

WESTERN AUSTRALIA
UNDERGROUND SUPERVISOR'S CERTIFICATE OF COMPETENCY
MINING PRACTICAL EXAMINATION

2 October 2013

Time allowed: **Three (3) hours**
Reading Time: **15 minutes**

ADVICE TO CANDIDATES

- **Answers must be written in ink or ball point pen.**
- **Use sketches to describe your answers where appropriate.**
- **Sketches may be done in pencil.**
- **Check that you have the correct examination paper.**

A Total of 60 per cent is required for a pass.

Read all questions carefully and make sure that you understand what you are being asked to do.

THERE ARE SEVEN (7) QUESTIONS IN THE PAPER.
ANSWER ONLY FIVE (5) OF THE SEVEN (7) QUESTIONS

QUESTION 1

A new operator has started at your mine. He has had a formal induction, but it appears to you that he is not fully familiar with the procedure for Reporting of Emergencies.

Write down the main points which he should know about the following:

- (a) What actions must be taken in case of an emergency?
(e.g. fire, rock fall, injury,etc) (7 marks)
- (b) In what manner should an emergency report be made and what information has to be provided when reporting an emergency? (8 marks)
- (c) If a telephone report is made, in what circumstances is the person making the report allowed to leave the telephone location? (5 marks)

(TOTAL 20 Marks)

QUESTION 2

Describe in detail what you understand by the following terms (use sketches where appropriate).

- (1) Fresh air bases
- (2) Atmospheric contaminant.
- (3) Decked charges.
- (4) Blasting initiation system.
- (5) Responsible person (in relation to a mine)
- (6) High voltage
- (7) Trailing cable
- (8) Cut-off grade
- (9) Dilution
- (10) Raise.

(TOTAL 20 Marks)

QUESTION 3

A small underground mine is to be brought in to operation in a remote locality. You have been appointed as underground manager and your first priority is the preparation of a project management plan. One of the requirements of such a plan is a broad assessment of the major risks and a summary of the strategies proposed to manage those risks.

- (a) **List eight (8) possible hazards that could occur at the mine** **8 marks**
- (b) **What means would you consider for preventing, or dealing with the risks associated with the above hazards?** **12 marks**

Total 20 marks

QUESTION 4

List six(6) ways in which dust or fumes may be generated in the underground working environment.
In each case describe how the dust or fumes may be minimised and the miners protected.

(TOTAL 20 Marks)

QUESTION 5

Rockfalls have resulted in a number of fatalities and are a major cause of injury. Many of the accidents occur during “barring down”.

- (a) As the training supervisor, what basic rules or instructions would you give your new recruits on “barring down”.
Give the reasons for your instructions. **8 marks**

The backs of a 100m section of unsupported 5m x 5m decline are showing signs of serious deterioration and are to be bolted and meshed.

- (b) What equipment would you require to do the job safely? **6 marks**
- (b) List, in the correct sequence, the work necessary to perform the task. **6 marks**

(TOTAL 20 Marks)

QUESTION 6

It is intended to sample the ore in a mine that has not been worked for some years and has been allowed to flood with water. Water level is at 10m below the collar of the shaft which consists of three compartments.

The shaft is known to be 75m deep and has levels at 30m and 60m depth. There are crosscuts to the ore which have been developed on both levels. Sections have been timbered and partly stoped. Describe fully the methods and precautions you would take in dewatering the shaft and workings, and setting the samplers to work.

(TOTAL 20 Marks)

QUESTION 7

Whilst doing your round on night shift you come across one of your men who has been pinned against the wall by a large rock. Although the person is conscious it is obvious that he is seriously injured.

- (a) What immediate action would you take? 10 marks
- (b) List the additional actions you would take and procedures you would initiate to ensure that a rescue was promptly and efficiently effected. 10 marks

(TOTAL 20 Marks)

END OF PAPER

WESTERN AUSTRALIA
UNDERGROUND SUPERVISOR'S CERTIFICATE OF COMPETENCY
MINING PRACTICAL EXAMINATION

April 2013

Time allowed: **Three (3) hours**
Reading Time: **15 minutes**

ADVICE TO CANDIDATES:

- **Answers must be written in ink or ball point pen.**
- **Use sketches to describe your answers where appropriate.**
- **Sketches may be done in pencil.**
- **Check that you have the correct examination paper.**

A Total of 60 per cent is required for a pass.

Read all questions carefully and make sure that you understand what you are being asked to do.

THERE ARE SEVEN (7) QUESTIONS IN THE PAPER.
ANSWER ONLY FIVE (5) OF THE SEVEN (7) QUESTIONS

QUESTION 1

A new employee underground with basic competency levels in blasting has been given the task of secondary breaking of oversize rocks in a number of mill-holes. Bogging from the mill-holes is being carried out at the same time by a front end loader tramping to a nearby grizzly.

