



Regional
NSW

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

EXAMINATION: Mechanical engineering manager

EXAM PAPER: CME1 – Mechanical engineering practices applicable to underground coal mines

DATE: 25 November 2021 – 8:50 am to 12:00 pm

EXAMINATION FOR CERTIFICATE OF COMPETENCE TO BE A MECHANICAL ENGINEERING MANAGER OF UNDERGROUND COAL MINES

Issued under the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

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 2017

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

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

Candidates shall be seated in the exam room no later than 8:30 am for exam instructions.

10 minutes reading time is allowed prior to the start of the examination. Candidates can use a **highlighter only** to mark points of importance during the reading time, but may not begin answering the questions. You must NOT use any other writing item during the reading time such as a pen.

It is expected that candidates will present their answers in an engineering manner, making full use of diagrams, tables, relevant schematics where applicable, and showing full workings in calculations. Consideration will be given when marking for **legibility in diagrams and handwriting**.

Provide answers in point form wherever appropriate. If you are unable to fit your answers in the available space use the three (3) blank pages included at the end of the paper. Ensure the question you are answering is clearly marked.

Electronic aids may not be used, apart from a non-programmable calculator.

All six (6) questions are to be attempted.

All questions are of equal value, but parts of questions may vary in value. The marks applicable to each part of a question will be indicated adjacent to the question.

This examination is a **closed book** examination – that is you cannot bring any reference material in to refer to during the exam, such as copies of legislation. Reference material will be provided in the exam paper as applicable.

Place your identification number only, NOT your name, at the start of this paper at the commencement of the exam – that is after the reading time is over.

EXAMINATION BOOKLET

Question Number	Mark	Availabl emark	Marked by <i>Name</i>	Summary comments to justify, as necessary
1	1		18	
	2		6	
	3		6	
	4		6	
	5		6	
	6		6	
	7		6	
	8		3	
	9		3	
	Total		60	
2	A		20	
	B1		8	
	B2		7	
	B3		10	
	B4		9	
	B5		6	
	Total		60	
3	A		20	
	B		20	
	C		20	
	Total		60	
	Subtotal I		180	

Question Number	Mark	Available mark	Marked by <i>Name</i>	Summary comments to justify, as necessary
4	1	10		
	2	12		
	3	20		
	4	10		
	5	8		
	Total		60	
5	A1	12		
	A2	12		
	A3	10		
	B1	6		
	B2	10		
	B3	10		
	Total		60	
6	A1	4		
	A2	12		
	A3	9		
	A4	9		
	B1	12		
	B2a	5		
	B2b	5		
	B2c	4		
	Total		60	
PAPER TOTAL		360		<i>Marks checked by:</i>

If marking is reviewed under approved processes, then examiner is to record details:

Date	Examiner	Questions reviewed	Marks changed	Details/justification, as necessary
Eg. 2/8/19	Andrew Palmer	All	Q1 – 4 (previously 5)	Found one more criteria

Question 1 – Elevated Work Platforms

60 marks

Mines use a diverse range of plant to provide access for maintenance and inspection, from scissor lifts and cherry pickers, to work platforms attached to forklifts, telehandlers, and LHDs.

- 1. Identify nine (9) hazards associated with the use of elevated work platforms (18 marks)

Your mine is planning to use a QDS / RAS work platform attached to the front of an LHD. As part of the change management process identified in your introduction to site system you are checking the functionality of the LHD work platform combination, particularly the risk of the work platform dropping rapidly, or in a jerking / uncontrolled manner.

2. Draw the hydraulic schematic symbol for a pressure relief valve (6 marks)

	/ 6
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3. Draw the hydraulic schematic symbol for a pilot operated check valve (6 marks)

	/ 6
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4. In the context of controlling the movement of an LHD mounted work platform what is the function of a pilot operated check valve? (6 marks)

	/ 6
--	-----

5. Draw the hydraulic schematic symbol for a counterbalance / load lock valve

(6 marks)

	/ 6
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6. In the context of controlling the movement of an LHD mounted work platform what is the function of a counterbalance valve? (6 marks)

	/ 6
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7. What is the advantage of using a counterbalance valve over using a pilot operated check valve? (6 marks)

