

## Written examination for a coal mine (surface) BEUL reference - 2018

### Examination paper

The exam comprises of 22 questions, with sub parts, requiring 36 answers to be provided.

Candidates have three hours to complete the examination. 10 minutes reading time will be provided prior to the commencement of the examination. Only a highlighter can be used during this period.

ALL questions are to be attempted.

The calculation question number 18 on page 17 must be answered so the candidate achieves a minimum of 5 marks out of 10. If the candidate fails to achieve this then they will not pass the exam.

ALL questions are not of equal value. The exam is marked out of 100 and question values are noted for each question.

### Question 1

State the names of the Acts that control the use of explosives in the NSW coal mines. (2 marks)

### Question 2

What are the legal obligations under the “duty of care” the shotfirer is responsible to implement? (5 marks)

### Question 3

Name the licence issued by SafeWork that allows a person to have unsupervised access to explosives (2 marks)

### Question 4

Briefly explain what the following terms mean:

- a) Critical diameter
- b) VOD
- c) Echelon
- d) Critical density
- e) Charging density
- f) Powder factor
- g) Dead press

h) Sympathetic detonation

i) MIC

j) PPV

(1 mark each for a total of 10 marks)

### Question 5

As a shortfirer in charge, who do you contact if you find out that explosives are missing/unaccounted/stolen? (2 marks)

### Question 6

What are the top five hazards associated with open cut coal mines blasting? (5 marks)

### Question 7

Describe the snap, slap and shoot phenomenon. (3 marks)

### Question 8

What are the advantages and disadvantages of electronic initiation systems? List at least three of each.

a) Advantages (3 marks)

b) Disadvantages (3 marks)

