2705/104   2709/104
2707/104   2710/104
SURVEYING I AND WORKSHOP
TECHNOLOGY I (MECHANICAL)
June/July 2016
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN BUILDING CONSTRUCTION
DIPLOMA IN CIVIL ENGINEERING
DIPLOMA IN ARCHITECTURE
MODULE I

SURVEYING I AND WORKSHOP TECHNOLOGY I (MECHANICAL)

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
    Drawing instruments;
    Scientific calculator;
    Answer booklet.
*This paper consists of **EIGHT** questions in **TWO** sections; A and B.*
*Answer **FIVE** questions choosing at least **TWO** questions from section A,*
***TWO** questions from section **B** and **ONE** question from either sections.*
All questions carry equal marks.
Maximum marks for each part of a question are as shown.
Candidates should answer the questions in English.

This question paper consists of 4 printed pages.

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

    Turn over

SECTION A: SURVEYING I

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

1. (a) Define the following terms:

    (i)   contour interval;
    (ii)   horizontal equivalent;
    (iii) contour line.   (6 marks)

    (b) Outline **two** uses of contours.   (4 marks)

    (c) With the aid of sketches, discuss the **two** methods of contouring.   (10 marks)

2. (a) Differentiate between ordinary spirit levelling and precise levelling in terms of the staffs used.   (6 marks)

    (b) With the aid of a sketch, explain the procedure in reciprocal levelling.   (9 marks)

    (c) During a reciprocal levelling exercise the following observations were made at either sides of the river bank at point X, 1.470 and 3.52 and at point Y, 0.516 and 2.620 for point A and B respectively.
    Calculate the true difference in level between A and B.   (5 marks)

3. During fly levelling, the following notes were taken

    B.S = 0.62, 2.05, 1.42, 2.63 and 2.42 metres
    F.S = 2.44, 1.35, 0.53 and 2.41 metres

    The first back sight was taken on a benchmark of reduce level 100.00 metres. From the last B.S it is required to set 4 pegs each at distance of 30 metres on a rising gradient 1 in 200.

    (i)   Reduce the levels using the rise and fall methods.
    (ii)   Determine the staff readings on the pegs.
    (iii) Apply the arithmetic check.   (20 marks)

4. (a) Outline **four** types of surveys.   (8 marks)

    (b) Table 1 shows a record of staff readings taken during a levelling exercise. The first reading was taken on a benchmark of reduced level 100 metres.
    (i)   Reduce the staff readings using the height of collimation method.
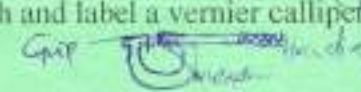   (ii)   Apply all the arithmetic checks.   (12 marks)

Table 1

B.S.	I.S	F.S	Remarks
1.663			BM 100.00
	2.946		
	2.008		
	2.153		
3.787		2.585	
	3.270		
	2.218		
		1.646	

SECTION B: WORKSHOP TECHNOLOGY I (MECHANICAL)

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

5. (a) Outline **four** personal safety measures to be observed in a workshop.   (8 marks)

   (b) Sketch and label a vernier calliper.   (4 marks)

   (c) List:

     (i) **two** causes of fire in a workshop;

     (ii) **two** house keeping precautions taken in a workshop.   (4 marks)

   (d) Explain **two** disadvantages of using carburettor in a petrol engine.   (4 marks)

6. (a) State **four** advantages of centrifugal pump.   (4 marks)

   (b) Define the term priming as used in pumps.   (2 marks)

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

   (d) State **four** advantages of indirect injection for diesel engines.   (4 marks)

   (e) State any **four** advantages of indirect injection for diesel engines.   (4 marks)

7. (a) Describe the following hand tools, stating where each one is used:

   (i)   ball peen hammer;
   (ii)   claw hammer;
   (iii) mallet;
   (iv)   body hammer.   (8 marks)

   (b) State the basic purpose of a file.   (1 mark)

   (c) Explain the use of the following punches:

   (i)   centre;
   (ii)   prick;
   (iii) pin.   (6 marks)

   (d) State **five** factors to be considered when determining the correct speed and feed
       rates in a lathe machine.   (5 marks)

8. (a) Differentiate petrol engine from diesel engine.   (4 marks)

   (b) State **four** components of a reciprocating pump.   (4 marks)

   (c) Discuss the **four** stroke petrol engine.   (12 marks)

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