to pass paper, OR

New Candidates: Essential questions are: 1c, 1f and 2, all require 60% or above to pass the paper.

10 minutes reading time is allowed prior to the start of the examination

Unless otherwise stated all references to 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 2022
Explosives Act 2003
Explosives Regulation 2013

ANSWER BOOKLET

- A HIGHLIGHTER ONLY (no pen/pencil etc) can be used in this part of the exam paper during reading time

- If you have a question raise your arm and wait for an exam supervisor

- Answers are to be written in the allocated spaces within this booklet and the provided mine plan 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

Campbellstone Colliery Brief:

Campbellstone Colliery is an operating longwall mine, operating near a main railway network in NSW. Workings are shown on the attached plan.

The mine operates in the “Lynn” seam, which is 2.8 metres thick in total and has a high propensity to spontaneous combustion. The seam is overlaid by 6 metres of laminated shale quartz bearing sandstone and mudstone, with several smaller coal seams above which have not been previously mined. Typical roadway dimensions are 3.2m high by 5.2m wide in the gateroad panels, 3.4m high by 5.4m wide in the mains panels and LW7 has an extraction height of 3.2m

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

The Campbellstone Colliery workings are accessed via 2 portal drivages. One of these portal drivages is connected to the Main Ventilation Fans, the other is a combined conveyor and transport roadway.

The “Lynn” seam is moderately gassy with high permeability characteristics. Total in situ-seam gas content is up to 12 m3/t, with a CO2:CH4 ratio of 30:70. 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 2.8 million tonnes per year of Coking coal from 3 Continuous Miners in development units seven days per week and a longwall panel (LW7) five days per week.

Two continuous miners are advancing the new maingate 9 headings, while a single continuous miner is being used to develop a 4 heading mains roadway for the new lease area to the West.

<u>On the accompanying ‘Campbellstone Colliery’ plan:</u>

Question 1 (total 100 marks)

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

/15

b) Ventilate the plan using the code of signs specified by the Regulations and Standards, addressing the issues identified in question 1. (25 marks)

/25

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 during an operating shift: (15 marks) **(essential 60% 9/15)**

i. LW7 production face
ii. MG09 development panel
iii. Western Mains panel

/15

d) Show calculations for the general body methane concentration in each operating panel return. (15 marks)

/15

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. (15 marks)

/15

f) Show the locations and type of required atmospheric monitoring. (15 marks) **(essential 60% 9/15)**

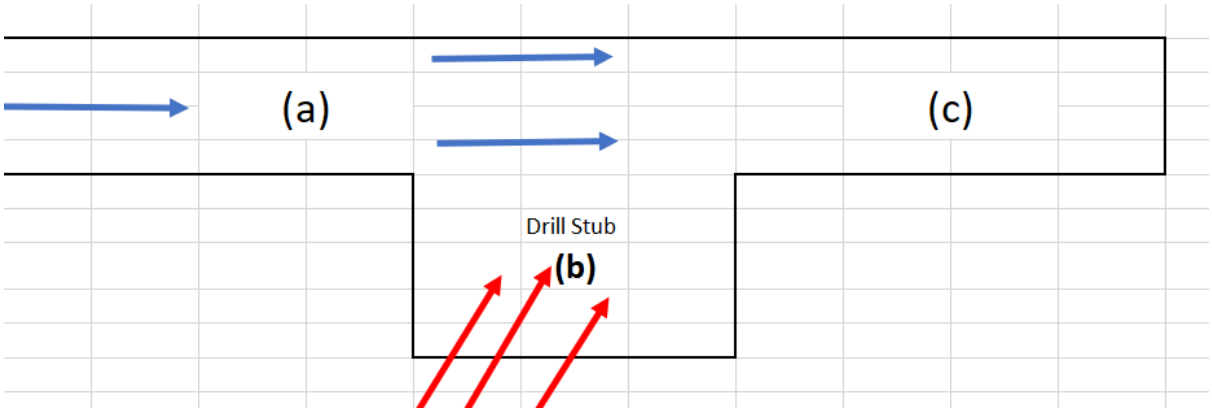
Question 2 (total 70 marks)

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) **(essential 60% 42/70)**

	/70

Question 3 - (30 marks, each sub-question is worth 10 marks)

Calculate the following based on the information provided. All calculations are relating to methane (CH4) only. The blue arrows represent intake air. The red arrows are indicative of inseam gas drainage boreholes. Assume a constant 40m3/s airflow for sub questions 1 and 2.