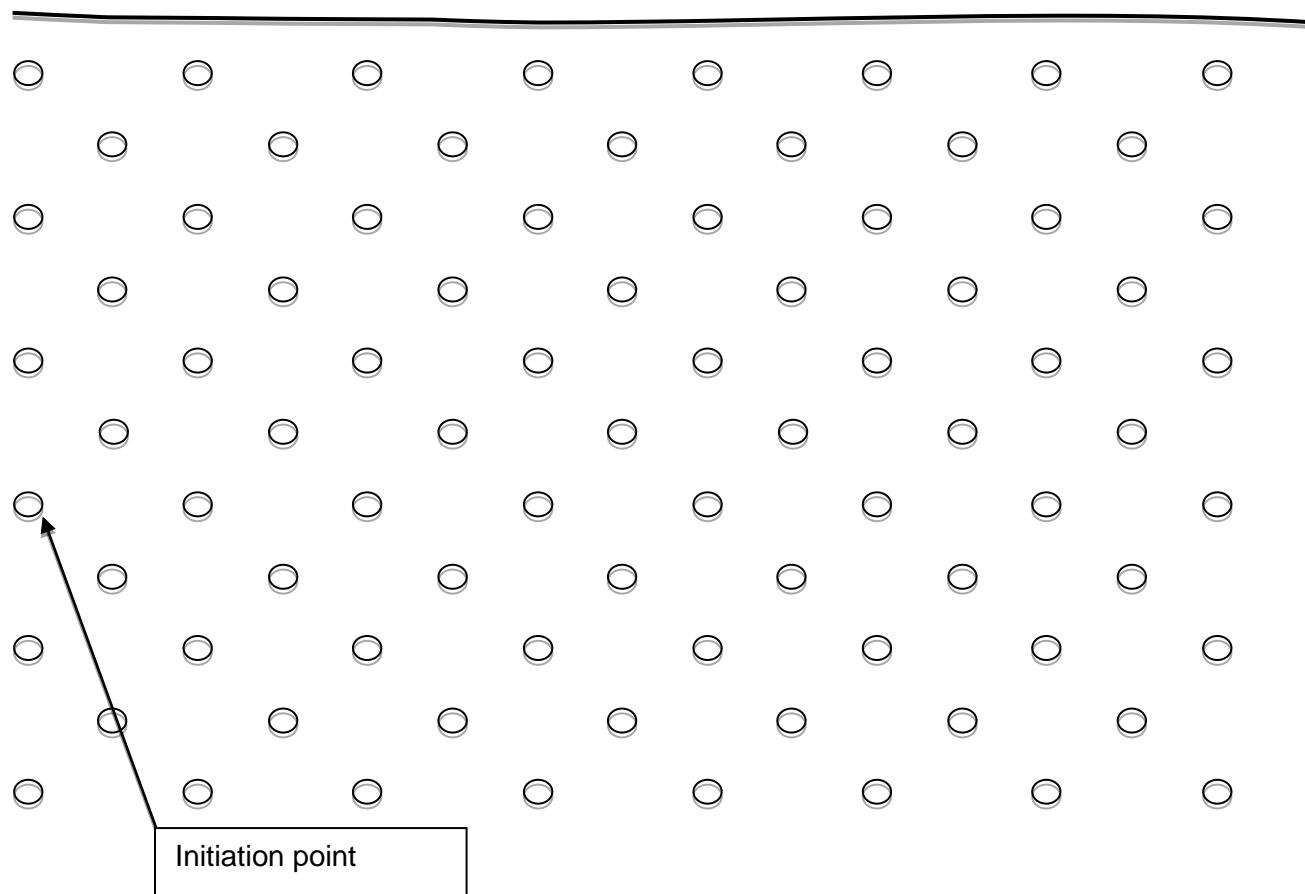
### Question 9

State two visual observations that would indicate that a detonator was defective. (2 marks)

