



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

FIRST SEMESTER EXAMINATION, NOV/DEC 2018

COURSE NO: GL 229 Unihubgh.com
COURSE NAME: ELEMENTS OF MINING AND ROCK FRAGMENTATION
CLASS: GD II **TIME:** 3 HOURS

Name: _____ Index Number: _____

SECTION A (15 marks)

Answer True/False to the Following Questions

1. A shaft may be either inclined or vertical.
2. Shafts are mostly sunk in the hangingwall.
3. Raises can be driven to provide ventilation.
4. Hinged type of rippers is relatively inexpensive.
5. The crosscut is excavated to terminate in a stope drive.
6. The primer has higher VOD than the explosive column.
7. Flushing is sometimes used to stabilize the walls of the drill hole.
8. The efficiency of ripping increases as the formation gets progressively harder.
9. The ripping distance method is claimed to be the best ripping method available.
10. Refraction seismograph technique gives the degree of consolidation of the formation.
11. The tool bar is that section of the whole ripper assemblage on which the shank is attached.
12. Generally, development in surface mining operations is more expensive than underground.
13. The main components of the ripper are: tip, point, shank, tool bar, beam and power assembly.
14. In conventional top-hammer drilling, the mechanism impacting energy remains inside the hole.
15. Adit is a horizontal or nearly horizontal u/g passage that is open to the atmosphere at both ends.

SECTION B (15 marks)

Choose the Correct Answer

1. A material of any natural consolidation or unconsolidation that overlies a deposit which must be removed to get access to the desired material is?
(a) Prospect (c) Hanging
(b) Overburden (d) Gangue
2. Surface mining methods include the following except
(a) Placer (c) Open Stope
(b) Open Pit (d) Open Cast

3. The size of ground vibrations does not depend on
 - (a) Quantity of co-operating changes
 - (b) Constriction
 - (c) Drilling pattern
 - (d) Characteristics of the rock

4. is used for supporting the floor of an excavation.
 - (a) Sill
 - (b) Crown
 - (c) Barrier
 - (d) Rib

5. In this ripping method, the area to be ripped is first determined after which ripping depth or penetration is measured to obtain the volume of material ripped.
 - (a) Ripping distance method
 - (b) Number of scrapper hauled method
 - (c) Cross-section method
 - (d) Bank-volume method

6. All the following are physical characteristics which favour ripping except
 - (a) Weathering
 - (b) Large grain size
 - (c) Massive and homogeneous formations
 - (d) Moisture permeated clay

7. Drilling accessories includes the following except
 - (a) Circulatory fluid
 - (b) Drill bits
 - (c) Drill rods
 - (d) Coupling sleeves

8. Joining of two or more drill rods is called
 - (a) Tandem
 - (b) Coupling
 - (c) Drill-string
 - (d) Drilling system

9. The process of removing debris from a drill hole is known as
 - (a) Drill cuttings
 - (b) Circulating fluid
 - (c) Flushing
 - (d) Blasting

10. The following are considered when choosing a drill bit for a drilling system except
 - (a) Penetration rate
 - (b) Flushing medium
 - (c) Service life
 - (d) Drill hole straightness

11. Auxiliary operations in mining include the following except ;
 - (a) Hoisting
 - (b) Ground control
 - (c) Dewatering
 - (d) Atmospheric pollution control

12. The vertical distance between the crest and toe of a bench is called.....
 - (a) Bench face
 - (b) Slope height
 - (c) Bench height
 - (d) Berm

13. Which of the following is not true about placer mining
 - (a) Materials can be blasted
 - (b) Materials are unconsolidated
 - (c) Materials undergo chemical weathering
 - (d) Material requires little or no grinding

14. Solution mining can be done for the following minerals except
 - (a) Potash
 - (b) Uranium
 - (c) Sulfur
 - (d) Gangue

15. The grade at which the recoverable revenue exactly balances the specified category of cost is called
 - (a) Balancing grade
 - (b) Cut-off grade
 - (c) Breakeven grade
 - (d) Mill head grade

SECTION C (60 marks)

Answer all Questions

With your background in Elements of Mining and Rock Fragmentation (GL 229), you have been consulted to assist Effuanta Gold Mining Company (EGMC) in the design of their drilling and blasting operations. The drill and blast parameters provided by management of the mine are as follows: Blasthole diameter (127 mm), Burden (3.5 m), Spacing (4 m), Hole depth (10), Stemming height: (3 m), Subdrill: 1 m, Explosive density: 1.20 g/cc (emulsion). Fig. 1 is a layout of the proposed blast design. Management has decided to construct an explosive magazine on site and also contract explosive service providers for the supply of explosives to the mine. **Use this preamble to answer the questions below:**

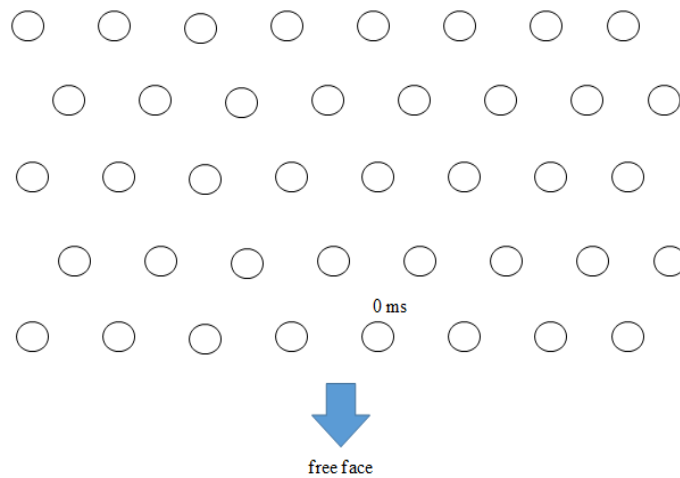


Fig. 1 Blast Layout

1. Give three licenses EMC should acquire before exploitation of the mineral (3 marks).
2. Name two explosive companies in Ghana you can contract to supply explosives to EGMC? (2 marks)
3. Give three (3) features you would see inside the explosive magazine. (3 marks).
4. Give three (3) security features you would put in place at the magazine. (3 marks)
5. How far should the explosive magazine be located from human settlement? (2 mark)
6. Name the regulation that governs the storage and handling of explosives in Ghana?(2 mark)
7. What drilling pattern is employed in Fig. 1? Any alternative? (4 marks)
8. Calculate the total quantity of explosives required for this blast. (5 marks)
9. What is the technical name for the explosive truck used to transport emulsion to the blast site? (1 mark)
10. What is the volume of material to be blasted? (2 mark)
11. What is the powder factor for this blast? (2 mark)
12. What initiation system would you adopt for the blast and why? (2 marks)

13. Given that; the downline has 500 ms delay, design the firing sequence for the blast using 25ms delay between the rows and 17 ms between the holes in the rows. (6 marks)
14. What is the Maximum Instantaneous Charge (MIC) for this blast? (5 marks)
15. Give any three stemming material you can employ for this blast. (3 marks)
16. Give three (3) precautions you would take before firing the holes? (3 marks)
17. What four (4) effects you expect from this blast? (4 marks)
18. What factors (3) would determine the level of ground vibrations for this blast? (3 marks)
19. Under what circumstances (2) would you employ deck loading for this blast? (2 marks)
20. Discuss three environmental impacts of exploiting the mineral at Effuanta. (3 marks)

GOOD LUCK!

Course Examiners: Sylvester Yenzanya/Dr George Agyei