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| **PROGRAM** | : | NATIONAL DIPLOMA<br>*MINERALS SURVEYING* |
| **SUBJECT** | : | **STRUCTURAL GEOLOGY 3** |
| **CODE** | : | **MSG 3121** |
| **DATE** | : | SUPPLEMENTARY EXAMINATION<br>11 JANUARY 2017 |
| **DURATION** | : | (X-PAPER) 15:00 - 18:00 |
| **WEIGHT** | : | 40 : 60 |
| **FULL MARKS** | : | 100 |
| **TOTAL MARKS** | : | 100 |

| | | |
|---|---|---|
| **EXAMINER** | : | MR D.N. WILSON |
| **MODERATOR** | : | MR D. RAE |
| **NUMBER OF PAGES** | : | 2 PAGES AND 3 ATTACHMENTS |

| | | |
|---|---|---|
| **INSTRUCTIONS** | : | CALCULATORS ARE PERMITTED (ONLY ONE PER STUDENT)<br>: ALL SHADING MUST BE DONE NEATLY ACCORDING TO THE INSTRUCTIONS IN THE QUESTIONS.<br>: ALL THE MAPS (ATTACHMENTS) MUST BE INSERTED INTO THE SCRIPT EVEN IF THE STUDENT DID NOT ATTEMPT THE QUESTION.<br>: STUDENTS MUST ENSURE THAT THEIR STUDENT NUMBER IS WRITTEN ON ALL THE MAPS. |

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|---|---|---|
| **REQUIREMENTS** | : | DRAWING EQUIPMENT |

**INSTRUCTIONS TO STUDENTS**:

1. ANSWER ALL QUESTIONS.

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**Question 1 :**

Map "A" shows an area of ground where vertical boreholes and prospecting has revealed the presence of a reef ore-body and a fault.

The fault is known to be younger than the reef and has dislocated the reef.

The scale of the plan is 1:1500.

The plan shows surface contours at fifty (50) metre intervals.

Given (borehole information):

| Point | Depth of reef intersection below collar | Depth of fault intersection below collar |
|---|---|---|
| R | 75 m | 225 m |
| P | - - - - - - - - - - - - - - - - - - - | 200 m |
| S | 50 m | - - - - - - - - - - - - - - - - - - - |
| U | "Outcrop" | - - - - - - - - - - - - - - - - - - - |
| V | "Outcrop" | - - - - - - - - - - - - - - - - - - - |
| Q | - - - - - - - - - - - - - - - - - - - | "Outcrop" |

Answer the following questions:

1.1 Graphically plot the outcrop of the fault on the plan. (4)

1.2 Graphically plot the outcrop of the thin reef on the plan. (6)

1.3 Determine the true dip, the direction of true dip and the strike of the fault. (3)

1.4 Determine the true dip, the direction of true dip and the strike of the reef. (3)

1.5 Draw the lines of intersection. (2)

1.6 Shade the area on the map where the reef **does** exist (the area underlain by reef).
**DO NOT SHADE ANY OTHER AREAS.** (4)

1.7 Determine the vertical throw of the fault. Classify the fault (normal or reverse). (3)

**[25]**

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**Question 2 :**

The plan shows a section drawn through line X – Y.

The section line X-Y lies West-East.

The sale of the plan is 1:1000

Fault (F2) is the youngest fault, and this fault dips at **35° due South**.

Fault (F1) is the older fault, and this fault dips at **65° due South.**

The reef strikes North – South.

The direction of movement is shown on the plan.

Show all the fault and reef strike lines on 21 and 22 levels of the mine. Clearly label all the strike lines.

Shade the blocks of reef-bearing areas and indicate the gains or losses of ground.

**[25]**

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**Question 3 :**

The plan shows three faults and a reef on the First level of a mine. All the given strike lines are on the first level of the mine.

Fault "A" is the youngest dislocation. The true dips of the reef and the fault's are shown on the plan.
The scale of the plan is 1:1000.

Complete the plan showing all the blocks of ground (reef-bearing areas).