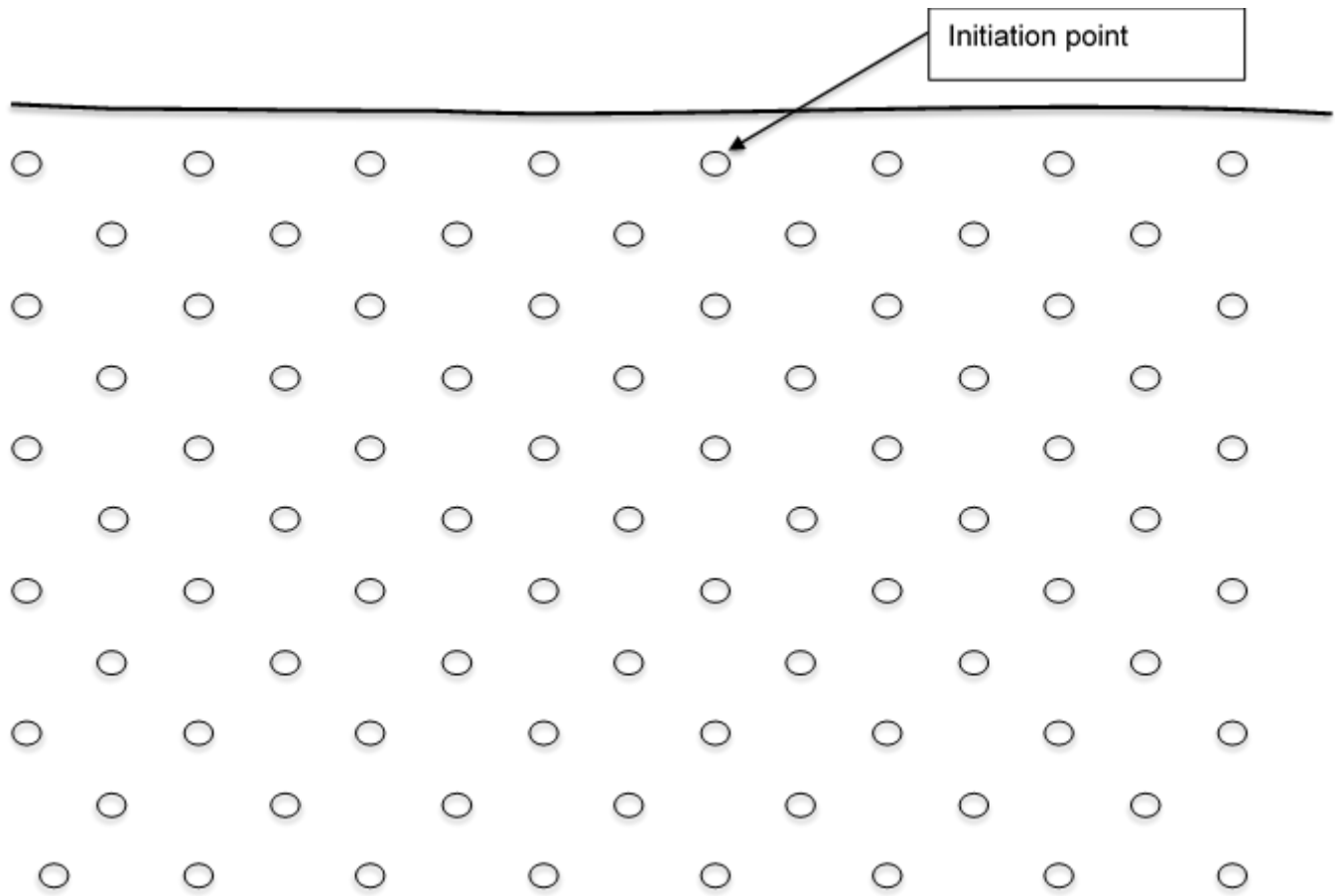
## Question 10

Tie up the following patterns, including delay timing on each hole. (total 15 marks)

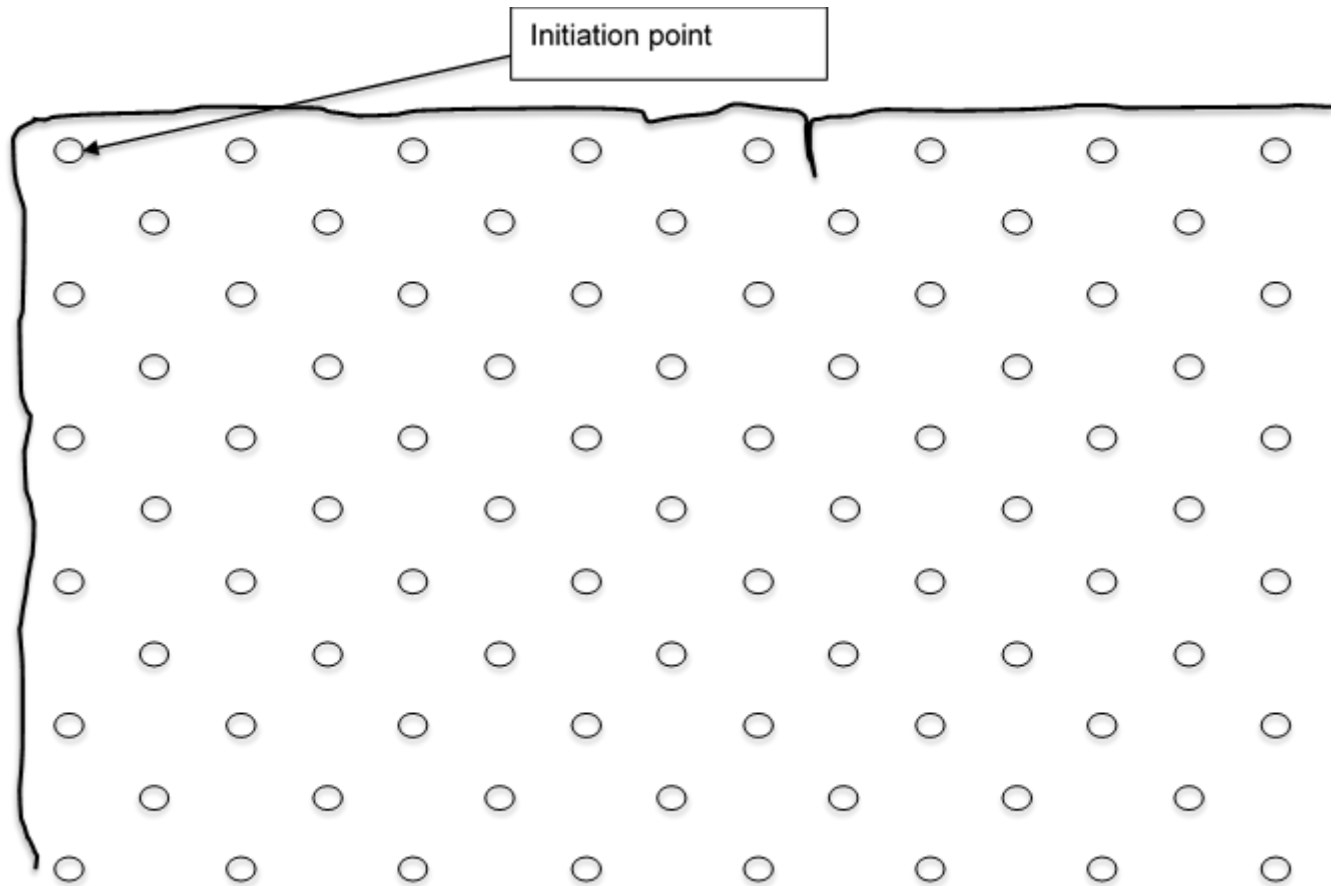
a) Zipper shot (5 marks)



