

ANNEXURE B.

QUESTIONS ASKED AT THE 1910 MINE-MANAGERS' EXAMINATION FOR FIRST-CLASS CERTIFICATES OF COMPETENCY.

SUBJECT 1.—*Prospecting, Boring, Shaft-sinking, and Opening out a Colliery.*

1. If called upon to lay out a colliery on a coalfield where, in consequence of alluvial covering, the measures cannot be examined,—
 - (a.) How would you proceed to find the position of the coal-beds and line of greatest dip?
 - (b.) State the considerations which would guide you in deciding on the position of the shafts and general lay-out of an extensive colliery.
2. In sinking a shaft 400 yards deep which has to pass through several seams of coal, state how you would ventilate it, give size of fan and pipes, state how secured in the shaft, and whether you would use exhausting or blowing fan.
3. Having to sink and equip a shaft from which it is intended to raise 1,000 tons per eight-hours shift, allowing time for raising and lowering men, depth of shaft to be 1,200 ft.,—
 - (a.) State the general requirements for sinking, and precautions requisite for the safety of the sinkers.
 - (b.) Show by sketches and description how you would fit up the shaft for cages, and what safety appliances you would adopt in connection with the winding-plant.
 - (c.) Give size of winding-engine and strength of ropes required for the work.
4. If required to open a colliery by incline tunnel 500 yards long driven on a grade of 1 in 4 through the overlying coal-measures, state—
 - (a.) Size of tunnel you would adopt, the minimum output to be 600 tons per shift of eight hours.
 - (b.) How you would ventilate the tunnel during its progress, and the special precautions you would adopt to secure the safety of the men working in the face.
 - (c.) What considerations would influence you in adopting machinery or only hand-labour in driving the tunnel, and what class of pump you would apply to deal with feeders of water, 150 gallons per minute.
 - (d.) What systems of haulage you would install to deal with the output and safety appliances, if any, which you would use in connection with the haulage.

SUBJECT 2.—*Working Coal and Timbering Underground.*

1. State your own actual experience of working coal under the—
 - (a.) Longwall system or any modification thereof; and
 - (b.) Bord-and-pillar system.

Give sketches showing each system, and methods of timbering requisite, and define the relative positions of coal-face props, packs, chocks, and lines of rails.
2. In a longwall seam where the roof is much stronger than the floor, what effects are the roadways likely to show? Give a sketch showing how you would secure a main road through a heavy fall where top weight is great.
3. What are the dangers to be avoided in pillar-extraction, and how should a colliery be laid out so as to avoid as far as possible accidents in connection with such work?
4. The reports of mining inspectors in all mining countries show that the greatest percentage of accidents is due to falls of roof and sides in working coal: what in your opinion is the cause of this, and what steps should be taken to avoid such accidents?

SUBJECT 3.—*Mine-gases, Spontaneous Combustion, and Ventilation.*

1. When firedamp at its most explosive point is fired what takes place? What are the resultant gases, in what proportions, and what are their properties?
2. Name the chief constituents of pure air, and give chemical properties; also give the chemical properties of firedamp and black damp, and their weights as compared with the atmosphere.
3. State what you understand is meant by the term "spontaneous combustion," and what you consider the best means of dealing with outbreaks of fire underground, giving your own experience, if any.
4. If a water-gauge of 1·8 in. produces 110,000 cubic feet of air per minute, what quantity will a water-gauge of 2·5 in. produce, and what additional horse-power will be required?
5. What rules should be followed in splitting the air-currents in mines, and what practical limits are imposed by considerations of efficiency and economy?
6. Ventilate the plan herewith, and show ventilation-currents, stoppings, air-crossings, canvas doors, main doors, and regulators.