Written examination for a coal mine (surface) BEUL reference - 2017

Instructions to candidates

The exam comprises of 10questions.

Candidates have two hours to complete the examination.

ALL questions must be attempted.

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

Conduct

Calculators may be used.

Computers, mobile phones and similar devices are not allowed.

No written material is allowed into the exam, the exam is 'closed book'.

This exam paper must be returned at the completion of the exam.

Candidates are not permitted to talk to any person other than the examiner during the course of the examination.

Comfort breaks are allowed, candidates are to notify the examiner if a break is needed

Candidates who fail to meet the required conduct will be failed.

Candidates will be permitted to progress to an oral examination if a mark of 75% or greater is achieved in this written exam. If a mark of less than 75% is achieved, candidates can re- sit the examination after a period of 3 months.

Question 1

All holes in the pattern are 5 m deep and have been drilled with a 200 mm diameter drill bit. The D&B engineer has instructed you to put 65 kgs of emulsion product (density 1.15g/cc) in each hole. There are no air decks or gas bags in the hole.

What would the length of the stemming column be?

(5 marks)

Question 2

What are the advantages and disadvantages of electronic initiation systems?

List at least three of each.

Advantages:

Disadvantages:

(6 marks)

Question 3

A 40 m bench to coal is required to be blasted for a dragline.

The holes are dry. The plan was for a 3 m toe of 1.3 density heavy ammonium nitrate fuel oil **(**ANFO), a column of ANFO (density of 0.85 g/cc) and a cap of 2 m of 1.0 density heavy ANFO. However, the drillers reported a hard band from 22 m to 25 m in the hole, so the plan now includes a 5m charge of 1.2 density heavy ANFO at the hard band (four explosive products in the hole).

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

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

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

Calculate the powder factor for this blast. (tip draw a blast hole)

(10 marks)

Question 4

Explain the difference between hot hole blasting and reactive ground blasting. (3 marks)

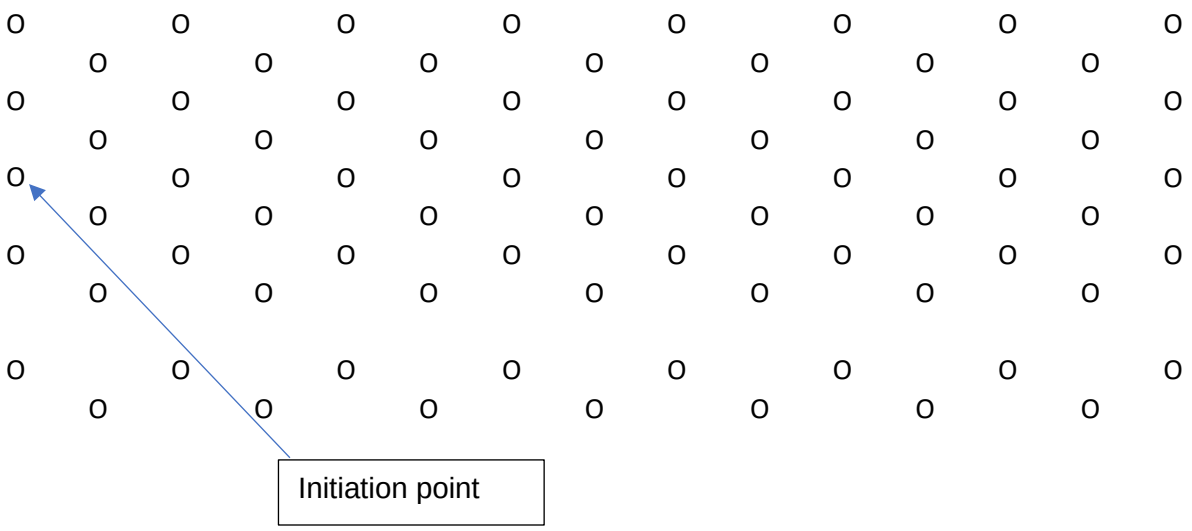
Detail the processes involved in hot hole blasting. (9 marks)

(12 marks – in total)