Blasting is permitted at any time.

As his supervisor, what instructions would you give to this employee to enable him to carry out his task, and what precautions would you stress to him so that he can work safely and not endanger others.

Total 20 marks

QUESTION 2

In hot and humid conditions the risk of heat stress or heat exhaustion is present, and may cause serious health problems, to the extent that death may occur.

- (a) As manager, what precautions would you take with regard to hot and humid conditions?
- (b) Summarise the factors you would discuss in an induction of new employees with regard to heat related problems.

Total 20 marks

QUESTION 3

Under the Mine Safety Inspections Regulations each person going underground shall be provided with a self rescuer.

- (a) Describe briefly how a self rescuer works.
- (b) When should a self rescuer be used?
- (c) What are the main limitations of a self rescuer?

(Your answers should be directed to the self-contained type, but not both).

12 marks

- (d) List eight (8) important topics (other than self rescuers) that you would include in an induction for underground workers.

8 marks

Total 20 marks

QUESTION 4

Describe how you would ventilate the following workplaces:

- (a) A shaft being sunk from surface whose current depth is 200 metres

OR

An advancing decline heading being developed 200 metres from the portal.

5 marks

- (b) A crosscut being developed using an airleg and loader.

5 marks

- (c) A blind stope with a rearing at each end.

5 marks

- (d) A blind rise whose face is 10 metres above the backs of the level.

5 marks

Total 20 marks

QUESTION 5

Describe in detail what you understand by the following terms:

- | | |
|--------------------------------|-------------------------|
| (a) Butt | (f) Pillar |
| (b) Primer | (g) Eye Bolt |
| (c) Foot Wall and Hanging Wall | (h) Brattice |
| (d) Friction Stabiliser | (i) Charged Hole |
| (e) Bearer | (j) Emulsion Explosives |

Total 20 marks

QUESTION 6

Many incidents are reported to the Department where fires occurred in underground operations.

- (a) List eight (8) potential causes of fire. **4 marks**
- (b) Define the fire precautions you would require at the following:
- i. An underground mobile equipment workshop **4 marks**
 - ii. An underground diesel refuelling area **4 marks**
 - iii. A shaft plat or pump station **4 marks**
 - iv. A main underground explosive magazine **4 marks**

Total 20 marks

QUESTION 7

Before driving a light vehicle, what safety checks (pre-start and after start) must be made?

What other precautions must be taken whilst driving a light vehicle underground and when leaving it parked underground in order to inspect the workplace?

Total 20 marks

END OF PAPER

WESTERN AUSTRALIA
UNDERGROUND SUPERVISOR'S CERTIFICATE OF COMPETENCY
MINING EXAMINATION (PRACTICAL)

3 October 2012

Time allowed: **Three (3) hours**
Reading Time: **15 minutes**

Answers must be written in ink or ball point pen.
Use sketches to assist your answers where possible.
Sketches may be done in pencil.

THERE ARE SIX QUESTIONS:

QUESTION 1 IS COMPULSORY

ANSWER FOUR (4) OTHER QUESTIONS OF YOUR CHOICE

A total of 60 per cent is required for a pass.

Read all questions carefully and make sure that you understand what you are being asked to do.

QUESTION 1 (Compulsory question)

Select one stoping method (eg in a mine you have worked at) and describe the details of it. Indicate in your answer the type of ore and width of the mining block. Your answer should include:

1. A sketch of the stope development layout, together with a cross section of the stopes indicating the size of the mining excavations.
2. Details of the method of ore breaking and of ore transportation.
3. A sketch of the primary and secondary ventilation air flow related to the stope.
4. Ground support is a requirement including specification of the type of ground support with the installation pattern.
5. A list of equipment used and a general description of the equipment.
List advantages and disadvantages of this mining method.

TOTAL: (20 Marks)

QUESTION 2

You have been asked by the Manager to produce a written blasting procedure for the underground operation. Draw up a procedure highlighting the safety issues you consider are paramount for each part of the procedure under the following headings:-

- | | |
|---|------------------|
| (a) Preparation for charging up. | (4 Marks) |
| (b) Charging up. | (3 Marks) |
| (c) Connection to the blasting circuit. | (3 Marks) |
| (d) Clearance for firing. | (4 Marks) |
| (e) Firing process. | (3 Marks) |
| (f) Clearance after firing. | (3 Marks) |

TOTAL: (20 Marks)

QUESTION 3

The remote control loader while working inside a large long hole open stope has stopped and is not responding to the control unit. Describe the procedure you would adopt to recover the loader, highlighting the essential safety considerations for the recovery. The LHD can be seen and the engine is still running, it is however 20 metres inside the stope beyond the brow.