	/ 6
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8. What additional hydraulic component is normally required to be added into a hydraulic circuit that supports a load when using a pilot operated check valve? (3 marks)

	/ 3
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9. What is the disadvantage of adding this hydraulic component? (3 marks)

	/ 3
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Question 2 - Winders

60 marks

Part A – Technical Reference Guide: Powered Winding Systems Part 2: Drift Winders (20 marks)

1. What is the general drift gradient for personnel and materials winding systems (2 marks)

	/ 2
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2. Dimensionally how is the standard rail track gauge of 1067mm determined by measurement? (2 marks)

	/ 2
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3. What is the general maximum rail track gauge tolerance, including wear, for straight sections of track? (2 marks)

	/ 2
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4. Based on AS 1085.1 what rail size is recommended for drift tracks? (2 marks)

	/ 2
--	-----

5. What is the maximum acceleration / deceleration of the dolly car in the drift? (2 marks)

	/ 2
--	-----

6. When determining the spacing between rope rollers what is the maximum angle the rope should bend over rope support rollers? (2 marks)

	/ 2
--	-----

7. Name two types of conveyance rail brake systems commonly used on dolly cars (4 marks)

	/ 4
--	-----

8. What is the difference between an end of track limit and an end of travel limit? (4 marks)

	/ 4
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Part B – Technical scenario

(40 marks)

Due to degradation of the slope haulage winder rope your mine has engaged a winder specialist company to remove the old winder rope and replace it. The winder is currently rated at 45 tonnes end of rope load when the dolly car is at the drift bottom travel limit. The drift is 1200 metres long at a slope of 1 in 3.5, with a further 100 metres from the portal to the winder drum which is at the same ground level as the portal. The winder rope is 52mm diameter weighing 11.8 kg/m.

1. What rope construction would you normally use on the drift winder? (8 marks)

(8 marks)

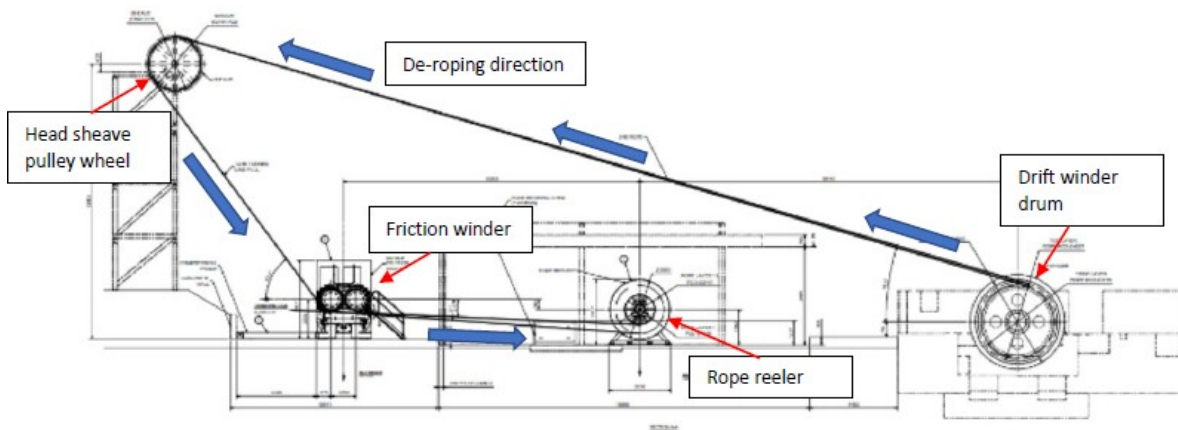
	/ 8
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2. For this scenario, and when considering the dolly car is fully loaded at pit bottom, draw the load diagram and write the formulas you would use to calculate the actual load on the rope as it wraps onto the winder drum? (7 marks)

	/ 7
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The winder specialist proposes a method for changing out the drift winder rope utilising a high powered friction winder to ensure there is the required preload on the rope when the new rope is wound onto the winder drum.

