

5. Describe a Wheeler and also a Boss pan, their speed, power required to work them, the quantity of material they treat in a given time, and also the quantity of quicksilver used in each.

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FIRST DAY.—TIME: 2 P.M. TO 5 P.M.

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

1. Give a sketch of a modern cyanide plant, the dimensions of vats and sumps you would use, and state the different processes that the ore from dry crushing and also from wet crushing goes through from the time it leaves the crushing-battery until the gangue is deposited as a waste product.

2. Describe fully how the bullion is precipitated from a cyanide solution, and the different processes that it goes through, with the fluxes you would use, before it is in a finished state for market.

3. Describe how you would dissolve the cyanide of potassium, and the strength you would make it up to in the dissolving-tank, and by what means you ascertain the percentage of KCN the solution contains.

4. Describe how you can ascertain the strength of solution to be used in the ore you propose to treat.

5. If you dissolved 30 lb. of cyanide of potassium containing 8 per cent. of KCN in 36 cubic feet of water, what percentage of KCN would the solution contain?

6. In using 20 cubic feet of stock solution containing 19 per cent. KCN, how many cubic feet of water would you require to dilute it to 0.2 per cent. solution?

7. If you were using 15 tons of a sump solution containing 0.13 per cent. KCN, require the quantity of a 5 per cent. solution to make it up 0.3 per cent. solution.

8. If you were using 5 tons of a solution containing 10 per cent. KCN, require the quantity of a 0.09 per cent. solution to reduce it to a solution containing 0.7 per cent. KCN.

9. How many tons of dry ore would a vat contain, the diameter of which is 25 ft., and filled to a depth of 3 ft. 10 in.? Also, state the quantity of solution you would use at once in this vat.

10. In the case of a workman showing signs of cyanide poisoning, what remedies would you use, and how would you apply them?

11. Describe the different methods now used for chlorination of gold-ores, and the time that is occupied in treating each charge of ore.

12. Describe the different methods for generating chlorine gas, giving the proportions of the different chemicals used; also, state how it is applied to the chlorination of gold-ores.

13. State the different methods for recovering the gold from a chlorine solution, and the processes it goes through to render it in a marketable condition.

14. If you had pyritous ores, containing a large percentage of gold, state the method you would adopt in treating them; describe fully.

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SECOND DAY.—TIME: 9 A.M. TO 12 NOON.

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

1. Describe how you know when quicksilver is in a good condition for adhering to gold, state the different impurities found in quicksilver, and the method you would take to remove them.

2. In coating new copper plates with quicksilver, describe the different methods used, their advantages and disadvantages.

3. Give a sketch showing dimensions of an amalgam trap, and state where it is placed in a battery.

4. Describe the different places in a battery where copper plates coated with quicksilver are used, the advantages or disadvantages of same.

5. Describe fully what is meant by a clean-up, and the different methods and processes used to get the bullion ready for assaying, in order to ascertain its average value.

6. How would you remove gold amalgam from copper-plated tables? Also, how would you remove the whole of the gold from copper plates if you were removing the plates from the tables?

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.

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SECOND DAY.—TIME: 2 P.M. TO 5 P.M.

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

1. If ore contained by assay 1 oz. 19 dwt. 12 gr. of gold and 15 oz. 14 dwt. of silver to the ton, what amount would be recovered from 676 tons of ore if the saving by the ordinary process of treatment was 85.0 per cent. of the gold, and 33 per cent. of the silver?