Show all missing strike lines on first level and all the strike lines on second level. Clearly label all the strike lines.

Show all gains or losses of reef bearing areas.

The vertical distance between levels is **48 metres**.

**[50]**

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**[Total = 100 marks]**

MAP "A"

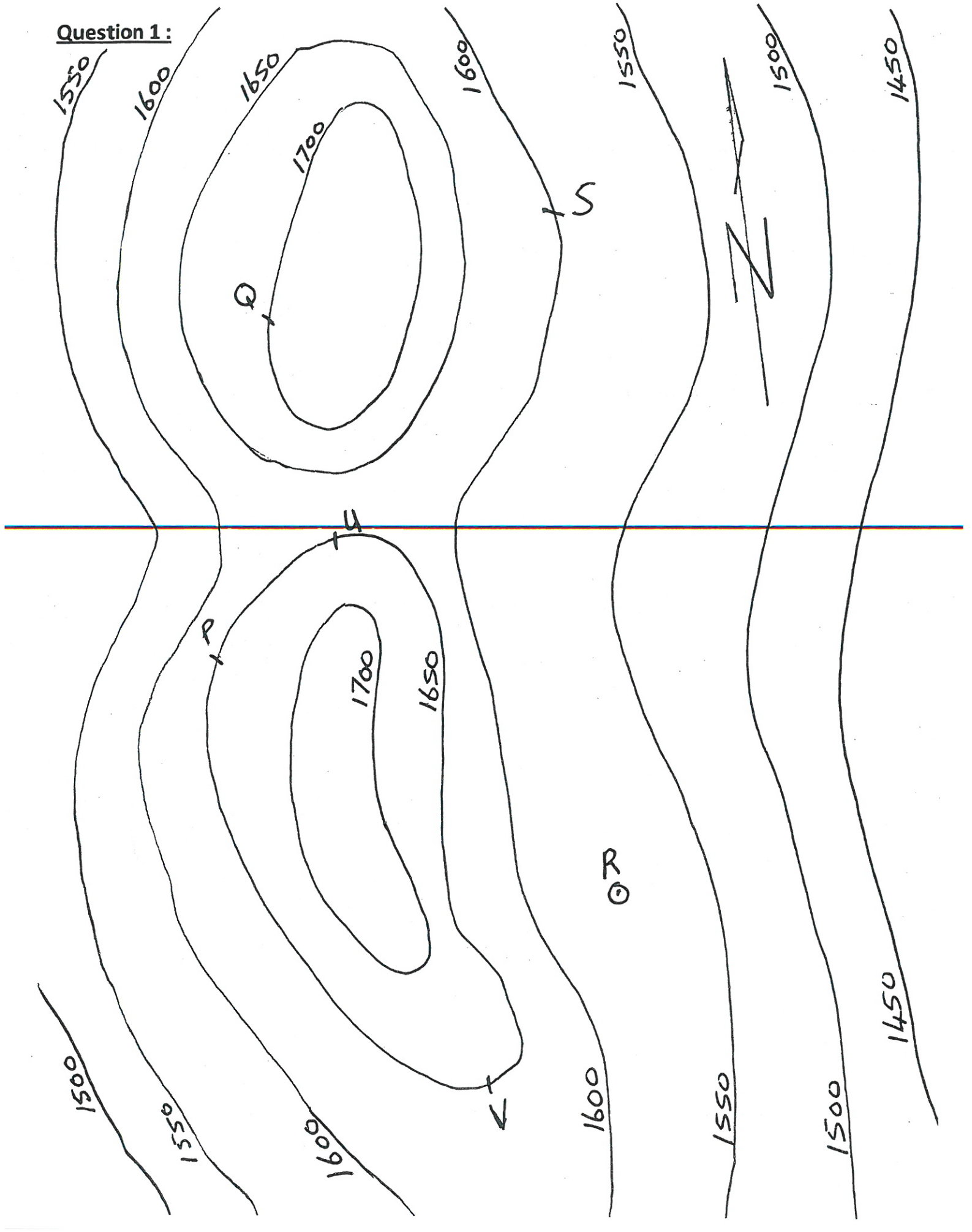