1) What would (c) be if the following was true:

I. (a) Is 0.1%

II. (b) Combined flow rate of 350litres per second

	/10

2) What would the combined flow rates of (b) be if the following was true:

I. (a) Is 0.15%

II. (c) is 0.9%

	/10

3) What would the ventilation quantity at (a) be if the following was true:

I. (b) Combined flow rate of 300litres per second

II. (c) is 0.6%

	/10

END OF QUESTIONS

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NSW GOVERNMENT | Regional NSW

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

EXAMINATION: **Undermanager of underground coal mines**

EXAM PAPER: **UB3 Coal Mining Practice /**

UB5 – Legislation & Coal Mining Practices

DATE: **Tuesday 5 March 2024**

EXAMINATION

BOOKLET

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

Question Number		Mark	Available mark	Marked by *Name*	Summary comments to justify, as necessary
1	a		7		
	b		3		
	c		5		
	d (Essential Question)		5		
	Subtotal		**20**		
2	a		10		
	b		5		
	c		5		
	Subtotal		**20**		
3	a		6		
	b		6		
	c		8		
	Subtotal		**20**		
4	a		10		
	b		4		
	c		6		
	Subtotal		**20**		

Question Number		Mark	Available mark	Marked by *Name*	Summary comments to justify, as necessary
5	a		10		
	b		10		
	Subtotal		**20**		
PAPER	**TOTAL**		**100**		*Marks checked by:*

(UB3/5)

Work Health and Safety (Mines and Petroleum Sites) Act 2013
Work Health and Safety (Mines and Petroleum Sites) Regulation 2022

EXAMINATION FOR CERTIFICATE OF COMPETENCE
Undermanager of underground coal mines

Legislation & Coal Mining Practices Paper

Tuesday 5 March 2024
12:50pm to 16:00pm (180 minutes)

Venue: Tocal College, Paterson NSW 2421

Room: The Hall

INSTRUCTIONS TO CANDIDATES

All five (5) questions are of equal value and must to be attempted.

Existing Candidates: 60% to pass paper, OR

New Candidates: Essential question is: 1d, which requires 60% or above to pass the paper.

10 minutes reading time is allowed prior to the start of the examination

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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

ANSWER BOOKLET

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Question 1 (total 20 marks)

You are the Day Shift Undermanager at a mine which has low gas contents and a low propensity for spontaneous combustion. The coal seam is 3.1m thick and has an immediate roof consisting of laminated mudstone / siltstone members with recent boreholes indicating thicker sandstone units starting 8m above the coal seam.

Due to development float, a decision has been made to shorten the gate roads, breakaway and commence driving the longwall install road next week. The roadway will be 300m long and 8m wide. You have been asked by the Production Manager to manage this project.

a) What are all the aspects of this project you will need to consider for High-Risk Activity approvals? (7 marks)

b) What is required to reduce a waiting period? (3 marks)

c) What risks need to be considered when conducting this work, and what are controls are needed to manage these? (5 marks)

d) The first pass is now complete and the weekend crews have widened the maingate stable and are now 100m along the 2nd pass of the install road. You receive a call from the panel deputy informing you that a section of rib between the install road intersection and the bootend site has failed. A 2m high x 5m long x 1.5m deep section of rib has failed into the roadway next to the shuttle cars main enclosure that was parked at the bootend. The shuttle car driver and panel electrician were standing at the rear of the shuttle car at the time of the incident.

What are your obligations as an Undermanager in relation to this incident? (5 marks) **(essential 3/5 60% pass mark required)**

	/20

Question 2 (total 20 marks)

You are an Undermanager at a partial pillar extraction mine. Management has identified a potential mining area adjacent to old workings that has been previously mined and subsequently sealed. This area of the mine is down dip to current workings and is known to be full of water. To access the new area, roadways are required to be driven within 30m of these workings. Various exploration boreholes are planned to be drilled into the old workings to remove the water prior to mining near these workings.

a) What are the requirements of an Inrush Principal Management Plan? (10 marks)

b) Describe the requirements in regard to working in an inrush control zone and what do you expect to see as controls to manage the drilling and environmental risks on shift as an Undermanager? (5 marks)