Figure 1 Drift winder de-roping procedure



5. In reviewing the winder specialists safe work procedure for the rope change out what controls would you expect them to put in place to manage the hazards you identified above? List three (3) (6 marks)

	/ 6
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Question 3 – Target answers

60 marks

Part A – Multiple choice

(20 marks)

Identify **ALL correct answer(s)** for each multiple choice question. If you circle one or more incorrect answers then the whole answer is marked incorrect. (2 marks each)

- a) Which legislative mechanism details the specific requirements of a safety management system
 - i. Work Health and Safety Act
 - ii. Work Health and Safety Regulation
 - iii. Work Health and Safety (Mines and Petroleum Sites) Act
 - iv. Work Health and Safety (Mines and Petroleum Sites) Regulation
- b) Work Health and Safety Regulation Part 4.1 Noise, Clause 56, nominates an exposure standard for noise of:
 - i. Average 12 hour exposure LAeq of 90 dB(A), and peak LC of 150 dB(A)
 - ii. Average 12 hour exposure LAeq of 85 dB(A), and peak LC of 140 dB(A)
 - iii. Average 8 hour exposure LAeq of 85 dB(A), and peak LC of 140 dB(C)
 - iv. Average 8 hour exposure LAeq of 90 dB(A), and peak LC of 130 dB(C)
- c) Work Health and Safety Regulation Part 4.1 Noise, Clause 58, requires the PCBU to provide audiometric testing to a worker frequently required to wear PPE to protect from the risk of hearing loss when:
 - i. The worker commences employment to set a baseline for possible workers compensation claims
 - ii. Annually, and if the worker submits a claim for hearing loss
 - iii. The worker commences employment, and then annually
 - iv. Within 3 months of the worker commencing the work, and at least every 2 years

- d) Work Health and Safety Regulation Part 4.3 Confined spaces, Clauses 66 to 77, identify a number of controls required to safely access confined spaces, and include which of the four following items:
- i. Confined space entry permit, signage, ladders, emergency procedures
 - ii. Risk assessment, atmospheric monitoring, breathing apparatus, signage
 - iii. Confined space entry permit, atmospheric monitoring, connected plant and services, emergency procedures
 - iv. Risk assessment, air locks, communication and safety monitoring, PPE in emergencies
- e) Work Health and Safety Regulation Part 4.4 Falls, Clause 79 specific requirements to minimise risk of fall, does NOT apply to which of the following work:
- i. The performance of stunt work
 - ii. The performance of acrobatics
 - iii. Theatrical performances
 - iv. A sporting or athletic activity
 - v. Horse riding
 - vi. Underground mining
 - vii. Residential accommodation construction
- f) In preparing a site standard of engineering practice (SEP) for safe working at heights which of the following Australian standards would you refer to?
- i. AS1418.17
 - ii. AS1657
 - iii. AS1891
 - iv. AS1892
- g) Of the following items of plant used in underground mining which has the highest operating fluid pressures
- i. Longwall powered roof support
 - ii. Electro hydraulic in seam gas drill rig
 - iii. Diesel engine LHD
 - iv. Continuous miner
- h) According to MDG 41 Fluid power safety systems at mines what is the minimum factor of safety for hydraulic hose assemblies and adapter fittings
- i. 3:1
 - ii. 4:1
 - iii. 6:1
 - iv. 8:1
- i) According to MDG 41 Fluid power safety systems at mines what is the minimum factor of safety for other fluid power components, such as cylinders, valves, actuators or similar
- i. 2:1
 - ii. 2.5:1
 - iii. 3.5:1
 - iv. 4:1
- j) What Australian Standard is referenced in relation to the safe use of elevated work platforms (EWP's), scissor lifts, boom lifts, and telehandlers
- i. AS2250.10
 - ii. AS4024
 - iii. AS2081
 - iv. AS2671

Part B – True or False - Winding Ropes**(20 marks)**

For each question place an 'X' in the box corresponding to True or False

(2 marks each)