TOTAL: (20 Marks)

QUESTION 4

There are varying types of ground support available for use in an underground mine. Explain what are the good and bad points about the following types of support:

- (a) Point anchor bolts.
- (b) Resin grouted steel bars.
- (c) Split set bolts.
- (d) Cable bolts.
- (e) Mesh and shotcrete.

(10 Marks)

Under what circumstances would you use each type of support, and in what situations would you use combinations of them.

(10 Marks)

TOTAL: (20 Marks)

QUESTION 5

You have recently been appointed as the Shiftboss on a decline mine.

The Manager has asked you to draw up a procedure for inspecting the underground travelling ways. These include:

- (a) The main decline
- (b) An emergency escape rise equipped with a ladder

Draw up a procedure for inspecting each travelling way indicating the frequency of inspection, equipment to be used and the hazards to be aware of in the work itself and to be inspected for.

TOTAL: (20 Marks)

QUESTION 6

Outline the full procedures for re-entry into a workplace after blasting in either stoping or development situations.

Identify any particular problems you may encounter and the means of overcoming them.

TOTAL: (20 Marks)

QUESTION 7

- (a) Underground fires can be extremely dangerous and every underground mine should be prepared for such an event.
- (i) Describe briefly how a self rescuer works.
 - (ii) When should a self rescuer be used?
 - (iii) What are the main limitations of a self rescuer?

(Your answer should be directed to either the filter type of the self contained type).

(10 Marks)

- (b) List ten important topics other than self rescuers you would include at an induction for underground workers on the subject of underground fires.

(10 Marks)

TOTAL: (20 Marks)

END OF PAPER

WESTERN AUSTRALIA
UNDERGROUND SUPERVISOR'S CERTIFICATE OF COMPETENCY
MINING EXAMINATION

18 April 2012

Time Allowed: **Three (3) hours**
Reading Time: **15 minutes**

Answers must be written in ink or ball point pen.
Use sketches to assist your answers where possible.
Sketches may be done in pencil.

THERE ARE SIX QUESTIONS:

QUESTION 1 IS COMPULSORY

ANSWER FOUR (4) OTHER QUESTIONS OF YOUR CHOICE

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Read all questions carefully and make sure that you understand what you are being asked to do.

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1. A sketch of the stope development layout, together with a cross section of the stopes indicating the size of the mining excavations.
2. Details of the method of ore breaking and of ore transportation.
3. A sketch of the primary and secondary ventilation air flow related to the stope.
4. Ground support is a requirement including specification of the type of ground support with the installation pattern.
5. A list of equipment used and a general description of the equipment.
List advantages and disadvantages of this mining method.

32 marks

Attempt any four of the following five questions

Question 2

When driving up a decline, an ore truck operator noticed smoke coming from the engine. He immediately stopped the truck, turned off the engine and pressed a fire suppression button. The fire suppression system did not work. He quickly got off the truck and tried to use a portable fire extinguisher which was attached to the front of the truck. The brace of the extinguisher was bent and the extinguisher could not be removed. Fortunately the driver recalled that there was another fire suppression button at the front of the truck and pressed the button. This time the system worked and smoke was extinguished. The whole action took about one minute and smoke quickly disappeared and the air in the decline was clear. There were no injuries but the potential for disastrous consequences was evident.

The driver calls you on a phone some five minutes later and advises you about the incident. Describe your immediate action (including getting information from the driver on telephone) and the follow up action to prevent similar occurrences in the future.

17 marks

Question 3

A new part of the orebody is being mined. You have to assess the stability of the ground and advise the miners on the type of support they have to use.

1. List all ground condition parameters which you should take into account.
2. List the different types of support you can choose from.
3. Give factors you would take into account when selecting the support.
4. Select a support system and list installation quality checks that can be performed.

17 marks

Question 4

You are required to provide secondary ventilation for a new 3.5 x 2.5 m strike drive. The drive will be 200 m long and will be developed using diesel equipment. An 18 kW electric fan and 720 mm flexible ducting will be used for ventilation purposes.

Describe in detail how and where you would install a fan and ventilation ducting to provide air to the face throughout the development of the drive.

In your answer you should describe the equipment and procedures that you would use during installation and operation of the fan.

Use a sketch to illustrate the airflow.

17 marks

Question 5

Describe in detail what you understand by the following terms - use sketches where appropriate:

- a) extra low voltage
- b) trailing cable
- c) exemption
- d) classified plant
- e) butt
- f) detonator
- g) primer
- h) mechanical bolt
- i) level
- j) grizzly

17 marks

Question 6

An ore pass (3 m in diameter and 65 m long) full of broken ore has not been used for some weeks. When drawing ore it has been observed that water was draining out through the rock at the bottom of the ore pass. After drawing about 400 tonnes of ore it has been realised that the ore pass was blocked between levels.

Give remedial action you would take and describe methods of clearing the blocked ore passes which you could apply.

17 marks

THE END OF PAPER
