

APPENDIX I.

MINING MANAGERS' EXAMINATION PAPERS.

QUESTIONS USED IN EXAMINATION OF MINING MANAGERS FOR FIRST-CLASS CERTIFICATES.

SUBJECT No. 1.—*On the Sinking of Shafts and Construction of Main Roadways, opening out a Mine, and the Division of a Mine into Districts.*

1. Describe the method of sinking a shaft where quicksand is met with in the first 30 fathoms.
2. Give sketches and dimensions of the materials generally used while sinking through quicksand for a shaft intended to be 12 ft. diameter when finished.
3. In opening up a new seam of coal, state fully what considerations would influence you in deciding method of working, say, by longwall or bord-and-pillar.
4. What precautions would you enforce to insure safety of men firing shots in sinking a shaft?
5. In opening up on a seam of coal known to contain firedamp, what precautions would you adopt to prevent its accumulating? and what means would you employ to get coal down after preparation by the miner? Give your reasons.

SUBJECT No. 2.—*The Various Methods adopted in securing Shafts and Workings in a Mine, showing Relation and Efficiency of each Class of Material used.*

1. How would you ventilate the space below the scaffold when men are employed lining the shaft?
2. Show by sketches how you would set timber in inclined seams so as to resist pressure of roof and sides.
3. What size pillars of coal would you leave for support of shaft—assume dip 1 in 3, and seam 7 ft. thick, shaft 1,000 ft. deep?
4. State the reasons which would guide you in deciding to drive the winning-places to the extreme boundary before opening out wide work, either bord-and-pillar or longwall.
5. Show by plan and section the method of timbering a 6-yard bord with bad roof, and also method of timbering and supporting the face and gateways in longwall workings.

SUBJECT No. 3.—*The Various Methods of hewing and cutting Coal of Different Classes, and Means of securing Ground while so engaged.*

1. Describe the different systems of coal-working with which you are acquainted, and say under what conditions each system works best. Give a rough sketch of the system adopted at any mine of which you have a knowledge, stating thickness of seam, quality of roof, floor, &c.
2. Give your experience of taking out coal-pillars. Describe how you protect yourself from falls of roof, illustrating by sketches.
3. Describe what is meant by "drawing" timber from coal-workings, and precautions to be adopted when doing so, and the effect the removal of timber has on the working of pillars.
4. What in your opinion is the best explosive now in use in coal-mines? Give your reasons, stating leading characteristics; and say what are your views as to substitutes for explosives, and under what conditions you would prohibit use of explosives.
5. Describe by sketches the method of getting coal by bord-and-pillar and by longwall, giving the size of seams and system of timbering, and generally means of supporting the roof best suited to each.

SUBJECT No. 4.—*The Various Methods of Ventilation, and Construction of Airways so as to produce a Good Circulation of Fresh Air in any Part of a Mine.*

1. Describe briefly the general principles of ventilation in mining, and describe by sketches the various means which have been adopted to obtain satisfactory results.
2. What are the chief points to be kept in view when constructing an airway with the object of passing a large volume of air with the minimum expenditure of power?
3. Describe the form and uses of the following: The thermometer, barometer, hygrometer, and water-gauge.
4. Having a pair of shafts 16 ft. diameter, 500 yards deep, requiring ventilation to be 120,000 cubic feet per minute, with 2 in. water-gauge, describe what type of fan and engine you would adopt, and show calculations of size of fan and engine required.
5. The total quantity of air passing in a mine is 100,000 cubic feet per minute, and it is distributed through four airways—
 No. 1, 1,200 yards long, 6 ft. by 6 ft. ;
 No. 2, 1,000 yards long, 5 ft. by 5 ft. ;
 No. 3, 2,000 yards long, 6 ft. by 5 ft. ;
 No. 4, 1,500 yards long, 5 ft. by 4 ft.

What proportion passes through each?

SUBJECT No. 5.—*Area of Airways, Velocity and Division of Currents, and Effect of Friction.*

1. What is meant by splitting the air? How does it affect the general ventilation of a mine, and what are the limits to its adoption?
2. Having regard to safety, what do you consider the extreme velocity for air travelling the faces in a fiery colliery?