		Question	True	False
1		The rope factor of safety for a vertical shaft drum winder shall not be less than 6.0:1 where the safety of personnel is involved		
2		The rope breaking force used in calculating the rope factor of safety is the lesser of the minimum design breaking force for new ropes, and the actual breaking force of the rope when new		
3		Drift winder rope discard criteria include:		
	a	The factor of safety falls below 10 as identified by testing		
	b	There is a loss of breaking strength greater than 10% of the as new rope strength		
	c	The discard criteria in AS4812 is exceeded		
	d	The loss of metallic area of the outer wires exceeds 10%		
4		Newly installed guide ropes for vertical shaft conveyances shall have a factor of safety not less than 5		
5		A friction winder balance rope factor of safety shall not be less than 6 when newly installed		
6		WHS(MPS) Regulation clause 47 (d) control measures that detect any of the following malfunctions that may be present—		
	a	Unsafe guide rope conditions		
	b	Rope slip		

Part C – Short answer**(20 marks)**

1. What is Pressure intensification

(5 marks)

2. What are the elements in the hierarchy of controls

(5 marks)

/ 5

3. Hydraulic system design should minimise the risk of injury to operators and maintenance personnel from the uncontrolled escape of pressurised fluids. Controls should be provided in accordance with the hierarchy of controls. List five (5) controls you would consider. (5 marks)

/ 5

4. When referring to elevated work platforms what does the term secondary safeguarding mean? (5 marks)

/ 5

Question 4 – Hot work management plan

60 marks

Your mine has been reviewing its five year plan, and identified the need to start routinely performing hot work on site in the near future. As Mechanical Engineer you are nominated to develop a hot work management plan (HWMP) for the site

1. What are five (5) major steps you will go through to develop the HWMP (10 marks)

/ 10

2. List six (6) highly relevant reference documents and / or standards you will refer to in the development of the HWMP (12 marks)

/ 12

5. List four (4) pre use / daily inspections required for an oxy acetylene set (8 marks)

	/ 8
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Question 5 – Mobile plant 60 marks

Part A – AS3584.2 Diesel engine systems for underground coal mines (34 marks)

1. Section 1.3.3 defines explosion protected diesel engine systems (ExDES) as a diesel engine that is designed, manufactured and maintained so it will not propagate or generate flame or sparks, which could initiate an explosion of the surrounding atmosphere. It identifies eight (8) items or components that the ExDES includes. List six (6). (12 marks)

	/ 12
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Part B – Stockpiles and Reclaim Tunnels

(26 marks)

1. Draw down points on stockpiles are considered hazardous to mobile plant, such as dozers, operating in proximity to them. List three (3) contributing factors to a dozer being caught in a draw down point. (6 marks)

	/ 6
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2. If a dozer were to become engulfed on a coal stockpile what potential risks of harm to personnel should you consider. List five (5) (10 marks)

	/ 10
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3. What additional controls should be installed on stockpile dozers to minimise the risk to dozer drivers from operating on coal stockpiles. List five (5) (10 marks)

	/ 10
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Question 6 – Preventative controls

60 marks

Part A – Frictional ignition

(34 marks)

Your mine has had a recent incident where flames were observed at the mining face of a continuous miner development panel. There were no injuries, but the mine has not encountered this issue before. The Mining Engineering Manager believes the incident was as a result of frictional ignition.

1. What is frictional ignition? (4 marks)

	/ 4
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4. For one of the controls you identified above list three (3) inspection and verification methods you would implement to ensure the ongoing effectiveness of the control (9 marks)

	/ 9
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Part B – Non Destructive Testing (NDT)

(26 marks)

In maintaining the structural integrity of plant and equipment at the operation there are a number of Non Destructive Testing techniques used to assist in determining the condition.

1. Identify six (6) common NDT techniques used at coal mines (12 marks)

	/ 12
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2. For one (1) of the NDT techniques identified in your answer above describe:

a. How it is carried out?

(5 marks)

	/ 5
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b. Why it is used?

(5 marks)

	/ 5
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c. What are two (2) applications where it would be used?

