

SUBJECT C.—*Quicksilver, and the Methods of using it in connection with the Extraction of Gold and Silver from Ores.*

1. State the quantity of quicksilver you would use in each of the following amalgamating-machines—namely, Berdan-McKay pan, Watson-Denny pan, and combination pan—and give your reasons for same.
2. State fully the process you would use for removing antimony, lead, tin, or copper from quicksilver, and the effect that these metals have on its amalgamating properties.
3. Describe how you would clean and coat copper plates with quicksilver, also how you would always keep plates coated and the quicksilver in a lively condition.
4. Describe fully how you would remove the bullion from plates and machines and make it in a marketable condition.
5. In making a final clean-up at a mill, how would you remove all bullion from the copper plates? Describe fully.

SUBJECT D.—*Cyanide, Chlorination, and other Chemical Processes of recovering Gold and Silver from Ores.*

1. Describe fully how you ascertain the strength of cyanide-solutions. Also, how do you ascertain the strength of solution required for the ore you have to treat?
2. Describe fully how you proceed to make up stock solutions, and the strength of same.
3. Show by calculation how many tons of stock solution containing 19 per cent. of KCN would be required to make up 15 tons of sump solution containing 0.012 per cent. of KCN to a 0.25-per-cent. solution.
4. How many pounds of crude salt containing 76 per cent. KCN is required to make up 30 tons of a solution of 0.26 per cent. KCN?
5. How many tons of 0.3 per cent. of KCN would 4 tons of 9-per-cent. solution of KCN make, using water for dilution?
6. How many tons of 0.25-per-cent. solution of KCN would $2\frac{1}{2}$ tons of 15-per-cent. solution make, using a sump solution of 0.01 per cent. KCN?
7. A vat is 30 ft. in diameter and 6 ft. deep; it is filled with pulverised ore to a depth of 4 ft. 3 in.: how many tons does it contain?
8. Show by sketch a modern cyanide plant capable of treating 80 tons of ore per day, with description in full of the different parts.
9. Describe fully the remedies you would apply if any of the workmen showed signs of cyanide-poisoning.
10. Describe step by step how the ore-vats are filled, how the KCN solution is applied, and how the solution is drained off and disposed of.
11. Describe fully the difference between a chlorination and a cyanide plant, and how the bullion is recovered by each process, and how it is made into a marketable condition.

SUBJECT E.—*Sampling and Testing of Ores.*

1. Half a hundredweight of lode-stuff is submitted to you: describe the methods, step by step, that you would follow for its examination with the view of determining its value as an ore for gold, silver, copper, lead, or zinc.

SUBJECT F.—*Knowledge of Arithmetic and Method of keeping Battery Accounts.*

1. Give the value of 1,875 oz. of bullion of 0.3675 in gold, it being alloyed with silver—taking pure gold at £4 4s. per ounce and pure silver at 2s. 4d. per ounce.
2. If nine men and seven boys did a certain piece of work in seventy hours, how long would it take five men to do the same work, allowing that each boy did five-sevenths of a man's work?
3. If you had £150 to pay for four weeks' wages to seven men in a battery, five men in connection with a cyanide plant, and two men in the assay-office, and each of the seven men engaged in the crushing operation got seven-eighths of the wages that each man got in the cyanide, and each of the men in the assay-office got three-quarters as much as each man in the cyanide plant, how much did each man receive?
4. Give the value of 119 oz. 12 dwt. 12 gr. of 0.7452 fine, taking the pure gold to be worth £4 4s. per ounce.
5. Give a specimen of how you would keep books by double entry.