ANNEXURE B.

QUESTIONS ASKED AT THE MINE-MANAGERS EXAMINATION, 1913, FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT 1.—*Prospecting, Opening out a Colliery, Working Coal, and Timbering.*

1. Describe the plant and appliances which you would provide for sinking a shaft to a depth of 1,000 ft., and from which it is proposed to raise 1,000 tons in eight hours, stating thickness of brickwork you would apply to support the sides of shaft, what circumstances would guide you in fixing thickness, how you would fill up the cavities at the back of the walling, and how you would provide for the collection of the water coming out of the strata.
2. Having to drive an incline tunnel dipping 1 in 6 for a distance of 300 yards, and through which it is proposed to raise 800 tons per eight-hours shift, give dimensions of tunnel, method of haulage you would provide, and say how you would ventilate the tunnel during the progress of the driving, also the method of timbering you would adopt for such a work.
3. What is meant by "systematic timbering"? Give your views as to its advantages or disadvantages, and particularly as to its safety and economy. If you adopted it in a mine under your charge how would you carry it out, and what instructions would you give your deputies? Describe the application of this system where pillars are being extracted.
4. In a new colliery in which there are three seams numbered from the bottom upward, Nos. 1 and 2 are separated by 50 ft. of rock strata, 2 and 3 have 70 ft. between them, and from No. 3 to the surface there is 350 ft. of rock; angle of dip, 15°; all the seams have to be worked simultaneously, and you are required to describe and show by neatly drawn sketches how you would connect the various seams with the shaft, so that all the output can be raised from the bottom, and state in which of the seams the workings should be kept in advance of the others, having regard to the removal of the pillars as the bords are finished in each seam.
5. Describe, with sketches, how you would proceed to clear a road through a heavy fall with a rotten roof; the best form of timbering for such work, supposing also side pressure.
6. Describe the method of conveying coal from the working-faces to the main level in a seam dipping 1 in 3. What appliances would you adopt to prevent accidents? and show by sketches the appliances you would prefer.
7. Describe the operation of coal-getting on (*a*) the bord-and-pillar system, and (*b*) the longwall system; and state the precautions which should at all times be observed to prevent accidents from falls at the face, from the roof and sides, and from blown-out shots.
8. How would you proceed to draw the props in a longwall face with shale roof? How many rows of props would you maintain next the face? Give particulars of any appliances you may have used for this work, with sketches, and show how applied.
9. Having to reopen old workings in which an accumulation of water under considerable pressure is known to exist, state what steps you would take to verify the true position of the old workings in relation to the approaching drives, what precaution you would adopt in connection with the work, and the appliance you would provide to control the water when tapped.

SUBJECT 2.—*Mine-gases, Spontaneous Combustion, and Ventilation.*

1. Describe the modern safety-lamp, and say why it is considered safe, how used in testing for firedamp; also state the lowest percentage which can, in your opinion, be detected by the safety-lamp.
2. Describe what is meant by the term "ventilating district," and say how you would satisfy yourself that a fiery colliery is adequately ventilated; also, having regard to splits, what do you consider the extreme velocity allowable for air travelling the working-face of a fiery colliery?
3. The indicated horse-power of an engine is 90, and 8 per cent. is required to overcome frictional resistance in the engine; efficiency of the face is 80 per cent: find what effective horse-power is required.
4. The downcast and upcast shafts are each 1,000 ft. deep; the temperature of the downcast is 60° Fahr., upcast 100° Fahr.; barometer 30°: what is the motive column and water-gauge?
5. Describe how you would lay out and carry on the workings of a colliery where the coal is liable to spontaneous combustion, and say what you understand is meant by this term, and how you would proceed to deal with an outbreak of fire in such a colliery.