PROGRAM	:	B. Eng. Tech. Mining Engineering Bachelor Mine Surveying
SUBJECT	:	**STRUCTURAL GEOLOGY 2B**
CODE	:	**SGEMN2B**
DATE	:	FINAL EXAM 12 NOVEMBER 2019
DURATION	:	(X-PAPER) 12:30 - 15:30
WEIGHT	:	
TOTAL MARKS	:	100
FULL MARKS	:	100

EXAMINER	:	MR DN WILSON
MODERATOR	:	Prof H.J. GROBLER
NUMBER OF PAGES	:	3 PAGES AND 2 ANNEXURES AND GRAPH PAPER

INSTRUCTIONS

1. ALL ANSWERS MUST BE SHOWN IN THE EXAMINATION SCRIPTS AND NOT ON THE PLAN.
2. ALL SHADING MUST BE DONE NEATLY ACCORDING TO THE INSTRUCTIONS IN THE QUESTIONS.
3. ALL THE MAPS (ATTACHMENTS) MUST BE INSERTED INTO THE SCRIPT EVEN IF THE STUDENT DID NOT ATTEMPT THE QUESTION.
4. STUDENTS MUST ENSURE THAT THEIR STUDENT NUMBER IS WRITTEN ON ALL THE MAPS.
5. CALCULATORS ARE PERMITTED (ONLY ONE PER STUDENT)
6. STUDENTS TO SUPPLY DRAWING INSTRUMENTS.
7. GRAPH PAPER IS REQUIRED – 2 SHEETS PER STUDENT

INSTRUCTIONS TO CANDIDATES:

PLEASE ANSWER ALL THE QUESTIONS.

QUESTION 1

Map A shows an area of ground where a gold-bearing reef is to be mined. A major fault is expected through the area and six (6) exploration boreholes were drilled from surface to investigate the nature and position of this fault in relation to the reef.
The plan shows the surface contours at 100 metre intervals.
The scale is shown on the plan (1 : 2000) .

Drilling results are shown in the table below :

Point	Depth of reef intersection below collar	Depth of fault intersection below collar
A	"Outcrop"	250 m
B	"Outcrop"	- - - - - - - - - - - - - - - - - - -
C	100 m	- - - - - - - - - - - - - - - - - - -
D	400 m	- - - - - - - - - - - - - - - - - - -
E	- - - - - - - - - - - - - - - - - - -	100 m
F	- - - - - - - - - - - - - - - - - - -	200 m

Answer the following questions:

1.1   Graphically plot the outcrop of the fault on the plan.

(5)

1.2   Graphically plot the outcrop of the thin reef on the plan.

(8)

1.3   Determine the true dip, the direction of true dip and the strike of the fault.

(4)

1.4   Determine the true dip, the direction of true dip and the strike of the reef.

(4)

1.5   Draw the reef / fault lines of intersection.

(3)

1.6   Shade the area on the map where the reef **does** exist (the area underlain by reef).
DO NOT SHADE ANY OTHER AREAS – this shading must be neat and cover the entire area underlain by reef.

(6)

1.7   Determine the vertical throw of the fault. Classify the fault (normal or reverse).

(4)

1.8   A reef winze must be developed from point [A] on the true dip of the reef.
Determine the direction of this winze and also determine the horizontal and slope distance at which this winze will intersect the fault.

(6)

1.9   Draw a section on line X – Y in your exam books (script) .
Use a vertical scale of 1 : 5 000 and a horizontal scale the same as the plan (1 : 2000).

(10)

[50 marks]

QUESTION 2

Map B is a plan showing surface borehole positions resulting from a major exploration project. The reason for the drilling program was to determine the amount and extent of a coal deposit which will be available for mining by opencast methods. A major fault is expected to dislocate the coal seam.

The plan shows the surface contours at 10 metre intervals.
The scale is shown on the plan. (1 : 1 500)

Given : (Borehole information)