(4 marks)

	/ 4
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END OF QUESTIONS

**BLANK PAPER TO WRITE ANSWERS THAT YOU COULD FIT INTO THE SPACE
PROVIDED – INDICATE QUESTION NUMBER AT START OF ANSWER**

END OF PAPER



Regional
NSW

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

EXAMINATION: MECHANICAL ENGINEERING MANAGER

EXAM PAPER: CME2 – Legislation and standards applicable to underground coal mines

DATE: Thursday, 25th November 2021 – 1.05 pm to 3.15 pm

EXAMINATION FOR CERTIFICATE OF COMPETENCE TO BE A MECHANICAL ENGINEERING MANAGER OF UNDERGROUND COAL MINES

Issued under the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*

INSTRUCTIONS TO CANDIDATES:

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EXAMINATION BOOKLET

Question Number		Mark	Available mark	Marked by <i>Name</i>	Summary comments to justify, as necessary
1	1		12		
	2		12		
	3		24		
	4		12		
	Total		60		
2	1		10		
	2		14		
	3		15		
	4		15		
	5		6		
	Total		60		
3	1		6		
	2		8		
	3		5		
	4		8		
	5		3		
	6		15		
	7		15		
	Total		60		
	Subtotal		180		

Question Number	Mark	Available mark	Marked by <i>Name</i>	Summary comments to justify, as necessary
4	1	15		
	2	45		
	Total	60		
5	1	3		
	2	15		
	3	16		
	4	16		
	5	10		
	Total	60		
6	A1	15		
	A2	15		
	B1	18		
	B2	12		
	Total	60		
PAPER	TOTAL	360		<i>Marks checked by:</i>

If marking is reviewed under approved processes, then examiner is to record details:

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Eg. 2/8/19	Andrew Palmer	All	Q1 – 4 (previously 5)	Found one more criteria

2. What are the four (4) aspects referred to in this clause?

(12 marks)

	/12
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3. For each of the four aspects identified above list three safety management system documents that may be developed to specifically manage the aspect, such as the mines broad brush risk assessment. You cannot list a document more than once. (24 marks)

Question 2 – Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

(Total 60 marks)

Principal Mining Hazards

There is a risk of fatalities and serious injury in all parts of the mining sector that requires everyone to be vigilant and proactive in meeting their responsibilities. Learning from experience, preventing devastating reoccurrences, and improving the health and safety of all people working in the industry is a profound way of acknowledging and recognising all those that have been affected by mining safety incidents throughout history.

1. In Clause 5 what is the meaning of “Principal Mining Hazards”? (10 marks)

	/10
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2. List the seven (7) of the ten Principal Mining Hazards identified in Clause 5 (14 marks)

WHS(MPS) Regulations Schedule 1 Part 2 Clause 4 Roads or other vehicle operating areas

The following matters must be considered in developing the control measures to manage the risks of roads or other vehicle operating areas—

- a) mobile plant characteristics, including*
- b) the effect on road conditions of expected environmental conditions during operating periods (including time of day, weather, temperature and visibility),*
- c) the impact of road design and characteristics, including grade, camber, surface, radius of curves and intersections,*
- d) the impact of mine design, including banks and steep drops adjacent to vehicle operating areas,*
- e) the volume and speed of traffic and the potential for interactions between mobile plant with different operating characteristics, including heavy and light vehicles,*
- f) the potential for interactions between mobile plant and pedestrians, including consideration of park up areas and driver access,*
- g) the potential for interaction between mobile plant and public traffic,*
- h) the potential for interaction between mobile plant and fixed structures, including overhead and underground power lines, tunnel walls and roofs.*

3. With respect to Clause 4 (a) what matters does the legislation requires you to consider in relation to mobile plant characteristics? List five (5) of the six. (15 marks)

/15

4. For one of the matters identified above detail three (3) controls, specific to that mobile plant characteristic, that you would implement to manage the risks associated with it. (15 marks)

	/15
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5. When considering the requirements of 4 (e) to (h) list three (3) controls you would implement at your mine the mitigate the potential for vehicle collisions. (6 marks)

	/6
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**Question 3 – Work Health and Safety (Mines and Petroleum Sites) Regulation
Winding Systems**

(Total 60 marks)

Winders are often an integral component of mechanical plant in underground mines, especially in the NSW coal regions of the Illawarra, Blue Mountains and Lake Macquarie

1. According to Clause 3 what is the definition of a “winding system”? (6 marks)

	/6
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Clause 47 Mine shafts and winding systems

