



mineral resources
& energy

Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

MINE MANAGER'S CERTIFICATE OF COMPETENCY EXAMINATION

METALLIFEROUS AND COAL MINING GEOLOGY

DATE: 09 APRIL 2025

TOTAL MARKS: 100
TO PASS: 50

TIME ALLOWED: 3 HOURS
(09h00 to 12h00)

INSTRUCTIONS:

- This question paper consists of **FOUR** pages including the cover page.
- **All** questions must be answered and are to be presented in a neat and readable manner. Answer books will not be marked if not readable.
- Read the instructions on the front page of your answer book carefully.
- Draughting utensils are to be supplied by the candidate.
- The use of a non-programmable calculator is allowed.
- Use a pen that writes in ink and should not be erasable.
- Do not use a red pen.
- Restrict the use of highlighters.
- No cellular phones, computers, laptops and any other related devices shall be allowed in the examination venue.

SECTION A: GENERAL GEOLOGY

QUESTION 1

- 1.1. Generally, rocks can be classified into three different groups on the basis of their origin. What is the name of each group and next to each name, give a specific rock type example. (6)
- 1.2. Molten magma can intrude the local rock formations in one of two ways – conformably or cutting through the existing structures. Provide a name for each such intrusive features making sure that the correct name appears next to the appropriate intrusive type. (4)
- 1.3. What is generally understood by the term "IMPACT CRATER"? Give a definition and quote two (2) examples. (5)

(15)

QUESTION 2

Dolomite and Dolerite are two different rock types that sound very similar. With this in mind, answer the following questions:

- 2.1. Which rock group does each of the two rock types belong to? (2)
- 2.2. Describe the possible origin(s) of each of the two rock types. (4)
- 2.3. List two (2) distinguishing features of each of the two rock types. (4)

(10)

QUESTION 3

Discuss five (5) physical properties of minerals and give examples. (15)

(15)

Total marks – Section A: [40]

SECTION B: DEPOSITS

QUESTION 4

Explain the formation and occurrence of ONE of the following economic deposits in South Africa: Gold or Platinum or Coal or Iron or Diamonds. Specifically mention the different primary and secondary (where appropriate) associated rock types and the localities where they are exploited. (30)

Total marks – Section B: [30]

SECTION C: PRACTICAL

QUESTION 5

- 5.1 Explain the different classes of Mineral Resources as stipulated in the SAMREC code. (3)
- 5.2 Explain the differences between Resources and Reserves? (2)
- (5)

QUESTION 6

- Give five (5) examples of non-intrusive exploration techniques. (5)

QUESTION 7

Diamond Drilling is one of the essential tools which can assist a Geologist in the Mining and Exploration environment. Explain what you understand from Geological Diamond drilling from a Geologist perspective and what it can be used for? (5)