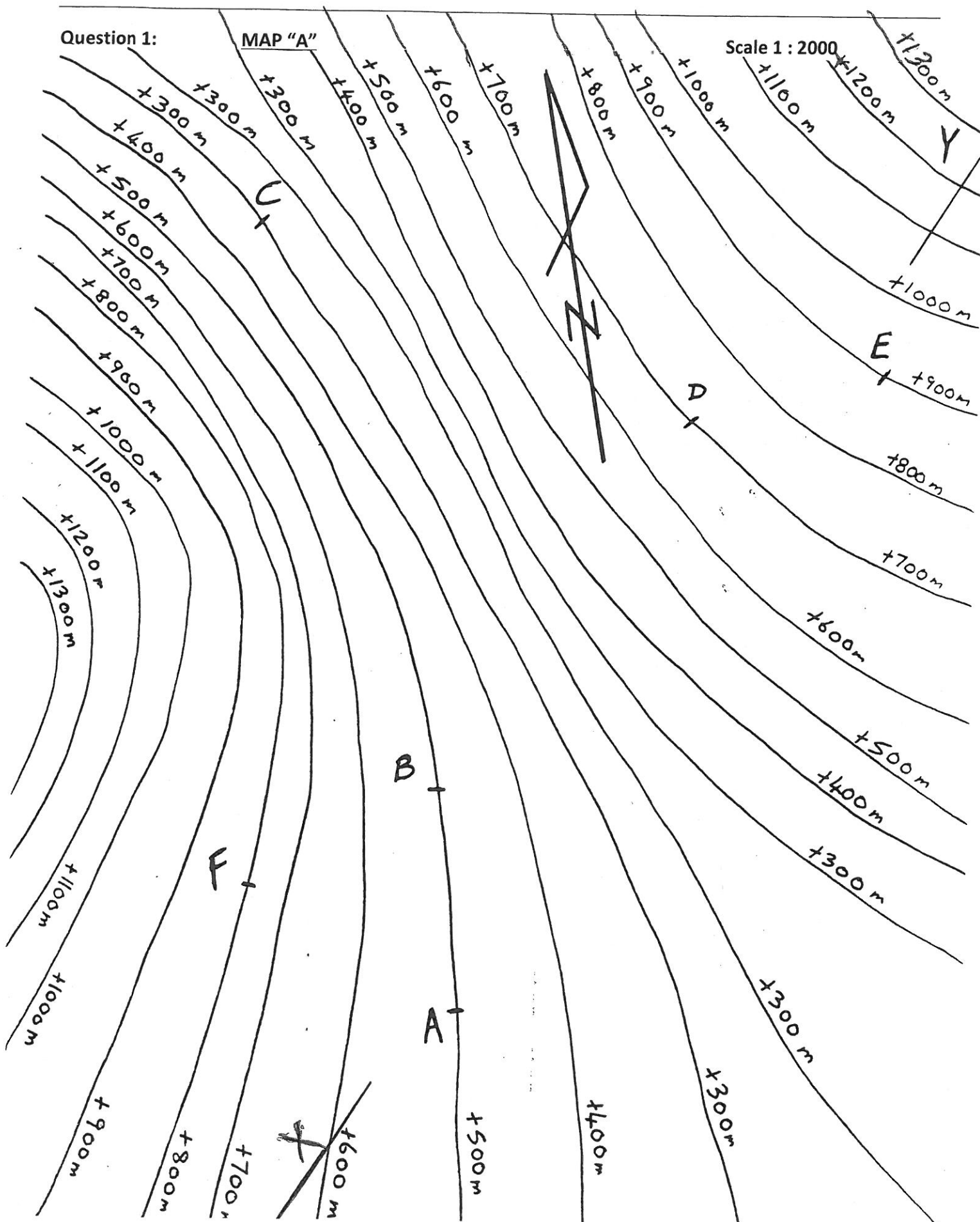| Point	Depth of coal seam intersection below collar	Depth of fault intersection below collar
P	"Outcrop"	-------------------------
Q	"Outcrop"	-------------------------
R	-------------------------	"Outcrop"
S	-------------------------	"Outcrop"
T	-------------------------	20 m
U	40 m	-------------------------
V	10 m	-------------------------

Answer the following questions:

2.1   Graphically plot the outcrop of the fault on the plan.

(4)

2.2   Graphically plot the outcrop of the coal seam on the plan.

(8)

2.3   Determine the true dip, the direction of true dip and the strike of the fault.

(4)

2.4   Determine the true dip, the direction of true dip and the strike of the coal seam.

(4)

2.5   Draw the lines of intersection.

(2)

2.6   Shade the opencastable area if no more than 30 metres of overburden must be removed to expose and mine the coal seam.
       DO NOT SHADE ANY OTHER AREAS – this shading must be neat and cover the entire opencastable area.

(8)

2.7   Determine the vertical throw of the fault. Classify the fault (normal or reverse).

(4)

2.8   Determine the **direction** of a winze (decline shaft) that could be sunk from point [Q] on the map at a dip of 8°. The winze will be sunk on the coal seam if the mine management does not approve the opencast method of mining.

(6)

2.9   Draw a section on line Z – W in your exam books (script) .
       Use a vertical scale of 1 : 500 and a horizontal scale the same as the plan (1 : 1 500)

(10)

[50 marks]

Total = 100 marks

Structural Geology 2B – SGEMN2B   **FINAL EXAM**   Date : 12 November 2019

Time allocation – 12:30 to 15:30   Student Surname: ....

Clearly show your student number and surname on each map. Student Number: ....

Question 1:   MAP "A"   Scale 1 : 2000

Structural Geology 111 – SGEMN2B   FINAL EXAM   Date : 12 November 2019

Time allocation – 12:30 to 15:30   Student Surname: ....

Clearly show your student number and surname on each map. Student Number: ....

Question 2:   MAP "B"   Scale 1 : 1500