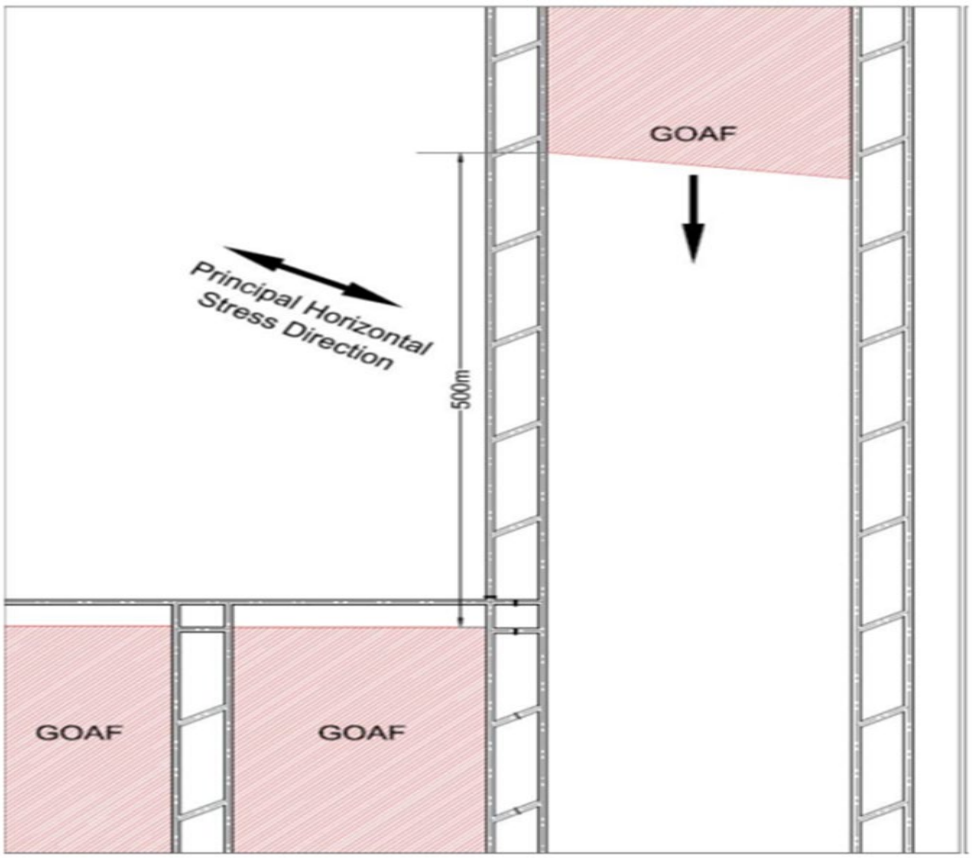
c) Describe what information, training and instruction you would expect to see for the workers and mining supervisors who are completing the drilling operations? (5 marks)

	/20

Question 3 (total 20 marks)

You are the undermanager of a longwall mine. The current longwall panel is 500 metres longer than the previous panel and will be extracted past the starting position of the previous panel. The layout and principal horizontal stress direction is shown in the following drawing.

The longwall extracts the full seam height of 2 metres. The immediate 2 metres of roof is comprised of weak laminated shale which is then overlain by strong sandstones.



a) What are the potential geotechnical conditions in the tailgate roadway as the longwall face approaches and passes the start line of the previous panel? Detail the conditions that may be experienced. (6 marks)

b) The Mine Manager has given you the task of planning and implementing secondary support of the tailgate roadway. Outline the type of secondary support to be used; including proposed timing of installation and any other considerations that should be implemented. (6 marks)

c) What process and steps would you take to develop and implement safe systems of work for installation of the secondary support and considerations for mining through this area? (8 marks)

	/20

Question 4 (total 20 marks)

You are an undermanager at longwall mine. It has been decided to implement a change in how over casts are excavated. The decision has been made to utilise explosives for the first time at this mine to excavate the overcast. You have been asked by the Mine Manager to coordinate the implementation of the change.

a) Section 33 of Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 [NSW] refers to the management of risks related to explosives and explosive precursors. List and describe how an Undermanager would demonstrate compliance to this requirement? (10 marks)

b) What are the requirements of the High-Risk Activity submission to use explosives designed for use in coal mines? **(4 marks)**

c) Draw a plan to illustrate a typical shot firing pattern to construct an overcast in hard sandstone roof. Seam height is 3.2m and the minimum clearance for ventilation through the overcast is 2.5m. The roadway width is 5.2m.
Draw your proposed Shotfiring pattern, including delays that would be used. How many stages would you propose to fire the overcast?

(Additional drawing space is provided on the next page)

The plan should detail **(6 marks)** –

- The number holes
- Spacing between holes
- Drill hole size
- Number and sequence of delays

/20

ADDITIONAL DRAWING SPACE FOR QUESTION 4

Question 5 (total 20 marks)

You are an undermanager at longwall mine. You have been asked by the Mine Manager to accompany the ISHR & SSHR on an underground inspection. During the underground inspection you come across a group of contractors working on installing the drive head for the next longwall block. As you arrive an observation identifies one of the workers positioned under a suspended load attempting to line up the drive module. The work is stopped, and nobody is injured. The ISHR issues the mine operator with a Section 30 Suspending operations directive in relation to installing the drive head.

a) What is your understanding of a section 30 notice, who can issue the direction and under what conditions? **(10 marks)**

b) The Mine Manager has allocated you the task of investigating the incident to compile the information to have the direction cancelled. What information / documents would you be looking for and what should be in place for the task? **(10 marks).**

END OF QUESTIONS

END OF PAPER

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