4. The upcast and the downcast shafts are 500 yards apart. Twenty men are employed in a section of working situated 700 yards from the downcast and 450 yards from the upcast. The downcast takes fire. How would you propose to rescue the men? and how many men would you send in each rescue-party?
5. A ventilating-current is passing at 5 feet per second. What increase of power will be required to double the velocity?
6. In a mine giving off a good deal of gas 200 persons are employed, and the intake airway is 5,000 yards long. What size would you have the airway? and give your reasons.
7. The shaft-pillars are to be 120 yards square from the shaft in all directions. Show by large sketch, giving dimensions with description, how you would arrange the airways during the formation of the pillars. The coal gives off fire-damp freely.

Paper IV.—Modes of Working.—(Time, 3 hours.)

1. What instructions would you give to shot-firers in coal mines?
2. Describe the safety-lamp that you like best, and name the make that you prefer for use at the working-face, on hauling roads, and for official examinations.
3. Describe a method for securing a circular shaft with wood. Give the sizes of timbers for a shaft 10 feet in diameter.
4. Sketch and describe different methods of timbering a main road in a flat seam.
5. Describe arrangements for getting coal from the working-faces to the main-roads underground in mines with considerable dip, and mention precautions to ensure the safety of the workmen.
6. Describe fully some system of underground haulage, and mention the conditions in the mine that would govern your selection of that particular system.
7. On opening a seam of coal in a new field unaffected by old workings, what conditions would lead you to advise the selection of bord and pillar in preference to longwall?
8. Sketch, with measurements, the openings about a pit-bottom laid out for longwall.

Paper V.—Surveying.—(Time, 2½ hours.)

1. What is meant by the term true meridian? Describe a simple method for approximately determining it.
2. How may underground and surface-surveys be connected: (1) when access is had through workings open to the surface; and (2) when by shaft only?
3. Explain, by writing, how to level and plot a section.
4. What are the special advantages and disadvantages in the use of the ordinary miners' compass as compared with the theodolite?
5. Lay down the following survey on the scale of 2 chains to an inch:—

Distance.	Chains	Horizontal Angles.
Shaft to A.	1·90 ...	A 145° 15′
A. B.	6·77 ...	B 177° 30′
B. C.	4·30 ...	C 213° 54′
C. D.	9·77 ...	D 97° 20′
D. E.	3·90 ...	E 130° 13′
E. F.	6·13 ...	F 167° 30′
F. G.	3·01	

The horizontal angles are those on the left hand of a person travelling in the direction of the survey, and the magnetic bearing of the line F. G. is 30° east of north.