SUBJECT 3.—*General Mining, Mine-drainage, and Haulage.*

1. Inspectors' reports from all parts of the world show that a considerable number of accidents occur on underground haulage-roads: state what, in your opinion, should be done to minimize these accidents in connection with the various systems with which you are acquainted.
2. Suppose you were working a seam of coal with naked lights and found it necessary to put the workings on with safety-lamps, what rules and regulations would you be required to conform to?
3. Describe any system with which you are acquainted with for pumping water from dip workings, and state what system you consider most economical and suitable for a fiery mine.
4. State the natural law which governs the workings of pumps and siphons, and sketch what you consider a suitable position in which to apply the latter method of dealing with water in underground workings (sketches to have figured dimensions).
5. What do you consider the best system of signalling for use in shafts and underground haulage-roads? Give reasons for preference.
6. Give sketches of the various systems of timbering for use in coal-mines, having special regard to timbering for carrying heavy pressure from side and top weight.
7. If required to tap water from old workings, what steps would you adopt to verify the position of the old workings in relation to the approaching drives? State what appliances you would use and the safeguards you would adopt, and how you would arrange for controlling the water when tapped.

SUBJECT 4.—*Elementary Electricity, Arithmetic, and Knowledge of Coal-mines Act, also First Aid to the Injured.*

1. Does the fact that electric signals are transmitted with great rapidity through great length of wire give us any information as to the speed of electric currents?
2. Would it be possible to transmit signals along a pipe by means of a slow-moving current of water? If so, how?
3. Name the four electrical units.
4. A plant requires 700 electrical horse-power at a pressure of 150 volts: what is the resistance, and what current is used?
5. State conditions under which, in your opinion, it would be unsafe to take electricity underground.
6. How many cubic inches are there in 29 cubic yards.
7. In one district of a colliery working nine hours, 8 horses and 8 drivers are employed hauling coal at the rate of 25 trips per day with an average of 3 tons per trip: what is the cost per ton, charging 6s. per day for each driver and 5s. per day for each horse?
8. The area of a block of coal is 5,760 yards: what is the area in acres, roods, perches, and yards? What weight of coal is there in the block, the seam being 5 ft. thick, and running 18 cwt. to the cubic yard?

First Aid.

1. Are you the holder of a certificate from the St. John Ambulance Society?
2. What are the requisite materials and appliances which should be kept in convenient places at all collieries for the rendering of first aid in case of accident?
3. How would you render first aid to persons suffering from severe burns?
4. What is the first and subsequent steps to be taken for the relief of persons suffering from having inhaled noxious gases?
5. How would you bandage with the object of stopping profuse bleeding from the forearm?

Knowledge of Coal-mines Act.

1. State your knowledge of the Coal-mines Act with reference to—
   - (*a.*) Ventilation.
   - (*b.*) Reporting of accidents and inspection of scene of accidents.
   - (*c.*) Signals in shafts and on engine planes.
   - (*d.*) The duties of a fireman under the Act; and briefly state the duties of an under-viewer under the Act.