

4. Assume that your concentrates contained both scheelite and iron-pyrites, and state how you would effect the separation of the pyrites from the scheelite.
5. State what you know of the principles and working of the Elmore oil-flotation process of ore-separation.

SUBJECT V.—*Assaying and Elementary Chemistry.*

1. Describe a trustworthy scheme for the sampling of mill-products where the ore is wet-crushed and contains some free amalgamable gold and sulphides carrying considerable values.  
The quartzose sands and slimes also carry sufficient values to warrant their treatment by the cyanide process: State how you would determine their value before and after treatment.
2. Describe simple qualitative tests for iron, copper, and zinc occurring as sulphides in an ore.
3. Free sulphuric acid is frequently liberated as a decomposition product of iron-pyrites. State how you would detect free sulphuric acid in such a decomposed ore.
4. Describe the separation of silver, iron, and copper in an aqueous solution of salts of these metals.
5. State what charge of fluxes you would use for the 400-grain fire assay of—(a) A fairly clean quartzose gold ore; (b) gold-bearing quartz containing 6 per cent. of iron-pyrites.

SUBJECT VI.—*Arithmetic and Law.*

ARITHMETIC.

1. In a sphere of gold 3 ft. in diameter of 22·5 carats, having a value of £3 17s. 6d. per ounce, how many ounces does the sphere contain, and what is its total value?
2. A pyramid 6 ft. square at its base and 9 ft. high, the top of which is 18 in. square: how many cubic feet does the pyramid contain?
3. The wages of a crushing-battery where 37 men are employed amounted as follows: 20 men in A division get £240; 10 men in B division get 90 per cent. of what each man in A division receives; 5 men in C division get 86 per cent. of what the men in B division receive; and 2 men in D division get 75 per cent. of what each man in B division receives. What did each man get, and what was the total of the month's wages?
4. The base of an excavation on a sideling is at one end 11 ft.; the length of the side on the slope of 1 to 1 is 15 ft. at one end and at the other end the base is 5 ft. and the side on the same slope is 7 ft.; the length of the excavation being 132 ft., how many cubic yards were excavated?
5. Extract the square root of 0·2169, divide the root by 0·316, and extract the cube root of the quotient arithmetically.

LAW.

1. What is the penalty for using an unregistered machine?
- 2 Under the Mining Act what is the definition of each of the following terms: Licensee, machine, metal, and ore?