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 2018/2019 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TET 3224

COURSE TITLE: ENGINEERING SURVEYING

EXAM VENUE: STREAM: BSc REN ENERGY TECH & MGT

DATE: ../12/2018   EXAM SESSION:

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
4. Use well labeled diagrams

Question 1

Upon initial set-up of a survey station, the levels established and recorded by means of accurate levelling.

a) Explain the following terms with reference to levelling; Differential levelling, Precise leveling, A level surface, A level datum,assumed datum,reduced level, bench mark (BM),A set-up, A run, A close, Height of Collimation, line of collimation,Orders of levelling. Change points. (14 Marks)

b) Construct a three column table with the headings Order, Purpose and Maximum close; fill the gaps below the column headings up to four rows to show the quality of levelling required. (12 Marks)

c) Levels can move out of adjustment so that line of collimation is not truly horizontal. Describe a simple step by step method to enable you correct the instrument. (4 marks)

Question 2

Distance measurement obtained in the field by way of tape measure may be in error.

a) Mention the three main sources of error and for each case show or explain how this would occur. (5.5 marks)

b) State the general equation that fully takes care of the parameters to be corrected. (2 .5 Marks)

c) Given a 30 metre steel tape, standardized at 20 °C using a tensile force of 70 N, measured against a standard tape, the tested tape had a length of 29.998 m. The 30 m tape has a weight of 1.69 N/m and a cross sectional area of 1.29 mm^2.A field measurement (L_f) of 29.663 was found at a temperature of 30 °C using a tensile force of 50 N. Find the actual or true length. (12 marks)

Question 3

A traverse consists of a series of straight lines of known length related one another by known angles between the lines. Explain the following terms as used in traversing (with aid of neat sketch diagrams) as appropriate.

i)   Open and closed traverse, Coordinates, Bearings, Departure and latitudes, Balancing a Traverse, Easting and Northings.(11.5 Marks)

ii)   Explain in detail two methods of balancing a traverse, the principle and the necessary equations for each method.(8.5 Marks)

Question 4

Given the two figures(a & b) below; state in clear six steps how you would use trigonometric leveling

1. To find the elevation of point Q (10 Marks).

2. Thereby show the relevant equations that take care of the two figures (10 Marks).
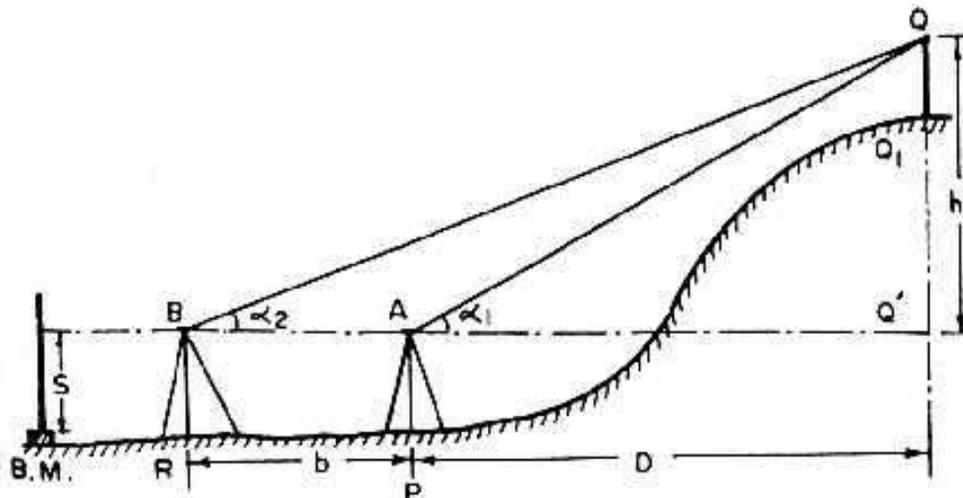
(a)
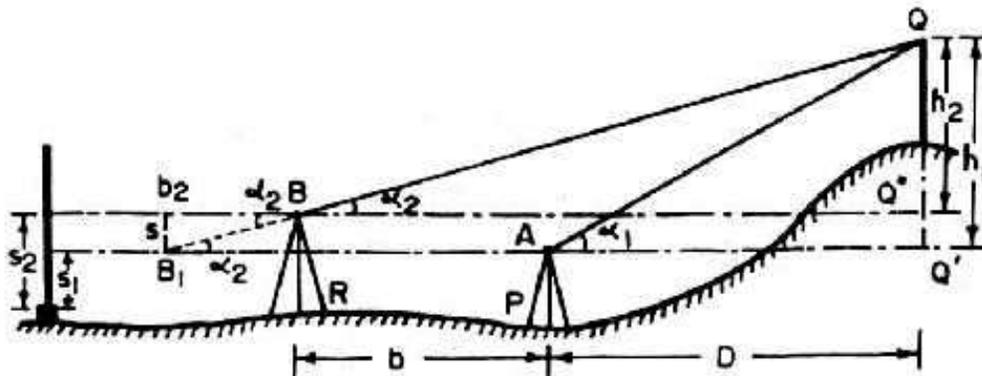
(b)

QUESTION 5

Theodolite is a versatile surveying instrument used for both vertical and horizontal angles measurements. In reference to this describe;

i) The four major parts of a theodolite (4 Mark)
ii) The four major axes of a theodolite and relationship if any.(6 Mark)
iii) The Plate level axis permanent adjustment (the prior action procedure and the adjustment steps).(10 Mark)