**Structural Geology 111 – MSG 3121**

**Date :** 11 JANUARY 2017

**Student Number:** .....

**Surname:** .....

**Question 1 :**



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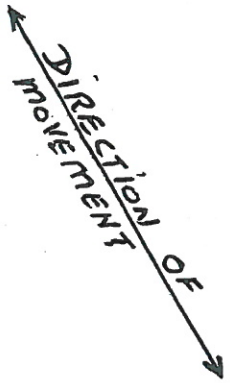
**Student Number: .....**

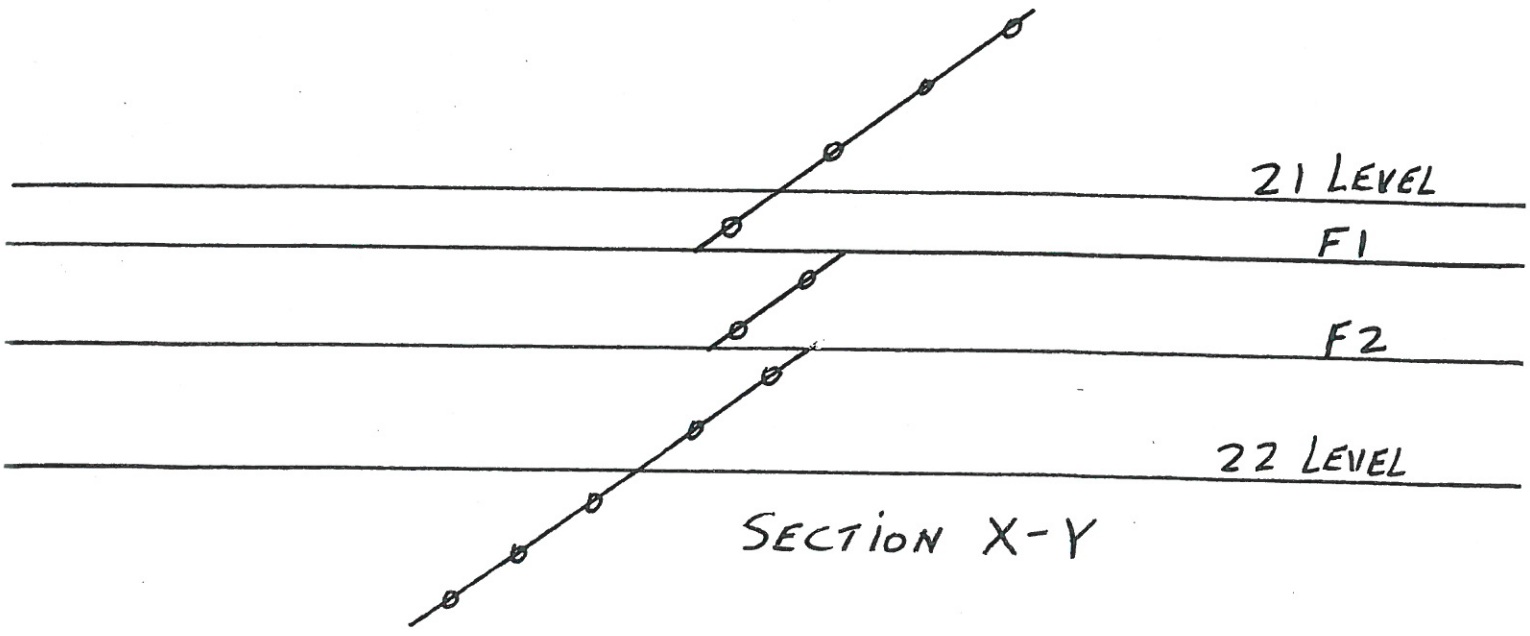
**Surname: .....**

**Question 2 :**




X – – – –

– – – – Y



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**Question 3 :**