



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF ENGINEERING AND TECHNOLOGY
UNIVERSITY EXAMINATIONS FOR THE DEGREE OF SCIENCE IN:
RENEWABLE ENERGY TECHNOLOGY AND MANAGEMENT
2ND YEAR 2ND SEMESTER 2015/2016 ACADEMIC YEAR
CENTRE: MAIN CAMPUS

COURSE CODE: TET 3224

COURSE TITLE: ENGINEERING SURVEYING I

**EXAM VENUE: W/S STREAM: BSc. RENEWABLE ENERGY TECHNOLOGY
AND MGT**

DATE: 26/4/16 EXAM SESSION: 2.00- 4.00 PM

TIME: 2 HOURS

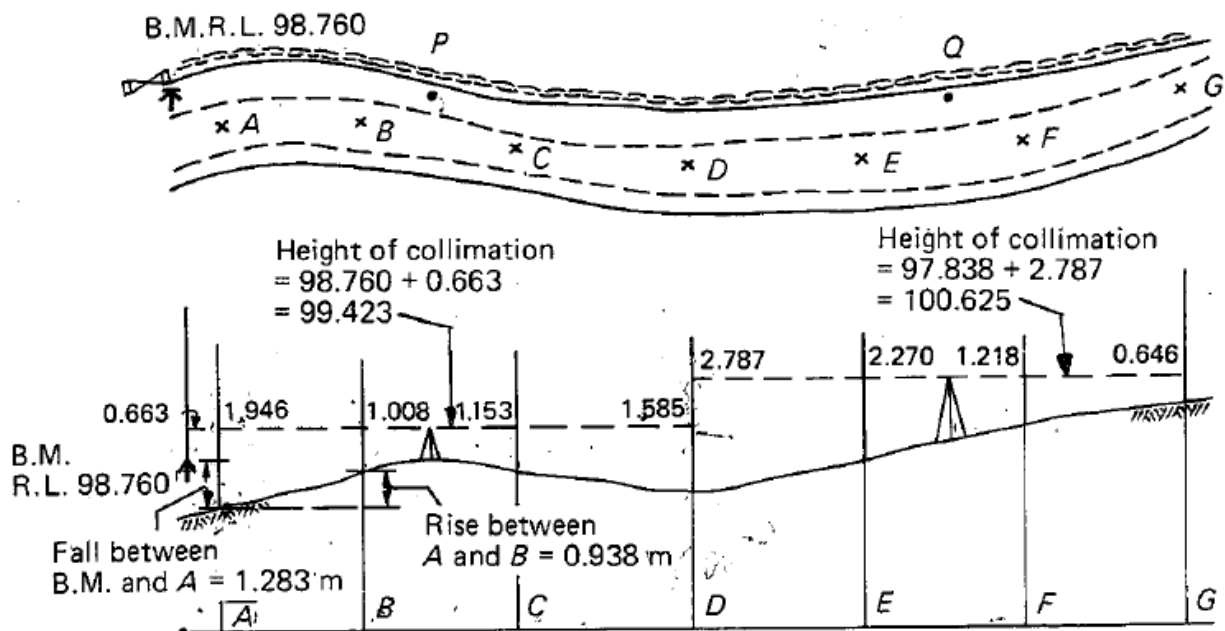
Instructions

- 1. Answer Question 1 (compulsory) and ANY other two questions**
- 2. Candidates are advised not to write on question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE

- i. Briefly compare and contrast geodetic survey and plane survey **(6 Marks)**
- ii. Four principles of conducting survey work were discussed in class. Name these principles. **(4 Marks)**
- iii. Measurements in survey basically fall under **FOUR** main categories. List these categories **(4 Marks)**
- iv. Outline **THREE** types of errors that are prevalent in survey measurements and explain how they affect the accuracies of the measurements. **(10 Marks)**
- v. Surveying can be broadly classified into three categories. List the three considerations under which the classifications are based **(6 Marks)**

QUESTION TWO



Using the figure above as reference, record the readings on a level note book as appropriate. Reduce the levels using the methods below applying all the necessary checks.

- i. Rise and Fall method **(10 Marks)**
- ii. Height of collimation method **(10 marks)**

QUESTION THREE

- i. A compass traverse ABCDE was completed and the following were the observations:

Line	Bearing	Line	Bearing
AB	349° 00'	DC	48° 00'
BA	167 15	DE	135 20
BC	298 30	ED	319 00
CB	118 30	EA	72 45
CD	229 00	AE	252 00

What are the stations where you suspect local attraction? Eliminate the effect of local attraction by using conventional methods and find out the correct bearings. Compute the included angles of the polygons with the corrected bearings.

(20 Marks)

QUESTION FOUR

A base line was measured by tape suspended in catenary under a pull of 145 N, the mean temperature being 14°C. The lengths of various segments of the tape and the difference in level of the two ends of a segment are given in the table below.

Bay/Span	Length (m)	Difference in level (m)
1	29.988	+ 0.346
2	29.895	- 0.214
3	29.838	+ 0.309
4	29.910	- 0.106

If the tape was standardized on the flat under a pull of 95 N at 18°C determine the correct length of the line.

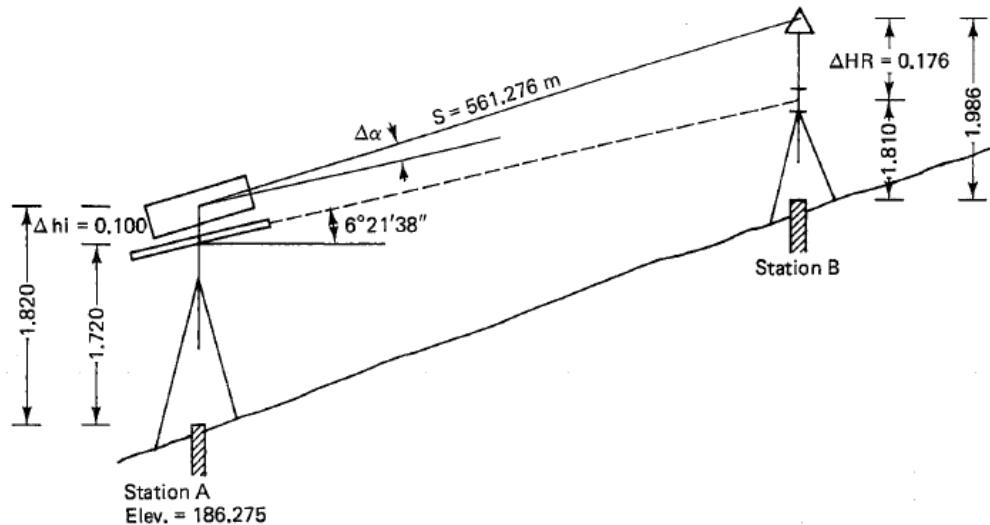
(20 Marks)

Take

Cross-sectional area of the tape = 3.35 mm²

Mass of the tape = 0.025 kg/m
 Coefficient of linear expansion = 0.9×10^{-6} per °C
 Young's modulus = 14.8×10^4 MN/m²
 Mean height of the line above M.S.L. = 51.76 m
 Radius of earth = 6370 km

QUESTION FIVE



An EDM slope distance is determined to be 561.276m. The EDM is 1.820 m above its station (A), and the prism is 1.986 m above its station (B). The EDM is mounted on a theodolite whose optical centre is 1.720 m above the station. The theodolite was used to measure the vertical angle (+ 6° 21' 38") to a target on the prism pole; the target is 1.810 m above station (B).

Compute both the horizontal distance AB and the elevation of station B, given that the elevation of station A = 186.275 m. **(20 Marks)**