

4. Write down your opinion as to when a steel rope should be discarded through natural tear-and-wear.
5. Describe any system of underground haulage with which you are acquainted.
6. Would you approve of employing a single-link chain for raising and lowering men in a shaft? Why?
7. Describe any safe catch, and its different parts in detail, that could be adopted for a cage.
8. What horse-power would be required to lift 200 tons per hour 1,000ft., each lift occupying $1\frac{1}{2}$ minute, weight of cage, &c., $2\frac{1}{2}$ tons?

FOURTH DAY.—TIME: 2 P.M. TO 5 P.M.

SUBJECT H.—*The Effect that Faults, Slides, and Mullock-bars have on Lodes, and how to ascertain the Direction of Slides and Heavals.*

Give six diagrams, with fully written explanations, to illustrate the effect that is exercised on mineral lodes by faults, slides, and mullock-bars; and describe instances from your personal observations.

SUBJECT J.—*A Knowledge of the Different Rocks where Gold, Silver, Tin, Copper, Zinc, Lead, and Antimony are found, and on the Formation of Lodes and Leads.*

1. What metallic ores are usually associated with killas slate, propolyte, serpentine, and limestone respectively?
2. What is the composition of the chief ores of silver, lead, tin, antimony, copper, and zinc?

SUBJECT K.—*A Knowledge of Arithmetic and the Method of keeping Accounts.*

1. Divide 3·1416 by 0·007 and extract the cube root of the quotient to two places of decimals.
2. If four men could excavate a piece of ground 12ft. long, 10ft. wide, and 10ft. deep in two days and a quarter, working eight hours a day, how long would it take one man and one boy to do the same work, if three boys are equal to one man?
3. If an 18-carat gold chain weighs 2oz. 8dwt., and the alloy contained therein is in equal portions of silver and copper, what is the exact weight of gold, silver, and copper respectively in the chain?
4. What is the difference in the capacity of a circular vat 22ft. in diameter and 4ft. deep and of a square tank with 22ft. sides and 4ft. deep?
5. Find the cost of the following pieces of timber at the rate of 12s. 6d. per 100ft. :—
 15 pieces 9ft. lengths, 12in. by 1in.
 10 pieces 14ft. lengths, 16in. by 1in.
 126 pieces 9ft. lengths, 9in. by 1in.
 26 pieces 18ft. lengths, 4in. by 4in.
 15 pieces 12ft. lengths, 3in. by 2in.
6. A gold-mining company has a capital of £80,000, and makes a profit for the year of £5,200, what percentage dividend can be declared after deducting £1,500 for depreciation of machinery?

QUESTIONS USED IN EXAMINATION OF SECOND-CLASS MINING MANAGERS.

("The Mining Act, 1891.")

FIRST DAY.—TIME: 9 A.M. TO 12 NOON.

[Candidates must attempt to answer every question. All calculations to be shown in detail.]

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

1. In laying out the position of a vertical shaft to work a lode dipping at an inclination of 60° eastward, if the outcrop of the lode was seen on the surface, state where you would sink the shaft in relation to the lode, giving your reasons fully.
2. In sinking an inclined shaft, what provision would you make for raising the excavated material to the surface, and what appliances would you use?
3. Give the dimensions of a main level or drive for a double line of rails, and also the dimensions of a chamber you would construct if there were sixty men employed in each shift below ground.
4. What is meant by a "pass"? What is its use, and how would you construct one?
5. If a quartz lode were dipping at an angle of 55°, and you were to sink a vertical shaft on the outcrop of the lode on the surface to a depth of 600 ft., what distance would you have to drive from the bottom of the shaft to cut the lode?

SUBJECT C.—*On the Ventilation of Mines.*

1. What is meant by "ventilation"? Why is it required?
2. What gases are found in quartz-mines? Give their composition, and state how you would detect their presence in a mine.
3. How is ventilation produced—(a) by natural means, (b) by mechanical means? State fully how you would produce it by both systems.
4. How would you ascertain when the air in a mine is deleterious and unfit for workmen to be employed therein?