- (1) *The mine operator of an underground mine (other than an opal mine) must ensure that every winding system used or that may be put into use at the mine includes the following—*
- (a) *ropes and devices that can withstand all forces reasonably expected to be borne by the ropes and devices,*
 - (b) *control measures to prevent, so far as is reasonably practicable, any shaft conveyance from*
 - (c) *.....*
 - (d) *control measures that detect any of the following malfunctions that may be present—*
 - (i) *.....*
 - (ii) *.....*
 - (iii) *.....*
 - (iv) *.....*
 - (e) *control measures that cause the winder to be brought to a safe state when a condition or malfunction referred to in paragraph (d) is detected,*
 - (f) *warning systems to alert persons at the mine to any emergency in a winding system,*
 - (g) *if it is reasonably practicable, remote monitoring of the functions of the system,*
 - (h) *an effective means of communication—*
 - (i) *between the surface and any shaft conveyance used for carrying persons, and*
 - (ii) *between the point of control of the winder and the entry to every shaft that is in use,*
 - (i) *a device that safely attaches ropes to conveyances,*
 - (j) *in the case of multi-rope winders*

2. According to 47 (1) (b) list all four (4) conditions with respect to the shaft conveyance that must be prevented. (8 marks)

	/8
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3. According to Clause 47 (1) (c) how many braking systems are required for any winding system and why? (5 marks)

	/5
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4. Clause 47 (1) (d) requires control measures that detect four (4) types of malfunctions. List all four (8 marks)

	/8
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5. According to Clause 47 (1) (j) in the case of multi rope winders what must be provided? (3 marks)

	/3
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WHS(MPS) Regulations Schedule 1 Part 1

3 Mine shafts and winding systems

The following matters must be considered in developing the control measures to manage the risks associated with mine shafts and winding systems—

- (a) the potential for instability and loss of integrity of the shaft,*
- (b) the potential for fires in underground operations, the shaft or winder areas,*
- (c) the potential for any unintended or uncontrolled movement of conveyances within the shaft,*
- (d) the potential for a conveyance to fall down the shaft,*
- (e) the potential for failure of, or damage to, equipment and control measures, including the following—*
.....
- (f) the potential for injury to a person from—*
.....
- (g) provision for the emergency exit of persons from a conveyance.*

6. With respect to mine shafts and winding systems, when considering 3 (d) what effective control measures would you implement and maintain to prevent the potential for a conveyance to fall down the shaft. Describe five (5) controls. (15 marks)

	/15
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7. With respect to mine shafts and winding systems Clause 3 (g) requires provision for the emergency exit of persons from a conveyance. Describe three (3) methods you would consider for your vertical shaft friction winder. (15 marks)

	/15
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Question 4 – Work Health and Safety Act 2011

(Total 60 marks)

1. The legislative framework identifies a number of individual positions and groups who have a defined responsibility for safety on mine sites. Identify three (3) of these individual positions or groups. (15 marks)

	/15
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2. Each of the individual positions or groups you have identified above have specified duties and obligations under legislation. Using dot points list the legislated duties for each one. (45 marks)

Question 5 – Underground Mobile Diesel Plant

(Total 60 marks)

Work Health and Safety (Mines and Petroleum Sites) Regulation

39 Ensuring exposure standards for dust and diesel particulate matter not exceeded (cl 636 model WHS Regs)

- (1) The operator of a mine or petroleum site must, so far as is reasonably practicable, minimise the exposure of persons at the mine or petroleum site to dust and diesel particulate matter and must ensure that no person at the mine or petroleum site is exposed to 8-hour time-weighted average atmospheric concentrations of airborne dust and diesel particulate matter that exceed—*
 - (a) for respirable dust—3 milligrams per cubic metre of air, or in the case of a coal mine, 1.5 milligrams per cubic metre of air, or*
 - (b) for inhalable dust—10 milligrams per cubic metre of air, or*
 - (c) for diesel particulate matter— (measured as sub-micron elemental carbon).*

1. Effective from 1st February 2021, what is the prescribed diesel particulate matter exposure limit for Clause 39 (1) (c)? (3 marks)

