

Coal Mining Act 1925-1969.

Examination for

MINE SURVEYOR'S CERTIFICATE

(Limited to Open-Cut Mines)

Paper II

Monday, 3rd December, 1973, 2.00 p.m. to 5.00 p.m.

Attempt six (6) questions only.

All questions have equal value.

Show all calculations.

Chamber's Mathematical Tables, protractors, scales, drawing instruments and slide rules (where applicable) may be used.

The use of calculating machines is not permitted at the examination.

- (1) Indicate the principal differences between reconnaissance, location and working surveys with respect to the following items:
- (a) purpose;
  - (b) equipment and personnel;
  - (c) survey technique and precision;
  - (d) marking.
- (2) (a) You have somehow overlooked the regular standardisation of your working chain before surveying a mineral lease of 320 acres using a chain 500 links long. Because of a subsequent dispute, you standardise the chain and find it to be 500.8 links long.
- What is the correct area of the lease to the nearest one-tenth of an acre?
- (b) You are surveying the boundary of a tailings area by theodolite and chain, and find upon resumption of work that your line of sight is obstructed by dozers and heavy equipment. The drivers are unavailable and it is not considered expedient to move this machinery yourself.
- Describe with a sketch how you would project your boundary to the other side of this obstruction and measure the obstructed distance.
- (3) Define in detail:
- (i) accuracy;
  - (ii) precision;
  - (iii) standard deviation and formulae for deviation;
  - (iv) mean square error or probable error and its relationship to the standard deviation;
  - (v) the laws of accidental error;
  - (vi) systematic and random errors and illustrate with examples.