

50-1106

easyvet.com

Name: \_\_\_\_\_ Index No: \_\_\_\_\_

2306/302  
SURVEYING  
Oct./Nov. 2013  
Time: 3 hours

Candidate's Signature: \_\_\_\_\_

Date: \_\_\_\_\_



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN QUANTITY SURVEYING**

SURVEYING

3 hours

**INSTRUCTIONS TO CANDIDATES**

- Write your name and index number in the spaces provided above.*
- Sign and write the date of examination in the spaces provided above.*
- You should have a Scientific calculator for this examination.*
- Answer any FIVE of the EIGHT in the spaces provided in this question paper.*
- ALL questions carry equal marks.*
- Maximum marks for each part of a question are as shown.*
- Candidates should answer the questions in English.*

**For Examiner's Use Only**

Question	1	2	3	4	5	6	7	8	TOTAL SCORE
Candidate's Score									

This paper consists of 20 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

1. (a) State **four** uses of levelling. (4 marks)
- (b) Table 1 shows chainages and reduced levels taken by a quantity surveyor for setting out a drain. If the invert level at 10.0 m is 598.92 m and the drain falls at 1 in 200 from chainages 10.0 m to 76 m, calculate:
- (i) invert levels at all the chainages;
  - (ii) height of sight rails at 10.0, 30.0 and 76.0 m if the boning rod is 2 m long;
  - (iii) depth to be excavated at all the chainages.

(16 marks)

Table 1

Chainage (m)	Ground reduced level (m)
10.0	599.920
20.0	599.750
30.0	599.650
40.0	599.448
50.0	599.638
60.0	599.753
76.0	599.863

2. (a) Outline **three** methods for determining area of parcel of land bounded by irregular boundaries. (6 marks)
- (b) Figure 1 shows offset against chainages. Calculate the area of the parcel of land ABCD by Simpson's rule. (6 marks)

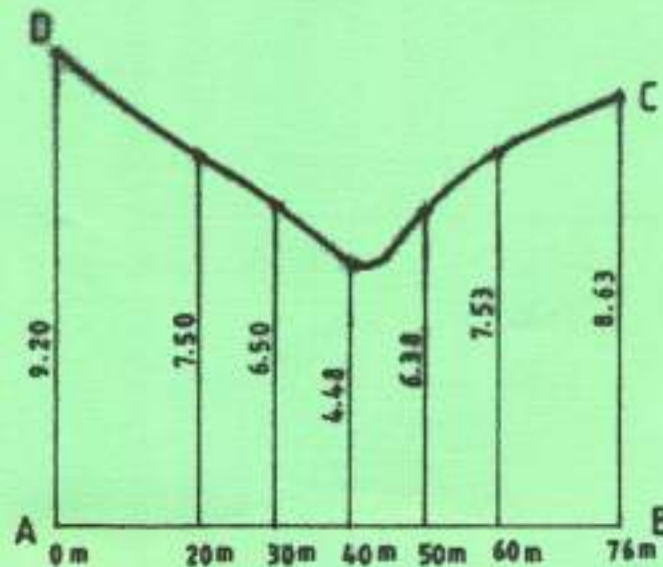
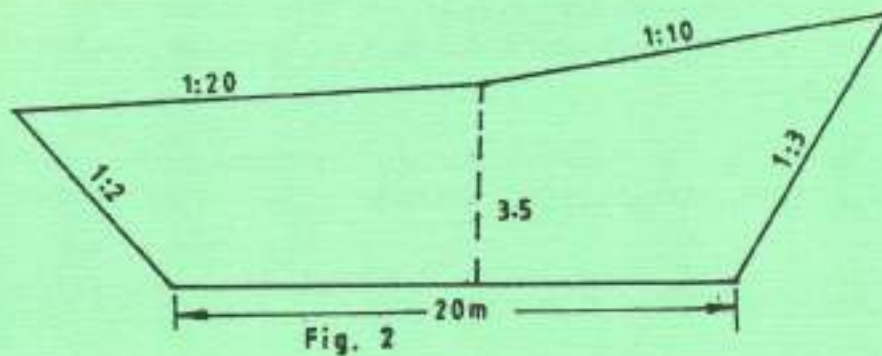


Fig. 1



- (c) Figure 2 shows a cross-section with various levels. Use the figure to compute its area. (8 marks)