QUESTION 8

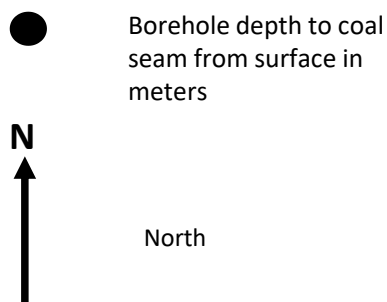
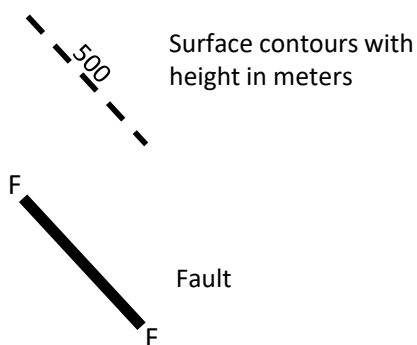
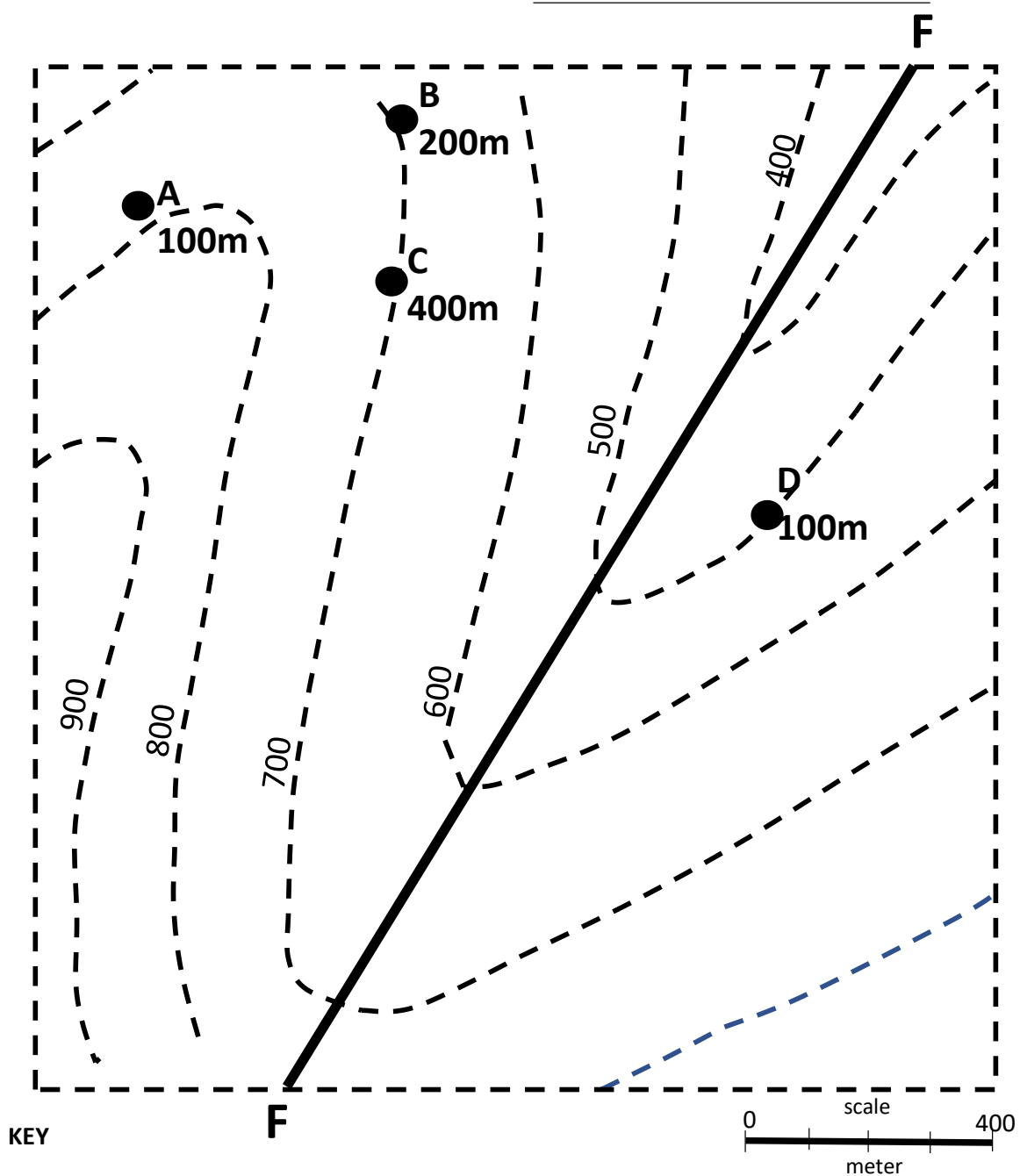
In the attached map, a constantly dipping coal seam occurs in drill hole A, B C and D at the depths shown.

- 8.1 Calculate the heights of the coal seam in drill holes A, B and C. Use these to draw structure contours for the coal seam across the whole map. Label the heights of the structure contours north west of the fault. (5)
- 8.2 Draw the outcrop of the coal seam north west of the fault. (2)
- 8.3 In which direction does the coal seam dip? (1)
- 8.4 At what angle does the coal seam dip? (1)
- 8.5 Use borehole D to number the structure contours to the south east of the fault (2)
- 8.6 Draw the outcrop of the coal seam on the south east of the fault (2)
- 8.7 On which side of the fault have the rocks been downthrown? (1)
- 8.8 By how many metres have the rocks been downthrown? (1)

[15]

Total marks – Section C: [30]

GRAND TOTAL [100]



NOTE: This sheet must be handed in with your examination book