JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY EXAMINATIONS FOR THE DEGREE IN SCIENCE IN RENEWABLE ENERGY TECHNOLOGY AND MANAGMENT

2ND YEAR 1ST SEMESTER 2017/2018 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TET 3224.

COURSE TITLE: ENGINEERING SURVEYING

EXAM VENUE: WS **STREAM: BSc REN ENERGY TECH & MGT**

DATE: 21/12/2017 **EXAM SESSION: 9.00 - 11.00AM**

DURATION: 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 1

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)	Distance 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.

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 × 104 MN/m2
- Mean height of the line above M.S.L. = 51.76 m - (30 Marks)

Questions 2

- Define the following terms as used in surveying
- Level surface and Horizontal surface (1.5 Marks)
- Precision and Accuracy (1.5 Marks)

b) Mention the 4 instrumental and the 6 natural sources of Errors in Leveling (5 Marks)

c) State the two practices that you would always observe in order to reduce and eliminate mistakes in leveling. (2 Marks)

d) Given a level machine in the field, state step by step how you would go about setting the Level (10 Marks)

Question 3

The following readings were taken with a level and 4 m staff. Draw up a level book page and reduce the levels by the rise and fall method. 0.578 B.M. (= 58.250 m), 0.933, 1.768, 2.450, (2.005 and 0.567) C.P., 1.888, 1.181, (3.679 and 0.612) C.P., 0.705, 1.810.

- Identify and list the readings with respect to definitions above e.g C. P etc (5 Marks)
- Show each calculation line by line before entry in table e.g. H. I_1 = h1 + B.S.1 =? (9 Marks)
- Draw up a level book page, enter the calculations and the reduced the levels by the Rise and Fall method. (6 Marks)

QUESTION 4

Surveying is made up of various specializations known as sectors or classes: State and explain with examples;

i) The two main types of survey (5 Marks)

ii) The three main branches of one of the main types of i) above (6 Marks)

iii) Three types with reference to surveyor qualification. (4.5 Mark)
iv) Three types with reference to purpose of the survey (4.5 Marks)

Question 5

Control Surveying is an important aspect of surveying;

a) Explain the term control surveying and its two components (6 Marks)
b) Differentiate between i) triangulation and trilateration ii) advantages and disadvantages as methods of control surveying (8.5 Marks)
c) Explain the three classifications of triangulation as a control surveying method. (5.5 Marks)