3. (a) Distinguish between link closed traverse and closed looped traverse. (4 marks)
- (b) Table 2 shows a traverse run between L and S. Use the information in the table and the datum coordinates to compute adjusted coordinates of points  $K_1$  .....  $K_3$  by Bowditch's method. (16 marks)

Table 2

Line	Bearing	Distance (m)
L - $K_1$	$54^\circ 52' 30''$	522.56
$K_1 - K_2$	$97^\circ 17' 20''$	287.92
$K_2 - K_3$	$202^\circ 32' 10''$	398.98
$K_3 - S$	$337^\circ 49' 40''$	438.76

Point	N	E
L	328236.92	-62377.55
S	328529.51	-61979.23



4. (a) With the aid of sketches describe the **three** systems of tacheometry. (6 marks)
- (b) If the contour value required is 20.25 m the bench mark values 23.50 m and staff reading on the bench mark is 2.25 m. Calculate the staff reading to locate the contour value. (6 marks)
- (c) Table 3 shows readings taken during a tacheometric exercise. If the multiplying constant is 100 and additive constant 0, use the readings to complete:
- (i) the horizontal distances PQ, QR and PR;
- (ii) The vertical distance PR. (8 marks)

Table 3

Instrument	Staff station	Staff readings			Vertical angle	Bearing
		Lower	Mid	Top		
Q	P	1.713	2.110	2.507	5° 32'	26° 36'
	R	0.957	1.356	1.755	-6° 46'	174 18'

5. (a) With the aid of a diagram, define the following terms as used in curves:
- (i) external distance;
- (ii) long chord;
- (iii) tangent points;
- (iv) mid ordinate;
- (v) curve length. (7 marks)
- (b) Two straights  $TI$  and  $IT_2$  have bearings  $86^\circ$  and  $130^\circ$  respectively. The two straights are to be joined by a circular curve of radius 600 m. If the chainage of intersection point I is 873.492 m and the curve is to be set out by deflection angles, determine:
- (i) the tangent length;
- (ii) curve length;
- (iii) chainage of tangent points;
- (iv) setting out data at 20 m chord on through chainage basis giving your answer in tabular form. (13 marks)



6. (a) State **seven** factors considered when selecting chain stations in chain surveying. (7 marks)
- (b) With the aid of a diagram, describe the random line method of overcoming obstacles in chain surveying. (7 marks)
- (c) A line was measured along a gentle slope of  $5^\circ$  using a 30 m chain. The measured length was 1520.0 m. If the length of the chain was later found to be 30.05 m, calculate the correct horizontal length. (6 marks)

7. (a) Outline five geometrical relationships that must be maintained by a theodolite in perfect adjustment. (10 marks)
- (b) Distinguish between the following terms as used in theodolite observations:
- (i) transiting and orientation;
- (ii) rectangular and polar coordinates. (4 marks)
- (c) Figures 3 and 4 show observations taken to determine the angle ACB. Use the observations to determine the most probable value of angle ACB. (6 marks)

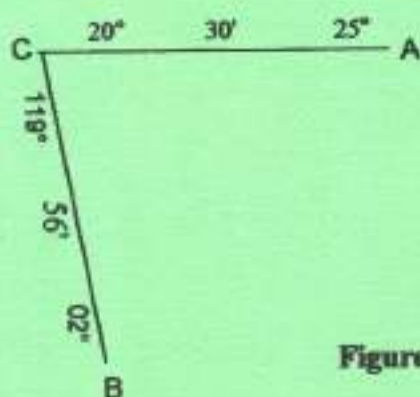


Figure 3

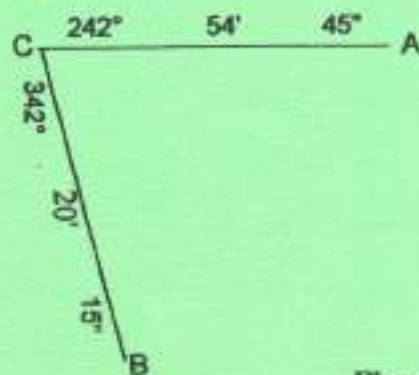


Figure 4

8. (a) Outline three errors found in linear measurements giving examples in each case. (6 marks)
- (b) With the aid of a diagram, explain how to overcome an obstruction of a chain line by an intervening rising ground. (8 marks)
- (c) State four properties of mass haul diagrams. (6 marks)