b) V shot (5 marks)



c) Throw shot (5 marks)



### Question 11

State the factors that would contribute to the desensitisation of ANFO? (2 marks)

### Question 12

State the basic ingredients of an emulsion explosive composition. (3 marks)

### Question 13

What are the physical differences between ANFO, ISANOL and HEAVY ANFO? (3 marks)

### Question 14

State two factors that will influence the fragmentation size of a material to be blasted. (2 marks)

### Question 15

What type of stemming should be used for open cut coal mine blasting? Explain the reason. (2 marks)

### Question 16

What would you, as the shotfirer, do if you had to leave the blast site during charging operations? (2 marks)

### Question 17

Explain the difference between hot hole blasting and reactive ground blasting. (4 marks)

### Question 18

A 35m bench to coal is required to be blasted for a dragline. The holes are dry.

The plan was for a 3m toe of heavy ANFO (density  $1.3\text{g/cm}^3$ ), a column of ANFO (density  $0.8\text{g/cm}^3$ ) and a cap of 2m of heavy ANFO (density  $1.0\text{g/cm}^3$ ). However, the drillers reported a hard band from 20 to 23m in the hole, so the plan now includes a 5m charge of heavy ANFO (density  $1.2\text{g/cm}^3$ ) at the hard band (4 explosives products in the hole).

The pattern has been drilled with a 311mm diameter bit.

The stemming height is set to 16.5 times the diameter of the hole.

The burden has been set to 8.0m and the spacing set to 11.0m to provide the best fragmentation.

Calculate the Powder Factor for this blast. (Show workings.)

(tip – draw a blast hole). (10 marks)

### Question 19

What precautions must be taken before any charge is fired? (6 marks)

### Question 20

State the reasons for inspecting the muckpile after each blast. (4 marks)

## Question 21

During the postblast inspection, you identify that a control row shutdown has occurred. Explain:

- a) What has happened? (2 marks)
- b) What steps you would take (2 marks)

## Question 22

During the half way charging process of a big shot, a significant lightning storm is approaching. As a shottfirer in charge, what will you do:

- a) to manage the situation? (cover people, shot area, storage of explosives) (3 marks)
- b) to ensure all blastholes are appropriately charged and fired safely? (list at least 6 points) (6 marks)

## More information

NSW Department of Planning and Environment

Resources Regulator

Mining Competence Team

T: 02 4063 6461

Email: [minesafety.competence@planning.nsw.gov.au](mailto:minesafety.competence@planning.nsw.gov.au)

## Acknowledgement

### BEUL examination panel

© State of New South Wales through the NSW Department of Planning and Environment 2018.

This publication is copyright. You may download, display, print and reproduce this material in an unaltered form only (retaining this notice) for your personal use or for non-commercial use within your organisation. To copy, adapt, publish, distribute or commercialise any of this publication you will need to seek permission from the NSW Department of Planning and Environment.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (October 2018). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the NSW Department of Planning and Environment or the user's independent advisor.

DOC18/754811