	/3
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Schedule 2 Principal control plans—matters to be addressed

2 Mechanical engineering control plan

- (3) The following matters must be taken into account when developing a control measure referred to in subclause (2)—*
 - (g) the risks associated with diesel engines including pollutants and, in the case of underground coal mines, the arrangements for meeting and maintaining any requirements for registration under clause 177 of this Regulation and Part 5.3 of the WHS Regulations in relation to plant with a diesel engine,*
 - (j) the risks associated with the transfer and storage of combustible liquids and other hazardous or volatile material associated with the use of plant or structures,*

Your mine runs a fleet of rubber tyred mobile plant that includes personnel transports, LHD's, a grader and a bobcat.

2. Describe five (5) methods of managing diesel exhaust emissions in an underground coal mine (15 marks)

/15

81 Internal combustion engines

The mine operator of an underground coal mine must ensure that no internal combustion engine is permitted—

- (a) at the mine, unless the engine is explosion-protected or fire-protected, or*
- (b) in any hazardous zone at the mine, unless the engine is explosion-protected.*

Note— Clause 34 and Schedule 4 prevent the use of internal combustion engines underground unless the engine is a compression ignition engine

3. Clause 81 identifies the requirements for use of specific types of engines underground. Describe an example of where a non-explosion protected internal combustion engine may be required to go underground, and identify four (4) controls you would put in place to enable this to occur? (16 marks)

/16

Diesel Engine System (DES) requirements

4. Fill in the missing words (16 marks)

71 Ventilation

(3) The mine operator of an underground coal mine must ensure that in any part of the mine where persons work and travel and where one or more diesel engines are in operation, the ventilation system provides an average volume of air measured across the work or travel area of—

(a) if the design of each of the engines is _____ under Part 5.3 of the WHS Regulations and a _____ is specified for the engine under that _____—whichever is the greater of—

- (i) the _____ so specified, or*
- (ii) _____, or*

(b) in any other case—whichever is the greater of—

- (i) _____ for each kilowatt of the _____ of those engines, or*
- (ii) _____.*

/16

5. With respect to the requirements of Clause 71 (3), as the Mechanical Engineering Manager what systems and documents would you be involved in preparing, or contributing to, to ensure compliance? List five (5) (10 marks)

	/10
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Question 6 – Work Health and Safety Act

(Total 60 marks)

Part A – Work Health and Safety Act Section 19 Primary duty of care

(30 marks)

19 Primary duty of care

- (1) A person conducting a business or undertaking must ensure, so far as is reasonably practicable, the health and safety of--*
- (a) workers engaged, or caused to be engaged by the person, and*
 - (b) workers whose activities in carrying out work are influenced or directed by the person, while the workers are at work in the business or undertaking.*
- (2) A person conducting a business or undertaking must ensure, so far as is reasonably practicable, that the health and safety of other persons is not put at risk from work carried out as part of the conduct of the business or undertaking.*
- (3) Without limiting subsections (1) and (2), a person conducting a business or undertaking must ensure, so far as is reasonably practicable--*
- (a) the provision and maintenance of a work environment without risks to health and safety, and*
 - (b) the provision and maintenance of safe plant and structures, and*
 - (c) the provision and maintenance of safe systems of work, and*
 - (d) the safe use, handling, and storage of plant, structures and substances, and*
 - (e) the provision of adequate facilities for the welfare at work of workers in carrying out work for the business or undertaking, including ensuring access to those facilities, and*

(f) the provision of any information, training, instruction or supervision that is necessary to protect all persons from risks to their health and safety arising from work carried out as part of the conduct of the business or undertaking, and

(g) that the health of workers and the conditions at the workplace are monitored for the purpose of preventing illness or injury of workers arising from the conduct of the business or undertaking.

1. You are reviewing the Mechanical Engineering Control Plan (MECP) for your mine. List five (5) subordinate systems or Standards of Engineering Practice (SEP) you plan to have in place to manage the requirements of WHS Act Section 19 (3) (b) over the lifecycle of plant and structures? (15 marks)

	/15
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2. The safety management system requires a hierarchal structure of documents to effectively manage hazards at the operation. List five (5) tiers of mechanical documents, from highest to lowest, that you will use to manage WHS Act Section 19 (3) (c) with respect to mechanical plant and structures (15 marks)

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Part B – Gazette No46, Friday 13th March 2020

(30 marks)

Consider the following gazette notice issued in relation to ancillary notice requirements for fire on mobile plant.