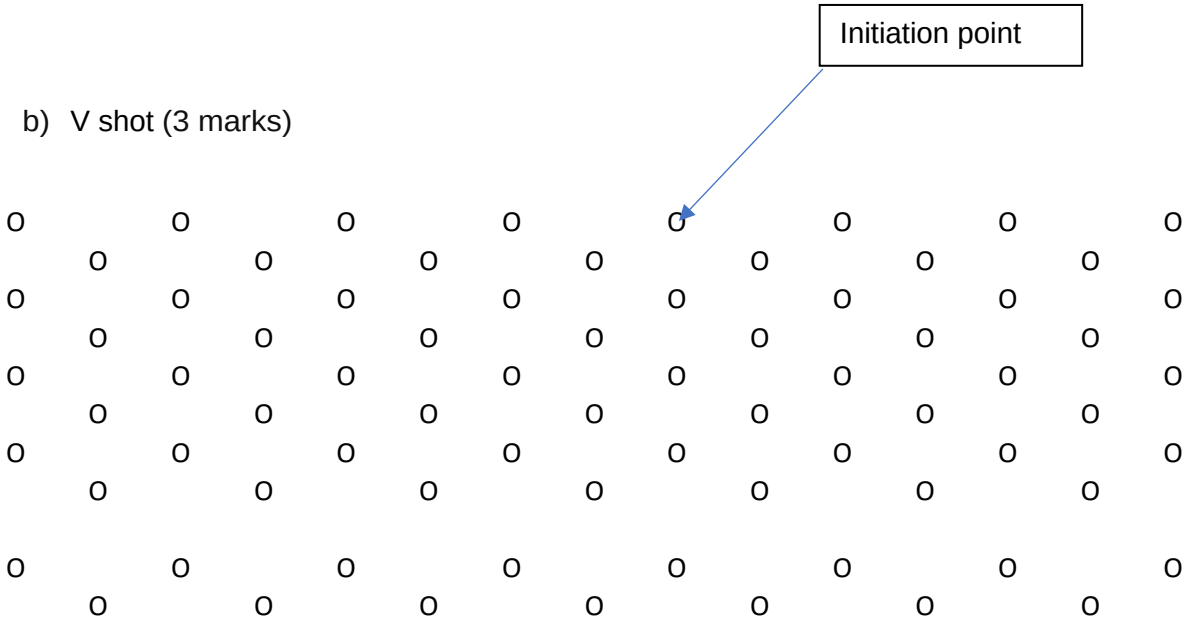
Question 5

Tie up the following patterns, including delay timing on each hole.

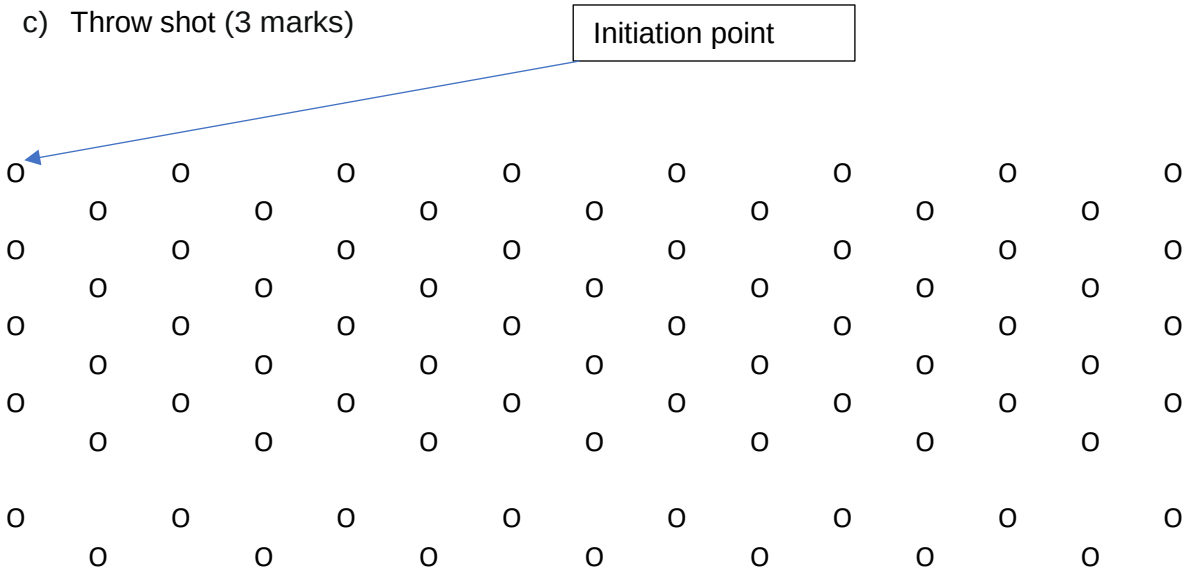
a) Zipper (3 marks)



b) V shot (3 marks)



c) Throw shot (3 marks)



(9 marks in total)

Question 6

You are the shotfirer in charge. What steps would you take in the following scenarios? (Note: do not state 'follow misfire procedure'. Detail your steps taken.)

1. You are loading a shot. A member of your crew tells you that he has lost a booster/detonator assembly down a hole.
    a. What has happened?
    b. What steps would you take?

2. The shot is tied up using electronic detonators. Your trainee shotfirer tells you that a detonator is not talking.
    a. What has happened?
    b. What steps would you take?

3. You fire the shot. During the post blast inspection, you observe that a control row shutdown has occurred.
    a. What has happened?
    b. What steps would you take?

4. An excavator has reported prill and signal tube in the dig face. The supervisor has contacted you and asked you to take care of it.
    a. What has happened?
    b. What steps would you take?

(4 marks a question - 16 marks in total)

Question 7

You are the shotfirer in charge of the shot. Overnight there has been a significant storm - no lightning observed). What items do you check on the shot prior to starting work?

List at least six points. (6 marks)

What methods can be used to reduce the potential for fume creation from blasting?

List at least 4 points. (4 marks)

(10 marks in total)

Question 8

You are the only shotfirer at a new open cut operation in the Gunnedah basin. The MEM has asked you to complete a broadbrush risk assessment of the shotfiring process.

List the top five risks /hazards that you would consider (10 marks)

What does M.IC. stand for? (1 mark)

What does M.I.C. mean? (2 marks)

What does V.O.D. stand for? (1 mark)

What does ANFO stand for? (1 mark)

(15 marks)

Question 9

Calculate the pattern size for an interburden blast which is to be drilled using 200mm diameter holes in a bench height of 9.5 m to achieve a powder factor of 0.56 kg/bcm when loaded with emulsion product (density 1.20 g/cc). The stemming height is 17.5 times the hole diameter.

(10 marks)

Question 10

What are the standard limits for vibration and overpressure at the nearest point of interest (POI) from blasting in the Hunter Valley area?

Detail at least five methods to reduce the vibration impacts on neighbours from blasting.

More information

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Acknowledgments

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