

ANNEXURE F.

EXAMINATIONS UNDER THE MINING ACT, 1908.

QUESTIONS ASKED AT THE 1911 EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY AS MINE-MANAGERS.

SUBJECT A.—*The Laying-out and Construction of Shafts, Chambers, Main Drives or Levels, Uprises, and Stopes.*

1. (a.) A vertical shaft to be sunk 1,000 ft. situated 50 ft. to the north-west of outcrop of a lode striking north-east and south-west and underlaying to south-east 12° from the perpendicular; the shaft to be 14 ft. by 6 ft. in clear of timber; to be timbered with framed sets and struddles, and divided into three compartments, one for pumping and two for hauling ore, &c.

(b.) Give the size you would make each compartment in the clear, also the size of timber you would use (the country being of medium hardness) for sets, struddles, and dividing-pieces.

(c.) Make a sketch-plan showing how you would fit the timbers, hang the sets, and the distance apart you would place them from centre to centre.

(d.) How far would you have to crosscut from bottom of shaft to reach the lode? (a.) Give the height of backs on course of reef from floor of level to surface.

(e.) On opening up the lode for stoping (provided it is 10 ft. wide) give the most suitable distances you would adopt between the levels. (b.) Give the height of chambers you would open and size of timbers you would use.

(f.) Having driven the levels, state how far apart you would sink winzes or put uprisers to facilitate filling up worked-out stopes and ventilation.

SUBJECT B.—*The Timbering of Shafts, Adits, Main Drives or Levels, Passes, Stopes, and generally the Systems of timbering Mines and filling up Old Workings.*

1. In stoping or beating out a lode (say, 10 ft. wide), state how far apart you would fix the ore-passes; describe how you would timber them; also the size in clear to avoid broken ore hanging up.

2. State where you would place ladder-roads, how far you would have them apart in the level, how you would timber them, and what size is the most convenient for travelling in.

3. Show by a sketch how you would timber stopes where the lode is friable and 20 ft. wide. To what height would you stope before filling in?

4. Where the output of ore is 200 tons per eight-hours shift, how many lines of rails would you have in crosscut, from chamber to level on lode, where timber is required? State size in clear sets would require to be to admit double line of rails, 2 ft. gauge.

5. Give the different systems of stoping in mines. Describe the shrinkage method fully.

6. State how you would timber a level where the walls are soft. Give a sketch showing how you would fit the sets, and the size and description of timber. Would you use sills?

7. What is the breaking-strain in tons of a rimu cap-piece uniformly loaded 18 in. diameter and 6 ft. span? Give the size of legs of same material 7 ft. to equal cap-piece.

SUBJECT C.—*The Ventilation of Mines and Composition of Gases.*

1. Prepare a chart or table for fire-damp, white-damp, and black-damp, under the following headings: Proper name; Chemical formula; Specific gravity; Character; Effect upon man; Explosive-proportions; Caused by; Test for; Where found.

2. How and where would you test the quantity and quality of air circulating in a mine which was reported to be inadequately ventilated? State the minimum velocity which an anemometer will correctly register.

3. Describe and sketch a "Sirocco" fan; state the special advantages claimed for this fan, and how the ventilation may be reversed when using one.

4. A current of 25,000 cubic feet of air is split into three airways, A, B, and C, having the following dimensions: A, area 6 ft. by 9 ft., length 700 yards; B, area 6 ft. by 10 ft., length 800 yards; C, area 4 ft. by 10 ft., length 300 yards: how will the quantity divide itself among these splits if no regulators are used and all splits are subject to a common pressure?

SUBJECT D.—*Tapping Water in Mines, and the Mode of constructing Dams in Underground Workings to keep the Water back.*

1. In approaching old and extensive lode-workings containing 300 ft. of water, for safety (independent of statutory provisions) what should be (a) the maximum width of the drive, (b) the minimum length and greatest diameter of the boreholes, (c) the angle of and distance apart of flank-holes, (d) the position of the flank-holes, (e) the discharge of water in gallons per minute when tapped by the borehole?

2. Describe and illustrate by sketches how you would prepare the site and construct an underground dam to resist a pressure of water due to a static head of 1,000 ft. Calculate the thickness of such a dam if constructed of hardwood having an ultimate crushing-strength of 10,000 lb. per square inch.