WORK HEALTH AND SAFETY (MINES AND PETROLEUM SITES) REGULATION 2014

Ancillary Reports – Fire related to mobile plant 2020

I, Garvin Burns, Chief Inspector, with the delegated authority of the Secretary of the Department of Planning, Industry and Environment, under clause 131 of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014* (the Regulation), do, by this notice, specify that:

- (a) an ancillary report must be provided to the regulator in respect of any incident described in the following clauses (but only in respect of such incidents that relate to fires on mobile plant):
 - i. 128(5)(a) of the Regulation, being an event referred to in clause 179(a)(ii) of the Regulation;
 - ii. 128(5)(t) of the Regulation;
 - iii. 179(a)(ii) of the Regulation;
 - iv. 179(b) of the Regulation.
- (b) an ancillary report must include the information specified in Schedule 1 of this notice
- (c) an ancillary report must be provided to the regulator using the Regulator Portal online form available at: <https://nswresourcesregulator.service-now.com/regulator>
- (d) the notice Ancillary Reports – Fire Related to Mobile Plant published in the NSW Government Gazette No 8 of 30 January 2015 is revoked on the day this notice commences.

This notice commences on the date of publication in the NSW Government Gazette and has effect until revoked.

Dated this 11th day of March 2020.

Garvin Burns
Chief Inspector of Mines
NSW Department of Planning, Industry and Environment

Schedule 1

Explanatory notes

As specified in this notice, an ancillary report must be provided to the regulator in respect of the following incidents (but only in respect of such incidents that relate to fires on mobile plant):

- an incident described in clause 128(5)(a) of the Regulation, being an event referred to in clause 179(a)(ii) of the Regulation—that is, an uncontrolled implosion, explosion or fire that would have been a dangerous incident if a person were reasonably in the vicinity at the time when the incident or event occurred and in usual circumstances a person could have been in that vicinity at that time (a **high potential incident**);
- an incident described in clause 128(5)(t) of the Regulation—that is, an uncontrolled fire on mobile plant that is in operation (whether operated directly, remotely or autonomously) (a **high potential incident**);
- an incident described in clause 179(a)(ii) of the Regulation—that is, an incident in relation to a workplace that exposes a worker or any other person to a serious risk to a person's health or safety emanating from an immediate or imminent exposure to an uncontrolled implosion, explosion or fire (a **dangerous incident**);
- an incident described in clause 179(b) of the Regulation—that is, 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 (a **dangerous incident**).

Ancillary reports are a separate and additional requirement to the initial notification of the incident to the regulator. Ancillary reports must be completed and submitted to the regulator no later than 30 days after the incident was required to be notified to the regulator.

Mobile plant means any item of plant that is self-propelled and ordinarily under the direct control of an operator. This also includes items of plant that are capable of being directly operated but are being operated autonomously or under remote control. Mobile plant does not include transportable plant which is relocated to be operated such as generators, diesel pumps and lighting towers.

Competent person has the same meaning as in clause 5 of the *Work Health and Safety Regulation 2017*.

The information that must be included in the ancillary report is set out below:

2. Fill in the blanks to identify what statement(s) and sign off(s) are also required to accompany the information in the ancillary report? (12 marks)

11. A statement by a _____ certifying that:

- a. they have _____ the content of the ancillary report; and
b. to the best of their knowledge the information supplied in the ancillary report is _____ in every particular.

12. A sign-off from an _____ declaring that:

- a. they have _____ from the mine operator to _____ the ancillary report on their behalf, and
b. to the best of their knowledge, the information provided in the ancillary report is _____ in every particular.

	/12
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END OF QUESTIONS

**BLANK PAPER TO WRITE ANSWERS THAT YOU COULD FIT INTO THE SPACE
PROVIDED – INDICATE QUESTION NUMBER AT START OF ANSWER**

END OF PAPER