

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

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SURVEYING I AND WORKSHOP  
TECHNOLOGY I (MECHANICAL)

June/ July 2014

Time: 3 hours



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

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

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN BUILDING TECHNOLOGY  
DIPLOMA IN CIVIL ENGINEERING  
DIPLOMA IN ARCHITECTURE

## MODULE I

SURVEYING I AND WORKSHOP TECHNOLOGY I (MECHANICAL)

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 and drawing instruments for this examination.**This paper consists of EIGHT questions in TWO sections; A and B.**Answer any TWO questions from section A, any TWO from section B and any other question from either section A or B 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

Section	Question	Maximum Score	Candidate's score
A		20	
		20	
		20	
B		20	
		20	
		20	
TOTAL SCORE		100	

This paper consists of 16 printed pages.

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



**SECTION A: SURVEYING I**

Answer any **TWO** questions from this section.

1. (a) Differentiate between plane surveying and geodetic surveying. (3 marks)
- (b) List any **three** branches of surveys. (3 marks)
- (c) Table 1 shows level readings taken between a permanent bench mark and a temporary bench mark. Using the information given, reduce the readings by the rise and fall method applying the arithmetic check. (14 marks)

Table 1

BS	IS	FS	Remarks
0.857			Bm (125.667 m)
	1.324		
	1.924		
1.042		2.864	
	1.696		
	0.498		
2.791		0.325	
	2.164		
	1.213		
		0.462	TBm

2. (a) State **five** characteristics of contour lines. (5 marks)
- (b) Explain the **three** main errors encountered in levelling. (9 marks)
- (c) A back sight of 1.78 m is taken on to a bench mark of reduced level 651.87 m. Determine the staff readings required to locate 650, 651, 652 and 653 contours respectively. (6 marks)

3. (a) Describe the procedure of direct method of contouring. (5 marks)
- (b) Reduce the following levels by height of collimation method applying suitable checks. (15 marks)

Table 2

BS	IS	FS	Remarks
1.632			Point A, RL = 54.173 m
3.467		1.124	Change point
	0.568		Point X
1.835		0.381	Change point
	-2.473		Point Y
1.732		3.941	Change point
		2.484	Point B

4. (a) Explain the following terms as used in levelling:
- (i) level line;
  - (ii) horizontal line;
  - (iii) parallax.
- (6 marks)
- (b) With the aid of diagrams, explain the "two peg" test in levelling. (5 marks)
- (c) Describe the temporary adjustment done to a dumpy level before its ready for use. (9 marks)



**SECTION B: WORKSHOP TECHNOLOGY I (MECHANICAL)**

*Answer any TWO questions from this section.*

5. With the aid of diagrams, explain the working process of an internal combustion engine. (20 marks)
6. (a) State:
- (i) any **four** safety measures to be taken when using a hacksaw. (4 marks)
  - (ii) **three** disadvantages of having excessive drill feed. (3 marks)
- (b) Sketch a drill bit and label the main parts. (6 marks)
- (c) Using sketches, differentiate between a ball peen hammer and a claw hammer. (7 marks)
7. (a) Define pressure as used in pumps. (2 marks)
- (b) Explain the use of the following parts of a centrifugal pump:
- (i) pump case;
  - (ii) impellers. (6 marks)
- (c) Sketch and label positive displacement pump. (6 marks)
- (d) Explain how one would protect a positive displacement pump. (4 marks)
- (e) State any **two** advantages of a reciprocating pump over a displacement pump. (2 marks)
8. (a) Sketch and label the structure of the ignition system of an engine.
- (b) Explain the function of the main parts labelled in (a) above. (20 marks)