

4. If mercury contained lead, antimony, and zinc, how would you remove these metals from the mercury so as to leave it in a pure state?
5. In using copper-plated tables for amalgamation, what steps would you take to keep the plates always clean and coated with mercury?
6. How is gold or silver removed from amalgamating-tables, and how are these metals separated from the mercury?

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

1. Under what conditions would KCN solution produce hydrocyanic-acid gas?
2. If a workman suffered from poisoning while working with KCN solution, what remedies would you adopt?
3. State fully how you would prepare stock solution to contain 15 per cent. KCN.
4. Give a sketch of a cyanide plant, showing the relative positions of all the modern appliances in connection therewith, with numbers indicating the parts they refer to.
5. How many pounds of impure salts containing 65 per cent. of KCN would be required to make 35 tons of a 0.25-per-cent. solution by using a sump solution 0.04 per cent. KCN?
6. Twenty tons of sump solution containing 0.02 per cent. KCN is used to make up 50 tons of a solution of 0.35 per cent. KCN: how many tons of 2 per cent. solution would be required to make up the 50 tons solution to the required strength?
7. What quantity of a stock solution containing 12 per cent. KCN would be required to make up a solution of 0.27 per cent. by using a sump solution containing 0.01 per cent. KCN?
8. If a circular vat 30 ft. in diameter was filled with fine pulverised ore to a depth of 4 ft., and a KCN solution above the ore to a depth of 20 in., show by calculation the number of tons of ore and solution in the vat.
9. Describe fully how you would treat slimes; also why it is necessary to subject slimes to a different treatment from ordinary pulverised ore.
10. Describe fully how gold and silver are recovered from KCN solutions, and the different processes gone through before they are in a marketable state.
11. Describe fully how gold is recovered from pulverised ore by chlorination.
 - (a.) How is chlorine produced by the Plattner process and also by the Newbery-Vautin process?
 - (b.) The time required for treatment?
 - (c.) The treatment the ore goes through before being subjected to chlorination?
12. How is gold recovered from chlorine-solution? State fully.
13. What would you do if any of the workmen were subjected to chlorine poisoning?

SUBJECT E.—Sampling and Testing of Ores.

1. How would you take a sample for assay from a large heap of ore?
2. Describe the fire assay for gold and silver of a sample of iron-pyrites.
3. How would you determine the zinc in a sample of ore containing sulphides of lead, zinc, and iron?
4. What tests would you apply to detect the following metals when occurring singly in rocks: Antimony, silver, manganese, bismuth, zinc, tin, and platinum?
5. How would you prove the presence of arsenic, mercury, copper, and iron in a piece of stone containing these elements as sulphides?

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

1. The wages for four classes of workmen amounted to £500. There were 20 men in class A; 15 in class B, who got $\frac{3}{5}$ of each man's wages paid in class A; 12 men in class C, who got $\frac{7}{8}$ of each man's wages in class B; 7 men in class D, who got $\frac{1}{2}$ of each man's wages in class C. How much did each man receive?
2. A pole 75 ft. in height when standing vertical broke at a certain place but still held together, when the top reached the ground 30 ft. from the base on a true horizontal line: what were the lengths of the two pieces?
3. Required the weight in pounds troy of a block of solid gold 3 ft. square at the bottom and 18 in. square at the top, having a height of 5 ft., taking its specific gravity to be 19.4.
4. A circular vat 5 ft. high, 24 ft. 4 in. in diameter at the bottom and 27 ft. 8 in. at the top, was full of water: how many imperial gallons did it contain?
5. A circular cistern whose height was $\frac{5}{8}$ of its diameter held 5,469 imperial gallons: how many square feet of sheet-lead lining would it require to cover the bottom and sides?

SUBJECT G.—A Knowledge of Part V. of "The Mining Act, 1905."
Oral.