UNIVERSITY
OF
JOHANNESBURG

PROGRAM	:	NATIONAL DIPLOMA *MINING ENGINEERING*
SUBJECT	:	**GEOLOGY: MINING III**
CODE	:	**MWG 3211**
DATE	:	SUMMER SSA EXAMINATION 2015 9 DECEMBER 2015
DURATION	:	(SESSION 3) 15:00 - 18:00
TOTAL MARKS	:	104
EXAMINER	:	MR K S PHOGOLE
MODERATOR	:	MR H BROWN
NUMBER OF PAGES	:	3

INSTRUCTIONS

1. ALL ANSWERS MUST BE SHOWN IN THE EXAMINATION SCRIPT OR ON THE ANNEXURES PROVIDED AS REQUIRED.
2. STUDENTS MUST ENSURE THAT THEIR STUDENT NUMBER IS ON ALL ANNEXURES.
3. ALL ANNEXURES MUST BE HANDED IN EVEN IF THE STUDENT DID NOT ATTEMPT THE QUESTION.
4. CALCULATORS ARE PERMITTED (ONLY ONE PER STUDENT)

REQUIREMENTS : DRAWING INSTRUMENTS

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Question 1

On the accompanying map all heights are given in meters above sea level.

The coal seam has been intersected by vertical boreholes (drilled at A, B and C), at the following depths below surface.

20m	at	A	Bottom contact
100m	at	B	Top contact
40m	at	C	Bottom contact

The coal has the vertical thickness of 10 metres. The coal is underlain by shale with a vertical thickness of 5 metres. The coal is overlain by a limestone with a true (stratigraphic) thickness of 10 metres

1. Determine the amount and direction of dip of the coal seam. (5)
2. Complete the outcrop pattern of the shale, coal and limestone over the map area. (12)
3. What is the true (stratigraphic) thickness of the shale and the coal? (8)
4. Shade in the area of opencastable coal if the overburden thickness limit is 20m. (5)
5. It is known that a thin oil shale occurs at a constant vertical depth of 70m below the bottom contact of the coal. Will it outcrop within the map area? If so, draw in its outcrop on the map (5)
6. At what depths below surface will boreholes drilled at D, E and F intersect both the shale, coal, limestone and the oil shale? (9)
7. Is there an area on the map where a borehole situated anywhere in the area will not intersect either the coal or the oil shale? If so clearly shade in the full extent of this area. (4)
8. Calculate the true (stratigraphic) thickness of the limestone, coal and shale combined? (6)
9. What will the distance and direction of a tunnel developed from E to G be; developed on the coal seam? (6)

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QUESTION 2

The area on the attached map (**MAP CT 2B/ 10**) shows part of the area of a coal prospecting program. It is known that the Dundas Seam, a relatively thick coal seam within a sequence of Vryheid Formation sandstone, occurs in the area. All elevations shown on the map are in metres above sea level and the dip of the strata is constant throughout the area.

Initial geological mapping has located the outcrop of the bottom contact of the coal seam in the valley at point **'A'**. At this position the bottom contact of the coal seam is disrupted by a fault which also outcrops at point **'A'.**

The results of early prospecting and drilling are shown in the table below:

POSITION No.	Depth to TOP of COAL	Depth to BASE of COAL	Depth to FAULT
A	Faulted out?	"outcrops"	"outcrops"
B	-	"outcrops"	No fault
C	"outcrops"	10 m	-
D	"outcrops"	10 m	40 m
E	"outcrops"	10 m	40 m
F	"outcrops"	10 m	No fault
G	10 m	20 m	No fault

Answer the following questions:

2.1 Using strike lines determine the angle (amount) and direction of true dip of the fault. (5)

2.2 Plot the outcrop of the fault on the plan. (6)

2.3 Determine the angle (amount) and direction of true dip of the coal seam. (5)

2.4 Plot the surface outcrop of the top and bottom contacts of the coal seam. (10)

2.5 What is the STRATIGRAPHIC thickness of the coal seam. (4)

2.6 Determine the vertical throw of the fault and classify the fault. (normal or reverse) (4)

2.7 Shade in the area on the map where the coal OUTCROPS on the surface. (2)
DO NOT SHADE ANY OTHER AREAS OF THE MAP.

2.8 Draw a TRUE SCALE section between 'X' and 'Y' on the attached graph paper. (8)

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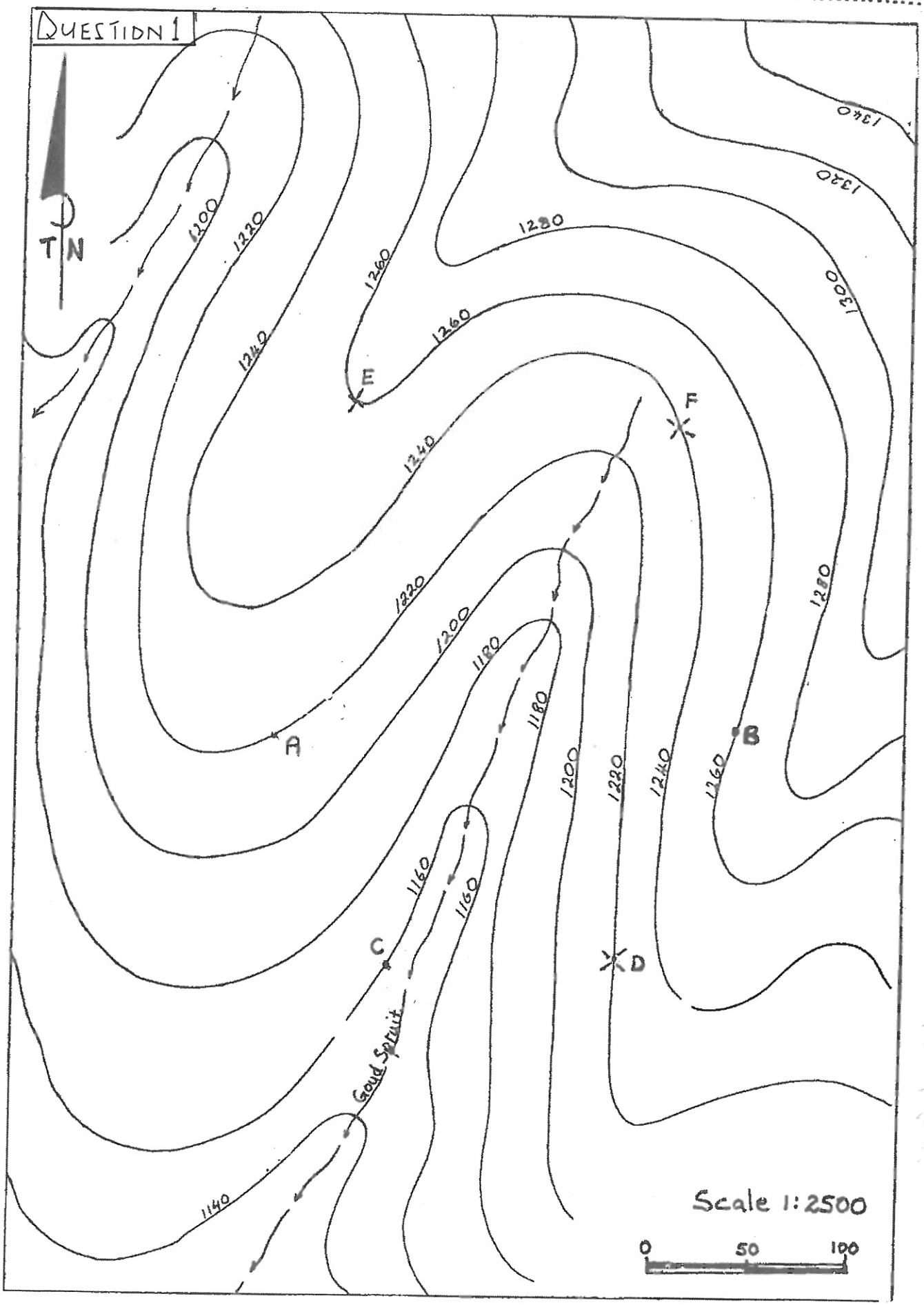
STUDENT No.:..... SURNAME and INITIALS:.....



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This sheet must be handed in with your examination script!