

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF MINERAL RESOURCES

EXAMINATION FOR THE MINE SURVEYOR'S CERTIFICATE OF
COMPETENCY

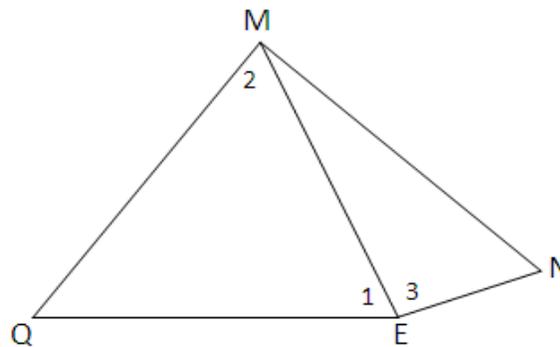
DATE: 15th April 2011 (Friday)
TIME: 8:30 to 11:30 (3 Hours)

TOTAL MARKS: 100
TO PASS: 50

SURVEY II

- 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) Sketches are not drawn to scale.
 - (5) The make and model number of your calculator **must** be written on the front cover of your answer book.

QUESTION 1



It is required to fix the co-ordinates of point Q from two existing beacons M & N. As it was impossible to set-up at point N, an eccentric station E was established near N so that the triangulation could be completed from M and E.

Given:

The direction from M to N = $318^{\circ}34'47''$

Mean horizontal clockwise angle QEM = 1 = $64^{\circ}36'20''$

Mean horizontal clockwise angle EMQ = 2 = $49^{\circ}18'45''$

Mean horizontal clockwise angle MEN = 3 = $91^{\circ}15'20''$

The horizontal distance from M to N = 7 610,000m (approx.)

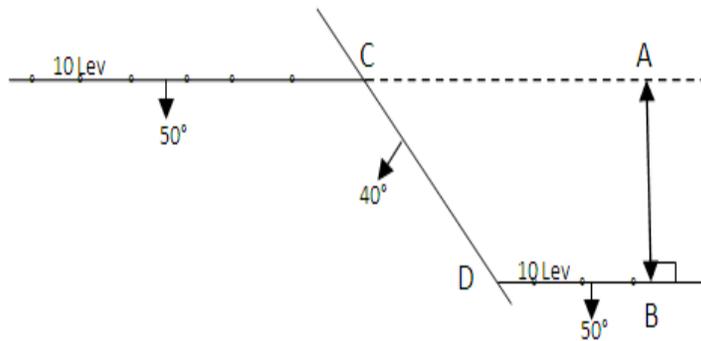
The horizontal distance from N to E = 3,165m

Calculate:

1. The direction from M to E
2. The direction from M to Q
3. The direction from E to Q

[10 marks]

QUESTION 2



The plan shows two strike lines of a reef on the tenth level of a mine. A fault has dislocated the reef as shown on the plan.

The reef is known to strike in a direction of $250^{\circ}30'00''$ and dips at 50° in a southerly direction.

The fault is known to strike in a direction of $165^{\circ}45'00''$ and dips at 40° in a westerly direction.

The direction of movement on the fault plane is $278^{\circ}00'00''$

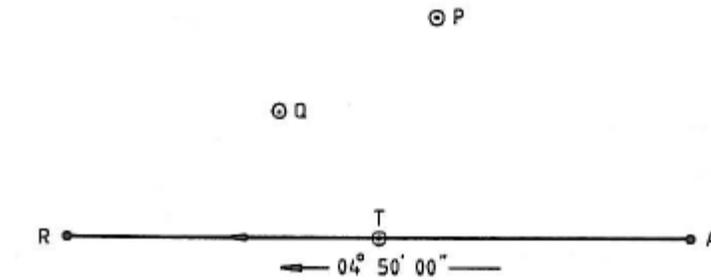
The true amount of movement on the fault is 35,0m.

Calculate:

1. The direction of the reef / fault line of intersection.
2. The dip along the reef / fault line of intersection.
3. The horizontal displacement [A] to [B] as shown on the plan.

[19 marks]

QUESTION 3



From the straight line of a track AR, it is required to lay out a curve which shall,

- Pass through the two points P and Q
- Have the straight line AR as tangent.

Given Co-ords :	Y	X
A	+ 15,000	-1 350,000
P	+948,000	- 853,000
Q	+512,000	- 452,000

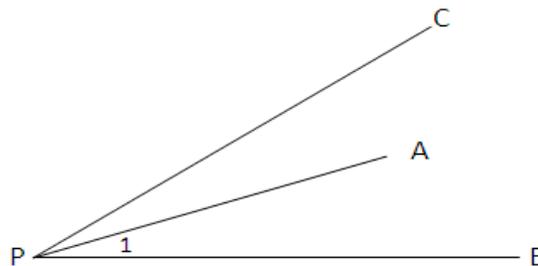
Direction AR = $04^{\circ}50'00''$

Calculate:

- The co-ordinates of tangent point T on straight line AR
- The radius of the curve

[28 marks]

QUESTION 4



In order to calculate the co-ordinates of an unknown point [P], the following information is available.

Given:

Horizontal clockwise angle $APB = 25^{\circ}09'50''$

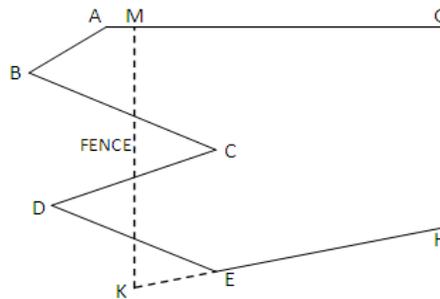
The direction from $[C]$ to $[P] = 24^{\circ}32'04''$

	Y	X
Co-ordinates of point [A]	-7 459,925	+8 039,770
Co-ordinates of point [B]	-7 919,807	+9 400,679
Co-ordinates of point [C]	-6 862,734	+4 516,853

Calculate the co-ordinates of point [P]

[25 marks]

QUESTION 5



ABCDE is the boundary between the adjacent mining properties. It has been decided to replace this boundary by means of a straight line MK parallel to GH without altering the area of either mining property. Point M must fall on line AG and point K must fall on line HE extended.

Given:

Co-ordinates in metres

	Y	X
Point A	0,000	0,000
Point B	-123,390	+ 31,410
Point C	-171,140	- 38,860
Point D	-250,600	+ 25,820
Point E	-352,610	-116,700

Directions

A to G = $180^{\circ}00'00''$

E to H = $161^{\circ}35'20''$

G to H = $273^{\circ}52'40''$

Calculate:

1. The co-ordinates of point M
2. The co-ordinates of point K

[18 marks]

Total [100 marks]