TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

TCV 4225 : ENGINEERING SURVEY - II

END OF SEMESTER EXAMINATION
SERIES: JANUARY 2025
TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination
-Answer Booklet, examination pass and student ID
This paper consists of five questions.
Attempt question ONE (Compulsory) and any other TWO questions.
Do not write on the question paper.

QUESTION ONE (COMPULSORY) (20 Marks)

a). Discuss the procedures of measuring a horizontal angle AOB shown in Figure 1 using an ordinary method **(10 Marks).**

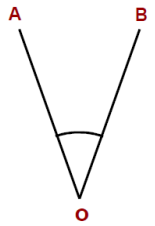


Fig 1. Observed angle AOB

b). Describe the following terms as used in theodolite traversing

i). Transiting of theodolite

ii). Centering

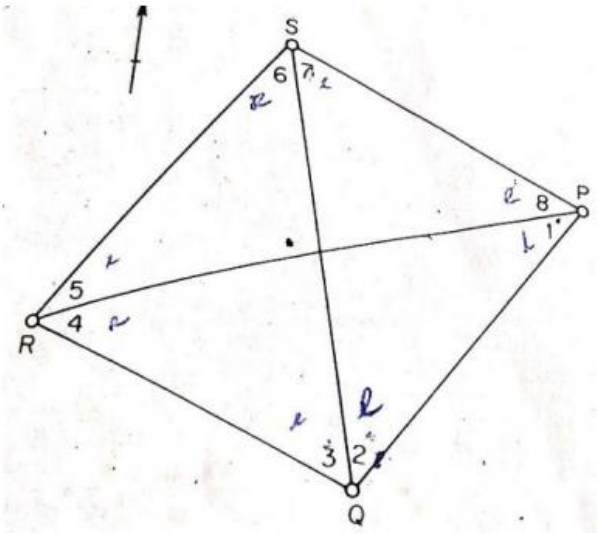
iii). Horizontal axis

iv). Traverse

v). Ray trace **(10 Marks).**

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO (20 Marks)



Angle	Observed value
1	
2	30° 20' 50"
3	54 10 45
4	55 44 38
5	39 43 39
6	41 53 49
7	42 37 47
8	54 54 56
	40 33 30

Station	Coordinates mE	mN
P	1885.82	1632.47
Q	1401.00	1045.76

Fig 2. Braced Quadrilateral

The field abstract of Fig 2 shows the observed angles for a braced quadrilateral PQRS. Determine the adjusted values of all the angles in the quadrilateral using method of equal shifts **(20 Marks).**

QUESTION THREE (20 Marks)

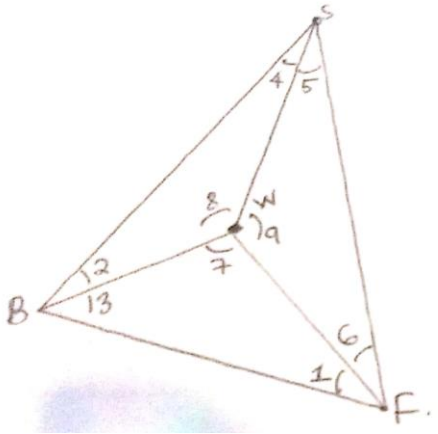
Given the following information, compute the new coordinates K_6, K_7, K_8, K_9, K_{10}, and K_{11}. The details were Donga to K_6 (251^0 44′ 00′′ and 336.139 m), K_6 to K_7 (354^0 03′ 22′′ and 272.315 m), K_7 to K_8 (43^0 08′ 09′′ and 479.504 m), K_8 to K_9 (05^0 20′ 53′′ and 366.565 m), K_9 to K_{10} (326^0 19′ 50′′ and 206.299 m), K_{10} to K_{11} (338^0 06′ 50′′ and 334.472 m) and finally, K_{11} to Twiga (298^0 32′ 40′′ and 430.924 m). Determine the new coordinates through applying Bowditch Method for correction of errors and the datum coordinates were

Station	**N (m)**	**E (m)**
Donga	26 549.36	68 6431.50
Twiga	28 162.86	68 5828.56

(20 Marks).

QUESTION FOUR (20 Marks)

The field abstract for a triangular scheme established for a small construction site in **Fig.3.** Using the data provided below, using equal shifts adjustment, determine the correct angles **(20 Marks).**



Angle	Observed value
1	26° 10′ 48″
2	27° 37′ 16″
3	35° 46′ 10″
4	32° 57′ 52″
5	28° 23′ 12″
6	29° 04′ 37″
7	126° 11′ 59″
8	111° 15′ 32″
9	122° 32′ 02″

Fig. 3. Triangular scheme

Note that bearing no should read 111^0 15′ 54′′

QUESTION FIVE (20 Marks)

a) Given the following details, determine interior angles and the distances of the triangle ABC

A	+ 2229.02	+825.70
B	+3417.08	+1118.77
C	+2011.08	+ 897.64

(10 Marks).

b) With aid of a sketch and equations discuss how you can intersect a point without occupying it using the following methods

i). Intersection using angles

ii). Intersection using bearings **(10 Marks).**