

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF BUILT ENVIRONMENT**  
**DEPARTMENT OF QUANTITY SURVEYING**  
**PART I SECOND SEMESTER EXAMINATIONS – JUNE 2010**  
**ENGINEERING SURVEYING – AQS1208**

Time: 3 Hours

Total Marks: 100

**Instructions**

Answer ANY Five Questions. All Questions Carry equal marks.

Carry out all necessary checks.

Untidy work will be penalised.

Diagrams drawn should be labelled.

**Requirements**

A non- programable calculator.

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**QUESTION ONE**

- a) A properly adjusting tilting level was set up at a point P and the following consecutive readings 0, 663m; 0,841m and -0,939m were taken on a staff positioned at points A, B and C respectively. The level then moved to a point Q and further readings at C and D were as follows; 1,198m and 1,100m respectively. Reduce and check the levels using the height of collimation method. Reduced level of A was given as +94,115m. (15 marks)
- b) What are the advantages and disadvantages that are associated with both the Rise and Fall and height of collimation methods? (3 marks)
- c) What is reciprocal levelling? (2 marks)

**QUESTION TWO**

- a) Define the following terms as used in compass survey.
- i) Isogonal lines (3 marks)
- ii) Agonic lines (3 marks)
- iii) Magnetic meridian (4 marks)

- b) Eliminate the effect of local attraction from the following compass bearing. Show the adjustment and the adjusted value.

AB=N30° 00'E	BC=S40° 00'E	CD=S45° 00'W
BA=S30° 00'W	CB=N45° 00'W	DC=N55° 00'E
DA=N55° 00'W	AD=S60° 00'E	(10 marks)

**QUESTION THREE**

A levelling exercise was carried along the track in an underground haulage. It has been decided to regrade the track on an even grade from station 1 to station 8. Thereafter, the haulage is to be advanced on a grade of 0, 50%. The required grade elevation at station 1 is 937,480m ie 1,00m above the existing track. Calculate the height above the existing track, required grade to be placed to regrade the track between station 1 and 8 and also at 9 to suit the new grade.

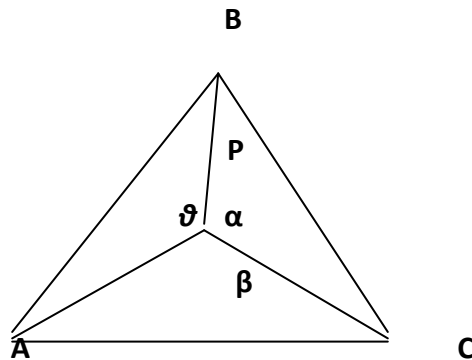
**(NB Calculate the cut and fill)** (20 marks)

**QUESTION FOUR**

- a) What are the responsibilities of an Engineering Surveyor on a Construction scheme? (10 marks)
- b) Describe in detail methods of controlling verticality during construction of either multi -storey buidling on a vertical shaft. (10 marks)

**QUESTION FIVE**

A resection was carried out at a point P and the following information extracted for observations to trigs A, B and C.



**Coordinates**

A -85 150,86	+ 2152 089,38	θ=65° 34' 04"
B -89 538,72	+2146 517,84	α=132° 51' 20"

C -88 401,35      +2157 031,46       $\beta=161^{\circ} 34' 36''$

Resect the coordinates of P, by the Barycentric method. (20 marks)

**QUESTION SIX**

a) Given coordinates in metres

A    +212 640,515    +7 646,103

B    +212 587,339    +7 899,902

Calculate the distance and direction A to B. (10 marks)

b) In a tape offset survey the following offsets were taken from a fence to a survey line.

Chainage m	0	20	40	60	80	100	120	410	160	180
Offset m	0	5,49	9,14	8,03	10,17	13,00	8,73	4,27	1,83	0

Find the area (hectares), between the fence and the survey line. Use Simpson's rule. (10 marks)

**END OF EXAMINATION**