

SUBJECT No. 5.—*On Mine Drainage and Haulage, and Appliances for same.*

1. Explain the different systems of mine-drainage, and fully describe any of which you have had experience.
2. Describe the main parts of a suction pump, and explain the principles of its working; also the principle on which a siphon works.
3. Describe the different systems of haulage in mines, and describe any mechanical method of which you have had experience.
4. Say how you would fit up and operate an incline of 1 in 10, and 400 yards long, to lower 200 tons of coal in a seven-hours shift.
5. Give rules for finding the breaking-strain and safe working-load of wire-ropes and chains.

SUBJECT No. 6.—*Arithmetic, and Knowledge of Coal-mines Act.*

1. How many square feet of brattice is contained in 129 yards long by 7 feet high; and what would be its cost at 6½d. per square yard?
2. How many 24-foot rails would be required to lay a road a quarter of a mile in length, and what will be the total weight of rails at 30 lb. per yard? Also, how many sleepers will be required at 2 ft. 6 in. centres?
3. In 11 days two miners put out 135 tons 12 cwt. of coal at 1s. 10d. per ton, and drove 4½ yards narrow at 5s. per yard, and were paid 11s. 6d. consideration: what is the average daily wage of each man?
4. How many gallons of water are there in a shaft 18 feet diameter and 70 feet deep when quite full?
5. Assume a stone drive 100 yards by 10 feet by 6 feet: what are the cubic contents in yards; and how much would it cost if driven at £2 2s. 6d. per foot?
6. State briefly requirements of Coal-mines Act as to—
  - (a.) Blasting;
  - (b.) Fencing entrance to shafts;
  - (c.) Ropes and chains;
  - (d.) Water and boreholes;
  - (e.) Duties of fireman and deputies.