

**REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF MINERALS AND ENERGY
EXAMINATION FOR THE MINE SURVEYORS CERTIFICATE OF COMPETENCY**

DATE: 15 October 2004
TIME: 12:30 to 15:30 (3 Hours)

TOTAL MARKS: 100
TO PASS: 50

SURVEY III

- Note:**
- (1) Work to 1 second of arc and 0.001m.
 - (2) All steps and checks must be shown.
 - (3) Logs and functions must be shown to six (6) decimal places.
 - (4) Sketch are not drawn to scale and attached herewith.
 - (5) The make and model number of your calculator **must** be written on the front cover of your answer book.

QUESTION 1

B and C are points surveyed on the outcrop of a quarry. D is a point on the intersection of the footwall and the highwall of the quarry. A is a point on the intersection of the surface and the highwall of the quarry. It is required to make the highwall safe for mine closure by blasting at a dip of 14° to the horizontal from G to X and filling the quarry with the blasted material from X to H at the same dip.

Co-ordinates			
Point	Y	X	Elevation (AMSL)
A	+1 003,742	+1 120,000	+1 020,416
B	+1 271,276	+1 240,000	+1 017,781
C	+1 208,284	+520,000	+1 006,674
D	+1 010,279	+1 000,000	+971,760

Assume the reef and surface planes are even and evenly dipping.

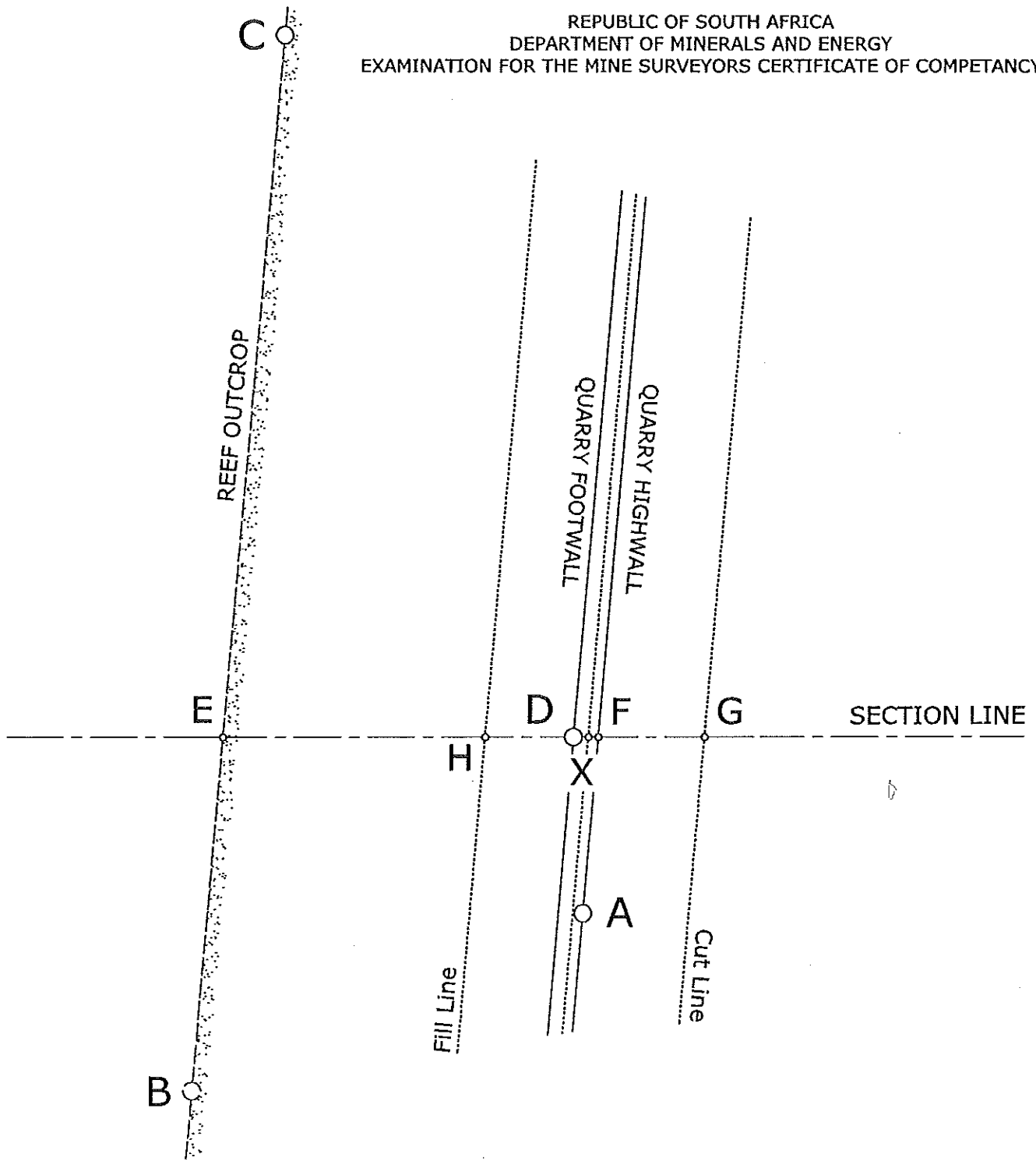
Assume the highwall height has been maintained throughout the area shown.

Assume that bulking of the blasted material is 35% (1m^3 in situ waste equals $1,35\text{m}^3$ blasted waste)

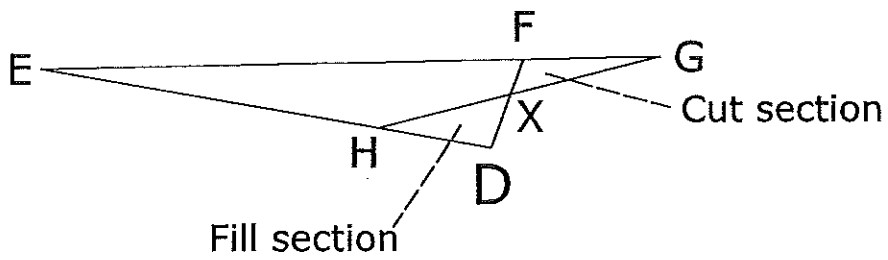
- a) Calculate the co-ordinates of E and F on the section EDF along the direction of true dip, intersecting the outcrop and highwall respectively.
- b) Calculate the co-ordinates of points G, X and H if the bulking of the blasted material is 35%.
- c) Calculate the width increase in the section from F to G.
- d) Calculate the required m^3 per linear metre to be blasted along the section line E - G.

[100 marks]

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PLAN



SECTION EG