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Name_____ Index Number:_____

2705/104
2707/104
2709/104
2710/104
SURVEYING 1 AND
WORKSHOP TECHNOLOGY 1
Oct./Nov. 2015
Time: 3 hours

Date:_____

Signature:_____

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN BUILDING TECHNOLOGY
DIPLOMA IN CIVIL ENGINEERING
DIPLOMA IN ARCHITECTURE

SURVEYING 1 AND WORKSHOP TECHNOLOGY 1

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.
Sign and write the date of the examination in the spaces provided above.
You should have a scientific calculator for this examination.
*This paper consists of **EIGHT** questions in **TWO** sections: **A** and **B**.*
*Answer **FIVE** questions choosing **TWO** questions from section **A**, **TWO** questions from section **B** and **ONE** from either section in the spaces provided in this question paper.*
All questions carry equal marks.
Maximum marks for each part of a question are as indicated.
Candidates should answer the questions in English.

For Examiner's Use only

Section	Question	Maximum Score	Candidate's Score
A			
B			
Total Score			

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.

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Turn over

SECTION A: SURVEYING I

*Answer at least **TWO** questions from this section.*

1. (a) In order to find the rail levels of an existing railway, a point A was marked on the rail, then points at distances in multiples of 20m from A and the following readings were taken:

Backsight 3.39 on OBM 23.10
Intermediate sights on A, A + 20 and A + 40, 2.81, 2.51 and 2.22 respectively.
A + 60: Change point: foresight 1.88, backsight 2.61.

Intermediate sights on A + 80 and A + 100, 2.32 and 1.92 respectively; and finally a foresight of 1.54 on A + 120, all being in metres. Tabulate and reduce the above readings on the collimation system and apply the suitable arithmetic check.

(11 marks)

(3 marks)

(b) Define surveying.

(c) Explain the following:

(i) topographical surveying;
(ii) cadastral surveying;
(iii) aerial surveying.

(6 marks)

(12 marks)

2. (a) Explain the **three** main sources of errors in levelling.

(b) Reciprocal observation while levelling a cross a wide river gave the following readings on to staves held vertically at R and S from instruments stationed at P and Q:

reading of staff at R from P   =   1.332 m;
reading of staff at S from P   =   1.016 m;
reading of staff at R from Q   =   1.614 m;
reading of staff at S from Q   =   1.278 m.

R and P were close to each other on one bank with S and Q similarly situated on the other bank. If the reduced level of S is 10.376m AOD, what is the level of R?

(8 marks)

3. (a) Explain the following terms:

    (i) Survey station.
    (ii) Base line.

                                                                    (3 marks)

    (b) The following staff readings were observed at a road bridge over a railway for the purpose of measuring the clearance between the rails and the girder on the side at which the rail is higher. Using the Rise and Fall method, reduce the levels and state the vertical distance between the girder and the rail.

                                                                    (17 marks)

Table 1

BS	IS	FS	RL	Remarks
1.22			68.40	BM
0.54		11.45		
	7.92			Rail a
	(-5.99)			Girder above a
	8.87			Rail b
	(-5.94)			Girder above b
	7.94			Rail c
	(-5.88)			Girder above c
	8.06			Rail d
	(-5.83)			Girder above d
12.16		0.32		
		2.15	68.40	OBM

4. (a) Explain

    (i) the term temporary adjustment as used in levelling;

    (ii) the temporary adjustments carried out to a dumpy level before it's ready for use.

                                                                    (15 marks)

    (b) State any **five** uses of contours.   (5 marks)

SECTION B: WORKSHOP TECHNOLOGY I

*Answer at least **TWO** questions from this section.*

5.   (a)   Sketch and label the following hand tools;

        (i)   ball peen hammer;
        (ii)   rasps file;
        (iii)   hack saw.

(6 marks)

   (b)   With the aid of a labelled sketch explain the function of a pipe vice.

(6 marks)

   (c)   State any **two** advantages of centrifugal pumps.   (2 marks)

   (d)   Explain the working principle of a centrifugal pump.   (6 marks)

6.   (a)   (i)   Define the term machine tool;
        (ii)   List any **two** types of lathe machines.

(3 marks)

   (b)   With the aid of a sketch explain the working principle of a lathe machine.   (12 marks)

   (c)   Explain the term "feed" as applied to lathe operation.   (2 marks)

   (d)   State the function of a coolant in a lathe machine.   (3 marks)

7.   (a)   State the functions of the following fuel systems of a vehicle:

        (i)   carburettor;
        (ii)   oil filter.

(4 marks)

   (b)   State:

        (i)   any **five** differences between petrol engines and diesel engines.
        (ii)   **four** functions of piston rings.

(14 marks)

   (c)   Differentiate between two stroke and four stroke engines.

(2 marks)

8. (a) State any **four** safety measures in a workshop. (4 marks)

(b) Outline any **four** house keeping procedures in a workshop. (8 marks)

(c) State where the following types of fire extinguishers can be used:

(i) water type extinguisher;
(ii) carbon dioxide extinguisher.

(4 marks)

(d) Explain any **four** emergency procedures carried out during a fire break out in a workshop. (4 marks)