

SUBJECT No. 2.—*On working Coal and Timbering underground.*

1. Describe the different systems of working coal with which you are acquainted, and under what conditions as to thickness and nature of coal, roof, and floor you would adopt one system in preference to the others, keeping in view the getting of the coal in the most marketable condition.
2. Sketch and describe by side and end views how you would retimber a main road having a soft roof, the road being 10 feet wide by 6 feet in the clear. State kind and size of timber to be used.
3. Many accidents are caused by falls of roof and sides in working coal: state what steps you would take to prevent such.
4. What seams with which you are acquainted work better by long-wall than by bord and pillar, and why?
5. Explain what explosive you would use, and how you would conduct the operation of shot-firing in a dry and dusty mine where gas is sometimes found.

SUBJECT No. 3.—*On Gases of Mines, Spontaneous Combustion, and Ventilation.*

1. Name the gases most commonly met with in coal-mines, and give your experience in dealing with same.
2. Describe by sketch a method of bratticing the bords and headings in seam of coal 8 feet thick; pitch of seam, 1 in 4; bords, 18 feet wide; and pillars, 15 yards thick and 50 yards from heading to heading.
3. What practical experience have you had in the ventilation of collieries, and how do you prefer that ventilation should be produced, by furnace or fan? Give reasons for preference.
4. What are the provisions of the Coal-mines Act in reference to ventilation?
5. Give your experience in dealing with underground fires, and say what, in your opinion, is the cause of outbreaks of fire underground.

SUBJECT No. 4.—*On dealing with Old Workings and other Sources of Danger.*

1. What are the precautions to be observed in approaching old workings likely to contain accumulations of water? Describe fully.
2. If confronted with a sudden inrush of firedamp, what steps would you take for safety of miners and to effectually clear the mine?
3. What are the provisions of Coal-mines Act in relation to spragging, and why is this precaution necessary?
4. How would you ventilate a dip heading where black damp is given off freely?
5. Why is it dangerous to use the Davy or Clanny lamp unprotected? Describe some form of lamp of which you have experience? What is the most explosive mixture of gas and air?

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

1. Describe your experience in the drainage of mines, and what is, in your opinion, the most efficient pump for this purpose.
2. Describe the natural law which governs the working of pumps and siphons.
3. Describe what, in your opinion, is the best system of haulage for application underground, stating your reasons for preference.
4. What is meant by the term "self-acting inclines"? and state conditions under which such are applicable and precautions to be adopted for safety of persons employed in connection with them.
5. What are the requirements of the Coal-mines Act with regard to manholes on underground inclines and engine planes?

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

1. There are 200 fathoms of roadway to be timbered every 2 feet with props 5 feet long on each side of the road: how many lineal feet of prop timber will be required; also what length of timber will be needed for cap pieces, each cap being 10 feet long?
2. In an airway 6 feet by 10 feet the velocity of the current is 5 feet per second, how many cubic feet of air passes per minute?
3. A tub for drawing water from a shaft is 4 feet long by 3 feet 6 inches diameter; the rate of winding is 40 tubs per hour: how many gallons will be drawn per minute, allowing 1-10th for leakage?
4. If an adit or heading rises 84 feet in a total length of 1,500 yards, what is the rise per yard?
5. State the requirements of the Coal-mines Act as to—
 - (a.) Hours of boys;
 - (b.) Fencing of disused places;
 - (c.) Duties of underground manager and fireman respectively.