

REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF MINERAL RESOURCES
EXAMINATION FOR THE MINE SURVEYORS CERTIFICATE OF COMPETENCY

DATE: 16 October 2009
TIME: 12:30 to 15:30 (3 Hours)

TOTAL MARKS: 100
TO PASS: 50

SURVEY III

- Note:
- (1) Work to 1 second of arc and 0,001m.
 - (2) Trigonometrical functions must be shown to six (6) decimal places.
 - (3) All steps and checks must be shown.
 - (4) All calculations and answers to be shown clearly.
 - (5) Sketches have been reduced and are not to scale and attached herewith.
 - (6) The make and model number of your calculator must be written on the front cover of your answer book.

re-survey were conducted from trig beacons to a vertical shaft. Following are the notes from the surveyor's field book:

Co ordinates of A	Y= -75 000,562	X= 2 800 456,632
Co ordinates of B	Y= -75 243,212	X= 2 800 470,572
Co ordinates of C	Y= -74 969,421	X= 2 800 167,465
Co ordinates of D	Y= -75 189,521	X= 2 800 162,285
Angle	E F C	140:05:18
Angle	E F D	107:05:06
Angle	C F D	112:49:36
Angle	E F W1	51:12:50
Angle	A E F	105:56:51
Angle	B E F	135:55:18
Angle	A E B	118:07:51
Angle	F E W3	85:54:29
HD	S1 - W2	49,156
HD	W1 - W2	59,535
Angle	W2 S1 W1	1:08:51
Angle	W1 S1 S3	157:24:28
Angle	W2 W1 F	126:13:47
HD	S2 - W4	49,589
HD	W3 - W4	59,146
Angle	W4 S2 W3	1:43:32
Angle	W3 S2 S3	152:01:03
Angle	W4 W3 E	169:06:28
HD	S1 - S3	99,368
HD	S2 - S3	104,596
HD	S3 - S4	137,728
HD	S4 - S5	146,740
Angle	S2 S3 S4	145:33:51
Angle	S3 S4 S5	86:44:28

Measurements made F – W1:

Measured distance = 94,562m

Distance measured with 100m steel tape known to be 0,016m too long.

Standard Temperature of tape = 20 degrees C.

Actual Temperature during measurement = 12 degrees C.

Elevation at point F = +1 704,926m

Elevation at point W1 = +1 705,453m

Radius of earth at 30 degree latitude = 6 373 000m

Co-efficient of expansion (C.O.E.) = 0,0000113 per 1 degree C

Measurements made E – W3:

Measured distance = 98,684m

Distance measured with 100m steel tape known to be 0,016m too long.

Standard Temperature of tape = 20 degrees C.

Actual Temperature during measurement = 24 degrees C.

Elevation at point E = +1 703,959m

Elevation at point W3 = +1 705,453m

Radius of earth at 30 degree latitude = 6 373 000m

Co-efficient of expansion (C.O.E.) = 0,0000113 per 1 degree C

Gyro base direction between S5 and S4 = 240:36:21

From the above information calculate the following:

1. Co ordinates of S3 from E and F respectively
2. Calculate the co ordinates of S5
3. Calculate the bearing closure between the re-survey and the gyro base direction.

[100 marks]

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